

Commonwealth of Pennsylvania



Comment and Response Document

**For the General Plan Approval and/or General Operating Permit for
Unconventional Natural Gas Well Site Operations and Remote Pigging
Stations (BAQ-GPA/GP-5A)**

**And the Revisions to the General Plan Approval and/or General
Operating Permit for Natural Gas Compressor Stations, Processing
Plants, and Transmission Stations (BAQ-GPA/GP-5)**

And the Revisions to the Air Quality Permit Exemptions (275-2101-003)

Part 1 of 2

**FINAL
June 2018**

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Introduction

On February 4, 2017, the Pennsylvania Department of Environmental Protection (Department or DEP) published notice in the *Pennsylvania Bulletin* of the availability of the proposed General Plan Approval and/or General Operating Permit for Unconventional Natural Gas Well Site Operations and Remote Pigging Stations (“BAQ-GPA/GP-5A” or “GP-5A”), proposed revisions to the General Plan Approval and/or General Operating Permit for Natural Gas Compressor Stations, Processing Plants, and Transmission Stations (“BAQ-GPA/GP-5” or “GP-5”) and proposed revisions to the Air Quality Permit Exemptions document (“275-2101-003” or “Exemptions List”) for public review and comment. ([47 Pa.B. 733](#)). The public comment period was originally scheduled to close on March 22, 2017. However, due to increased public and legislative interest, the comment period was extended until June 5, 2017. ([47 Pa.B. 1235](#))

This Comment and Response Document summarizes the comments submitted to DEP from 9,357 individuals and organizations during the public comment period on the above documents and provides the Department’s responses to those comments. Generally, this document is organized such that each comment and response is grouped according to topic. Each comment is followed by an identifying number for each commentator that provided comment. Where commentators have endorsed the comments filed by others, the supporters have been added under the appropriate comments. A list of commentators, including names and affiliations, if any, is provided in Appendix A – Commentator Matrix. Of the total number of commentators, the names of 180 were illegible. In addition, 238 anonymous comments were submitted. However, these comments are also addressed in this document.

Abbreviations and Acronyms

A/F	Air-to-Fuel
AVO	Auditory, Visual, and Olfactory Inspections
BAT	Best Available Technology
bhp	Brake Horsepower
BMP	Best Management Practices
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CPI	Consumer Price Index
DEA	Diethanolamine
DEP	Pennsylvania Department of Environmental Protection
EGR	Exhaust Gas Recirculation
EPA	U.S. Environmental Protection Agency
g/bhp-h	Grams per Break Horsepower-Hour
GHG	Greenhouse Gas(es)
GP	General Plan Approval/General Operating Permit
GP-5	General Plan Approval/General Operating Permit for Natural Gas Compressor Stations, Processing Plants, and Transmission Stations
GP-5A	General Plan Approval/General Operating Permit for Unconventional Natural Gas Well Site Operations and Remote Pigging Stations
H ₂ O	Water
H ₂ S	Hydrogen Sulfide
HAP	Hazardous Air Pollutant
HCHO	Formaldehyde
GPU	Gas Production Unit
MEA	Monoethanolamine
Mcf	Thousand Cubic Feet
MMBtu	Million British Thermal Units
MMBtu/h	Million British Thermal Units per Hour
N ₂	Molecular Nitrogen
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGL	Natural Gas Liquids
NGStar	The Natural Gas Star Program
NMNEHC	Non-Methane, Non-Ethane Hydrocarbon
NO	Nitric Oxide
NO ₂	Nitrogen Dioxide
NOX	Oxides of Nitrogen
NSCR	Non-Selective Catalytic Reduction
NSPS	New Source Performance Standards
OGI	Optical Gas Imaging Camera
PennDOT	Pennsylvania Department of Transportation
PM	Particulate Matter
PM _{2.5}	Particulate Matter with an Aerodynamic Diameter Less Than 2.5 Microns

Abbreviations and Acronyms (cont.)

PM10	Particulate Matter with an Aerodynamic Diameter Less Than 10 Microns
ppmdv	Parts Per Million, Dry, by Volume
ppmv	Parts Per Million by Volume
PRO	Partner Reported Opportunities
PTE	Potential to Emit
RACT	Reasonably Available Control Technology
RBLC	RACT/BACT/LAER Clearinghouse
REC	Reduced Emission Completion
RFD	Request for Determination
scf	Standard Cubic Feet
SCR	Selective Catalytic Reduction
SI RICE	Spark Ignition Reciprocating Internal Combustion Engine
SO ₂	Sulfur Dioxide
SO _x	Oxides of Sulfur
THC	Total Hydrocarbons
tpy	Tons Per Year
TSD	Technical Support Document
VOC	Volatile Organic Compound

Public Comment Process

Comment 1: Several commentators suggest that the Department provide a second round of public comment on the final draft versions of the GP-5 and GP-5A (hereinafter “General Permits”). (931, 945, 987, 994, 1047, 1053, 1054)

Response: The Department re-proposed the General Permits and the Exemptions List on March 31, 2018, providing the requested second round of public comment.

Requests to Maintain the Current Exemption 38 and Existing GP-5

Comment 2: The commentators recommend maintaining Category Number 38 (“Exemption 38”) of the current Exemptions List because, as proposed, the GP-5A will require operators to apply for the air quality general permit in conjunction with other required permits during the drilling phase of operation. The current system is working to protect the environment and allow the industry to be competitive with operations in other states. The Department has not provided adequate rationale for removing Exemption 38 as the primary authorization process for natural gas facilities.

Also, the details of air emissions sources on the well pad are likely unknown at this stage of development resulting in an undue burden on both operators and the Department from continual amendments to the application as changes are made to sources based on evolving knowledge of actual operational conditions. This would require an operator to submit an inaccurate application and subsequent modification requests; this can result in additional construction delays and expose the permittee to notices of violation (NOV), civil penalties, and enforcement actions. The commentators recommend that the Department maintain Exemption 38 with minor modifications instead of finalizing the GP-5A while addressing remote pigging facilities through a general permit. (227, 302, 707, 715, 853, 867, 871, 903, 904, 908, 916, 919, 921, 928930, 934, 935, 939, 945, 952, 957, 961, 972, 978, 981, 987, 990-992, 994, 995, 999, 1003, 1046-1048, 1050, 1053-1056)

Response: The Department is moving to a general permit from Exemption 38 to reduce confusion and improve industry’s compliance rates with the regulatory requirements. Permitting for appropriate sources will provide more transparency and assurance to the public. In addition, some operators have expressed a preference for the certainty that a general permit provides, as opposed to the prior permit exemption.

Through the implementation of Exemption 38, the Department discovered a high non-compliance rate. For example, between August 2013 and February 2017, over 3,000 wells were drilled and 28% of owners or operators of these well sites failed to comply with all of the conditions of the exemption criteria. This was unexpected considering the outreach conducted for the use of Exemption 38. The conditions for eligibility under Exemption 38 are significantly more stringent than other categories in the Exemptions List. It is likely that these numerous conditions contributed to the confusion over the compliance requirements for Exemption 38. Additionally, operators have underreported the emissions from remote pigging operations which led DEP to include these operations in the GP-5A.

The development of general permits for these sources in Pennsylvania is not unique. Several states, including Alaska, Louisiana, Texas, Ohio, West Virginia, and Colorado, have general permits for oil and gas production facilities in place. Operators of well pads in Pennsylvania who operate in these states have been authorized through general permits.

The Department has included a conditional permit exemption in revised Exemption 38(b) and Exemption (38c) for certain activities at conventional and unconventional sites, including temporary activities such as site preparation, well drilling, hydraulic fracturing, completion, work-over activities and associated temporary flaring operations.

The requirements in the revised Exemption 38 and in GP-5A are based on updates to the federal requirements. Certain requirements that were redundant with federal requirements have been removed. DEP has also updated certain requirements based on experience with the current GP-5 which will further reduce air emissions.

Comment 3: The commentators contend that the previous GP-5 has served the Commonwealth effectively by striking an appropriate balance between the interests of industry and community stakeholders. They also recommend that the only modification to the proposed GP-5 should be the inclusion of pigging operations as a source and including remote pigging stations as an applicable facility under GP-5 or its own category of general permit.

The commentators contend that while a general permit is necessary for the midstream operations conducted in Pennsylvania the proposed GP-5 no longer resembles a general permit, but rather an individual permit. Several provisions of the general permits are not supported by law or fact and fail to meet the commons standards for general permits. For example, as demonstrated by the Department's Air Emissions Inventory, the emissions from midstream operations in the Commonwealth do not support the restrictive terms and conditions in the proposed GP-5. (227, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department disagrees with the contention that the proposed general permits are not supported by law or fail to meet the standards for general permits. Both the proposed and final General Permits include all applicable terms and conditions as required by the Pennsylvania Air Pollution Control Act (APCA) and 25 Pa. Code § 127.621.

The definition of a Remote Pigging Station is given in both the final GP-5A and the Technical Support Document (TSD). Remote Pigging Stations were included in the applicability for the final GP-5A because they are generally small, isolated facilities similar to unconventional natural gas well sites.

Updated federal regulations were promulgated for the natural gas midstream compression and processing industry covered by the previous GP-5. Also, the Department has the obligation to ensure that the terms and conditions of a general permit must consider the best available technology (BAT) to minimize emissions to the maximum extent possible (see 25 Pa. Code § 127.1). The final GP-5 includes both the updated applicable requirements and the updated BAT requirements; the BAT determinations are documented in the TSD.

Grandfathering Existing Sources

Comment 4: The commentators recommend that the final Exemption 38 and general permits should only apply prospectively. Existing unconventional natural gas well sites should remain exempt from permitting under Exemption 38 unless and until a qualifying change is made at the site. The Department should confirm that, if issued, the general permits will not apply to currently permitted facilities,

facilities with pending applications, or modifications at existing facilities operating under Exemption 38 or GP-5. (853, 867, 871, 908, 931, 934, 939, 945, 978, 987, 994)

Response: The Department concurs that revisions to GP-5 and Exemption 38 apply prospectively. Existing unconventional well sites and associated equipment that are authorized to operate under the conditional exemption criteria dated August 10, 2013 remain exempt from permitting unless a new well is drilled at the existing well site, an existing well is hydraulically refractured, new equipment is added, or existing equipment is reconstructed or modified. In these events, the owner or operator must meet the exemption criteria under Exemption 38(c), submit and obtain approval of a Request for Determination (RFD), or apply for and receive authorization to use GP-5A.

While DEP agrees that the conditions revised in the June 9, 2018 version of GP-5 are not applicable to facilities permitted prior to August 8, 2018, the conditions are applicable to modifications after that date. The Department intends to issue final action on pending applications prior to August 8, 2018.

Comment 5: The commentators strongly support replacing Exemption 38 of the Exemptions List with a general permit for unconventional natural gas well sites. The requirements proposed in GP-5A are more protective and comprehensive than those contained in Exemption 38, and using the permit mechanism will provide greater certainty and oversight. Part of this oversight is in the preconstruction authorization for sources in GP-5A where Exemption 38 allowed operators to only demonstrate compliance six months after facilities were in operation. Changing to GP-5A provides potential for emissions reductions and cost savings.

The commentators recommend rescinding Exemption 38 because it is not satisfactory to merely remind operators of unconventional natural gas wells constructed since August 10, 2013 that they are subject to 40 CFR Part 60 Subpart OOOO. The Department is responsible under Pennsylvania's State Implementation Plan (SIP) for enforcing the federal regulations, and has done the right thing for new or modified construction by codifying this obligation under the GP-5A. The Department must finish the job by applying the GP-5A to existing wells. (3, 6-8, 11-14, 20, 22, 24, 25, 27, 28, 29, 31, 35, 38-40, 43-45, 48, 49, 51-53, 55, 57, 59, 60, 63, 64, 67, 70-72, 74-76, 78, 79, 82, 84-86, 89-94, 96, 99, 101-104, 107-109, 111, 113, 116, 117, 119, 121, 122, 126-129, 133-135, 137, 139, 140, 142, 143, 148, 150-152, 155-159, 162, 165, 166, 168, 173-176, 178-180, 183-185, 187-190, 192-196, 199, 200, 202-204, 207-219, 224, 228-230, 234, 235, 237, 239, 241, 242, 244, 245, 247, 250, 251, 253, 257, 258, 261-270, 274-280, 283, 289, 291-294, 297-300, 300, 305, 308-310, 312, 314-317, 319, 321, 322, 325-327, 329, 332, 336, 337, 339, 343, 344, 347-349, 351, 352, 354, 357, 358, 360, 367, 369, 371-373, 376, 380, 384-387, 390, 391, 393, 398, 400, 401, 403, 404-406, 409, 412, 414, 418, 419, 421, 423, 425, 429-431, 434, 436, 439-441, 445, 448, 450, 451, 454-459, 461, 462, 464, 466, 468, 470, 474, 475, 478, 479, 481, 485, 487, 488, 490, 493, 495, 497, 499, 501, 504, 506-512, 515, 516, 519, 521-523, 527, 528, 531, 532, 534, 537-539, 543, 544, 547-549, 552-554, 556-559, 561, 563, 565-567, 572, 573, 575, 577-580, 582, 583, 586-588, 590, 595, 599, 600, 602-604, 607, 608, 611, 612, 616, 617, 619, 620, 622-624, 627, 630, 633-635, 638, 641-643, 645-649, 651, 653, 656-659, 661-664, 667-669, 671-673, 677, 679-683, 687-689, 691-694, 699-705, 709, 712-714, 717-721, 723-726, 728, 730-732, 735, 737-739, 744, 745, 747, 749, 750, 753, 755, 756, 759-763, 765, 767, 768, 773-775, 780, 786-788, 791-794, 796, 798, 799, 805, 808, 813, 815-817, 819-824, 828-837, 845, 846, 849-852, 1004, 1008, 1009, 1018-1021, 1023, 1027, 1029-1034, 1037, 1039-1042, 1057-2228)

Response: The Department appreciates the commentators' support. However, based on the comments received, the Department revised the Exemptions List and republished it for comments on March 31,

2018. The Department maintains an exemption for temporary activities and insignificant emissions sources. Existing sources are covered under either Exemption 38(a) or Exemption 38(b) based on the date of construction, unless they trigger a modification by installing a new source, drilling or fracturing a new well, or fracturing or refracturing an existing well. A modified facility will be required to meet the conditions of Exemption 38(c) and, if unable, obtain authorization from the Department.

Although a source may be exempt from the plan approval and operating permit requirements of 25 Pa. Code Chapter 127, the source is subject to all other applicable air quality regulations. The Exemptions List does not exempt sources from compliance with emission limitations, work practice standards, and other applicable requirements contained in Title 25 of the Pa. Code. This requirement can be found in Section D (4) of the Exemptions List under “Further Qualifications Regarding Plan Approval Exempted Sources.”

The Department believes that the final criteria of conditional Exemption 38 are protective of public health and allow for the development of the natural gas industry in a safe and effective manner.

Comment 6: The commentator identifies a loophole in the Exemptions List created by the statement “This amended guidance document is applicable to sources that will be constructed as new or modified sources after the effective date of the document. It does not apply to sources that were constructed or modified prior to the effective date of this guidance document and operating lawfully without a permit.” The commentator recommends requiring all existing and future facilities to meet the applicable criteria, especially facilities subject to Exemption 38. (1020)

Response: The Department considers the types and quantities of emissions before placing a source or class of sources on the Exemptions List. Prior to 2013, oil and gas exploration and production sources were unconditionally exempt because emissions were determined to be insignificant. Since the Marcellus Shale boom, beginning in 2008, the number of facilities and type of drilling techniques changed. The Department then created a conditional exemption for unconventional natural gas well sites in August 2013 to further minimize emissions from these types of sources. GP-5A will further reduce emissions from these facilities. Conventional natural gas wells will remain unconditionally exempt from plan approval and operating permit.

On October 27, 2016, EPA issued Control Techniques Guidelines (CTG) for volatile organic compound (VOC) emissions from existing oil and gas sources identifying the Reasonably Available Control Technology (RACT) requirements. The Department is required to develop regulations to implement CTG for existing sources. The rulemaking for existing sources will be proposed for public comment prior to its promulgation. Although a source may be exempt from the plan approval and operating permit requirements of 25 Pa. Code Chapter 127, the source is subject to all other applicable air quality regulations. The Exemptions List does not exempt sources from compliance with emission limitations, work practice standards, and other applicable requirements contained in 25 Pa. Code, including federal requirements.

Comment 7: The commentator states that the Department will need to develop a RACT regulation for VOC emissions from existing oil and gas sources under the CTG issued by U.S. EPA on October 27, 2016. This regulation will have the co-benefit of reducing methane emissions from these existing sources. The Department must present a revised SIP document incorporating the RACT regulations to U.S. EPA by October 27, 2018. Until the Department develops an emission control regulation for new and existing conventional and existing unconventional natural gas sites, the Department’s ability to

control fugitive emissions is limited. (3-14, 17, 18, 20-22, 24, 25, 26, 2836, 38-40, 42-49, 51-53, 55, 57, 59-61, 63-65, 67, 69-72, 74-79, 82-86, 89-99, 101-104, 106-109, 111113, 116-119, 121-145, 147, 148, 150-153, 155-169, 172-176, 178-200, 202-205, 207-219, 221-225, 228231, 234, 235-245, 247, 250, 251, 253-258, 261-280, 283, 285, 287-300, 303-305, 308-310, 312, 314-322, 324-339, 342-344, 347-349, 351-354, 356-358, 360, 362, 363, 365-380, 384-387, 389-391, 393-406, 408, 409, 411-415, 417-419, 421, 423-425, 427-436, 439-442, 444-446, 448-459, 461-470, 474, 475, 477-481, 484-488, 490-502, 504-517, 519-534, 536-544, 546-550, 552-554, 556-563, 565-569, 571-580, 582, 583, 585-591, 593-595, 599-604, 606-613, 616-620, 622-624, 627-631, 633-639, 641-649, 651-665, 667-674, 677-683, 685-689, 691-706, 708, 709-714, 717-728, 730-733, 735-745, 747, 749, 750, 752-756, 759-763, 765-771, 773-776, 779-783, 786-799, 802, 806-809, 811, 813, 815-817, 819-825, 827-839, 842, 845, 846852, 1004, 1008, 1009, 1011, 1014, 1015, 1017-1019, 1021-1023, 1027, 1028, 1030, 1031, 1033, 1034, 1037-1039, 1040, 1042, 1057-2335, 3333-8683)

Response: On October 27, 2016, EPA issued CTG for VOC emissions from existing oil and gas sources identifying the RACT requirements. The Department is required to develop regulations to implement CTG for existing sources. The rulemaking for existing sources will be proposed for public comment prior to its promulgation.

Conventional Operations

Comment 8: The commentators are concerned that the Department may propose a general permit for conventional operations. One commentator states that the proposed GP-5A includes conditions that are overly complex, cost-prohibitive, and unnecessary for conventional operations. The commentators stress that there are differences between conventional and unconventional operations relative to controlling methane. The commentators are not only submitting comments regarding the proposed GP-5A, but also submitting comments to educate the Department on how conventional operations are different from unconventional operations and why the proposed GP-5A is inappropriate for conventional operations.

One major difference is the scale and duration of post-stimulation flowback with conventional wells typically completing flowback within 24 hours compared to unconventional wells taking on average seven days. This difference in duration makes it impossible for a conventional operator to recoup the cost of using a completion combustion device or reduced emissions completion equipment. Another is the typical arrangement of equipment such as compressors and storage tanks; often this equipment is centralized at a location other than the well pad and services more than one well pad. Conventional wells also produce gas at very low pressure, starting at several hundred psi and quickly reducing to single or double digits.

Conventional wells are also generally small, family-owned businesses with limited staff and resources. Most do not have the in-house technical expertise necessary to comply with the proposed general permits, nor the funds to hire outside experts. (1044, 1055)

Response: The final GP-5A is only applicable to unconventional natural gas well sites and remote pigging stations. The final Exemption 38(c) unconditionally exempts conventional well sites from permitting. However, nothing in Exemption 38(a), Exemption 38(b), or Exemption 38(c) relieves the Responsible Official from the obligation to comply with all applicable federal, state, and local laws and regulations.

Authority to Regulate

Comment 9: The commentators state that under the APCA the Department has the authority to regulate “air contaminants,” “air contamination,” “air contamination sources,” and “air pollution.” The Department does so by issuing a plan approval to authorize the construction, assembly, installation, or modification of or an operating permit to authorize operation of any stationary air contamination source. The APCA also authorizes the issuance of a general plan approval and general operating permit “for any category of stationary air contamination source if [the Department] determines that the sources in such category are similar in nature and can be adequately regulated using standardized specifications and conditions.”

However, the Department does not have the authority to regulate methane emissions from oil and gas facilities because they do not “cause” “air pollution” as the term “air pollution” is defined under the APCA. The commentators emphasize that to be “air pollution,” emissions must be “...in such place, manner, or concentration inimical or which may be inimical to the public health, safety, or welfare or which is or may be injurious to human, plant, or animal life or to property or which unreasonably interferes with the comfortable enjoyment of life or property...” Methane, unlike lead, mercury, particulate matter, and various other conventional pollutants, does not meet the conditions stated in the APCA.

Further, the Pennsylvania legislature must have had only direct effects in mind when it enacted the APCA in 1959, intending to regulate conventional pollutants and not “air contaminants” whose primary danger is predicated on cumulative worldwide emissions contributing to climate change under modern scientific theories. The APCA does not grant the Department authority to regulate greenhouse gases (GHG), nor has the Department previously done so to combat climate change. Even if it is conceded that the Department may consider climate change a public health threat, it is questionable whether methane emissions from individual oil and gas facilities can be said to “cause” this type of pollution as at best they can be said to “contribute” to climate change. (853, 867, 871, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department disagrees with the commentators’ contention that the Department lacks the authority to regulate methane emissions from oil and gas facilities because they do not “cause” “air pollution” as that term is defined under the APCA. Methane, as a greenhouse gas, is regulated under the federal Clean Air Act (CAA) as well as the APCA.

Because methane is a gas, it falls within the definition of “air contaminant,” and “air contamination” under the APCA. “Air contaminant” is defined as “[s]moke, dust, fume, gas, odor, mist, radioactive substance, vapor, pollen or any combination thereof.” 35 P.S. § 4003. While “air contamination” is defined as “[t]he presence in the outdoor atmosphere of an air contaminant which contributes to any condition of air pollution.” *Id.* Because the sources regulated under GP-5 and GP-5A emit methane they fall within the definition of “air contamination source” under the APCA which is “[a]ny place, facility or equipment, stationary or mobile, at, from or by reason of which there is emitted into the outdoor atmosphere any air contaminant.” 35 P.S. § 4003.

Methane also meets the definition of “air pollution” as that term is defined under the APCA based on current scientific data. “Air pollution” is defined as “[t]he presence in the outdoor atmosphere of any form of contaminant ... in such place, manner or concentration inimical or which may be inimical to the public health, safety or welfare or which is or may be injurious to human, plant or animal life or to

property or which unreasonably interferes with the comfortable enjoyment of life or property.” 35 P.S. § 4003.

In 2009, based on a large body of compelling scientific evidence, the EPA Administrator issued an “Endangerment Finding” under CAA section 202(a)(1) related to Greenhouse Gases.¹ EPA found that six well-mixed GHG — carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride — endanger both the public health and the public welfare of current and future generations by causing or contributing to climate change. New scientific assessments and observations strengthen the conclusions of this Endangerment Finding that GHG endanger public health and the environment.² Methane traps 86 times more heat in the atmosphere than carbon dioxide in the short-term, fast-tracking the consequences of catastrophic climate change. Methane is often accompanied by toxic air pollutants such as benzene, formaldehyde and ethylbenzene.

Methane is also a precursor to ground level ozone, which can cause a number of harmful effects on health and the environment. Exposure to ozone can cause respiratory system effects such as difficulty breathing and airway inflammation. *Id.* In addition, long-term exposure to ozone is likely to result in harmful respiratory effects, including respiratory symptoms and the development of asthma. *Id.*

Studies have indicated that shale gas development is associated with the production of secondary pollutants such as tropospheric (ground-level) ozone, which is formed through the interaction of methane, VOCs, and NO_x in the presence of sunlight. (Jerrett M, Burnett RT, Pope CA III, Ito K, Thurston G, Krewski D, et al. 2009. Long-term ozone exposure and mortality. *N Engl J Med* 360:1085-1095. U.S. EPA Integrated Science Assessment for Ozone and Related Photochemical Oxidants (EPA 600/R-10/076F) Available at: <http://www.epa.gov/ncea/isa/ozone.htm> [accessed 9 May 2018]). Tropospheric ozone is a strong respiratory irritant associated with increased respiratory and cardiovascular morbidity and mortality (Jerrett et al. 2009). Although toxicological data suggest that pure methane is not by itself health damaging (excluding its role as an asphyxiant and an explosive), it is a precursor to global tropospheric ozone (Smith KR, Jerrett M, Anderson HR, Burnett RT, Stone V, Derwent R, et al. 2009. Public health benefits of strategies to reduce greenhouse-gas emissions: health implications of short-lived greenhouse pollutants. *Lancet* 374:2091-2103.)

Based on all the information reviewed by the Department above, which the Department agrees with, adopts as its own, and incorporates by reference into this General Permit package, methane meets the definition of air pollution under the APCA, because as a GHG and ozone precursor, it is, among other things, inimical or may be inimical to the public health, safety or welfare.

The commentators fail to point to any specific language in the APCA that limits the Department’s ability to regulate conventional pollutants only. To the contrary, the definitions of “air contamination” and “air pollution” do not limit the Department’s legal authority in the way described by the commentators. Rather, the General Assembly was concerned with air pollution generally and that it be remedied no matter what the source. *See* 35 P.S. § 4002. Pennsylvania courts have found that the regulation of air pollution has long been a valid public interest. *See e.g., Bortz Coal Co., v. Commonwealth*, 279 A.2d 388, 391 (Pa. Cmwlth. 1971); *DER v. Pennsylvania Power Co.*, 384 A.2d 273, 284 (Pa. Cmwlth. 1978); *Commonwealth v. Bethlehem Steel Corporation*, 367 A.2d 222, 225 (Pa. 1976). Moreover, the

¹ “Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act,” 74 FR 66496 (December 15, 2009) (“2009 Endangerment Finding”).

² “Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources,” 81 FR 35824 (June 3, 2016).

Commonwealth Court has endorsed the Department's position that the General Assembly, through the APCA, gave the agency the authority to reduce GHG emissions. *Wolf v. Funk*, 144 A.3d 228, 250 (Pa. Cmwlth. 2016).

As stated by the commentators, the Department is authorized to issue a plan approval and operating permit to facilities that emit air contaminants under the APCA. The Department has developed these general permits to reduce the administrative burden on both industry and the Department by offering an alternative to the case-by-case determinations of the standard plan approval and operating permit program. As the commentators' state, the Department may opt to create a general plan approval and general operating permit for categories of sources that "...can be adequately regulated using standardized specifications and conditions." The final general permits detail these specifications and conditions. Owners and operators may, at their discretion, opt to undergo a case-by-case determination if these specifications and conditions may not be met for their individual facility.

The Department's authority to issue general permits is Section 6.1(f) of the APCA, 35 P.S. § 4006.1(f) and 25 Pa. Code Chapter 127, Subchapter H (relating to general plan approvals and general operating permits). In the case of the air contamination sources identified under GP-5 and GP-5a, and as required under Section 6.1(f), the Department determined that the sources are similar in nature and can be adequately controlled using standardized specifications and conditions through the general permit process. Both GP-5 and GP-5a control, among other things, methane emissions from natural gas compressor and processing facilities, and natural gas wellhead facilities.

The APCA specifically provides that "the Department is authorized to require that new sources demonstrate in the plan approval application that the source will reduce or control emissions of air pollutants, including hazardous air pollutants, by using the best available technology." 35 P.S. § 4006.6(c). Because general permits apply to new or modified air contamination sources, they establish BAT requirements and authorize the construction or modification of a source that meet the BAT requirements established under 25 Pa. Code §§ 127.1 and 127.12(a)(5). This requirement also extends to greenhouse gases like methane. *See Snyder v. DEP*, 2015 EHB 027. Both GP-5 and GP-5A establish BAT requirements to control methane emissions.

It is not correct to say that the establishment of BAT in these General Permits is the first that the Department is controlling GHG emissions. For instance, the Department is currently controlling methane emissions under Exemptions 33 and 38 of the Exemptions List. The Department is also controlling GHGs under *Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule* which mitigates GHG emissions from new and modified air contamination sources. 75 Fed. Reg. 31514. Pennsylvania implements these GHG requirements through its Prevention of Significant Deterioration of Air Quality (PSD) program under 25 Pa. Code Chapter 127, Subchapter D and Title V Operating Permits program under 25 Pa. Code Chapter 127, Subchapter G.

Comment 10: The commentators state that absent a federal standard or statutory authority to establish methane limits, the required control devices, extensive reporting requirements, and other provisions deviate from minor permit revisions and constitute changes that are akin to regulatory action. The Regulatory Review Act of 1982 (RRA) was enacted to address the lack of transparency, accountability, and judicious use of regulatory authority that the Department is showing as it seeks to advance complex and costly new regulations as permits.

The Department has circumvented the appropriate protocol for promulgating regulations by not subjecting them to the statutorily required comment periods, legislative review, and review by the Independent Regulatory Review Commission (IRRC). The Department has also failed to provide information vital to the rulemaking process including a statement of the need for the regulation, a cost-benefit analysis, and a description of the data upon which the regulations are based, including how the data was obtained and why the data is acceptable.

The commentators state that GP-5A is only going through a public comment process and is not going before the Environmental Quality Board (EQB) or the IRRC, nor has the House and Senate Standing Committees and the Attorney General's office had a chance to review, provide input, and approve or deny the General Permits.

The commentators state that there was insufficient dialogue with the industry prior to the publication of the proposed general permits. During the comment period, meetings were arranged; however, as the information on the dates, participants, and topics discussed are secret, it is not possible to determine whether the information gathered by the Department is representative of the stakeholders. (227, 302, 472, 862, 903, 910, 916, 928, 930, 931, 934, 936, 937, 939, 943, 945, 946, 952, 960, 961, 964, 967, 972, 974, 976, 981, 987, 991, 994, 999, 1046-1048, 1051-1054, 1056)

Response: The Department is not promulgating a regulation to control methane emissions. As a result, the provisions of the RRA and the corresponding sections of the APCA do not apply to this action. The Department has developed General Permits that control methane emissions through the general permit process. The general permit program and process is authorized under Section 6.1(f) of the APCA, 35 P.S. § 4006.1(f) and its implementing regulations under 25 Pa. Code Chapter 127, Subchapter H. The DEP is also authorized to require that new sources demonstrate in the plan approval application that the sources will reduce or control emissions of air pollution using BAT. The APCA specifically provides that “the Department is authorized to require that new sources demonstrate in the plan approval application that the source will reduce or control emissions of air pollutants, including hazardous air pollutants, by using the best available technology.” 35 P.S. § 4006.6(c). Because General Permits apply to new or modified air contamination sources, they establish BAT requirements and authorize the construction or modification of a source that meet the BAT requirements established under 25 Pa. Code §§ 127.1 and 127.12(a)(5).

Section 504(d) of the CAA allows the permitting authority, after notice and opportunity for public hearing, to issue a general permit covering numerous similar sources. 42 U.S.C. § 7661c(d).

Pennsylvania's General Plan Approvals and Operating Permits Program is being implemented in a manner consistent with the existing legislative framework established in the APCA and implementing regulations in 25 Pa. Code Chapter 127, Subchapter H. The General Operating Permit and General Plan Approval Programs are federally enforceable elements of the Commonwealth of Pennsylvania's SIP codified at 40 CFR §§ 52.2061(b) and 52.2062 b), respectively. Under the existing legislative framework, the General Assembly mandates that DEP grant authorizations to use general permits within 30 days of receipt of an application seeking authorization to use a general permit.

When the owner or operator of a facility seeks authorization to use either the GP-5 or the GP-5A, the owner or operator must demonstrate to the DEP that the sources they propose to install meets the requirements specified by the General Permit. If the applicant satisfactorily demonstrates that the source would comply with all the terms and conditions of the General Permit, the DEP authorizes the owner or

operator to use the General Permit. Because the terms and conditions of the General Permits cannot be modified during the authorization to use the General Permit, the public comment provisions under 25 Pa. Code § 127.612 are not applicable prior to each authorization to use the General Permit. However, the Department publishes a notice of each authorization to use the General Permit in the *Pennsylvania Bulletin*. Any final decision of the DEP concerning authorizations to use a General Plan Approval or General Operating Permit is appealable to the Environmental Hearing Board.

The process for the GP-5A is no different from the process that all the earlier general permits underwent before they were finalized. Since GP-5 A is a general permit and not a regulation, the draft general permit is not subject to EQB and IRRC reviews. However, the draft General Permits and associated documents (TSD, Application forms) have gone through public review and comment. The draft General Permits were discussed with the Air Quality Technical Advisory Committee (AQTAC), Citizen Advisory Council (CAC), and Small Business Compliance Advisory Committee (SBCAC) members.

The DEP followed the requirements to propose and finalize a general permit under 25 Pa. Code §§ 127.611 and 127.612. This includes a public notice of comment period, which under 25 Pa. Code § 127.612(b)(7) must be at least 45 days. The Department offered 120 days to comment on the proposed terms and conditions. The Department also published its TSD to support the determinations used to establish the terms and conditions of the general permit. In addition, the Department provides this Comment and Response Document (C/R Document) to increase transparency on the changes made to the final General Permits.

The Department met with numerous stakeholders before, during, and after the comment period while developing the General Permits. The Department also offered a second comment period on the revised General Permits beginning March 31, 2018.

Comment 11: The commentators state that the proposed GP-5A is an attempt by the Department to circumvent the Regulatory Review Act. By establishing a requirement with the force of law for sources that emit more than 200 tpy of methane, the Department in effect regulated methane for the first time. In *DEP v. Rushton Mining*, 591 A.2d 1168 (Pa. Cmwlth. 1991, *Rushton*), a number of coal companies challenged “standard conditions” that had been put in each of the companies’ coal mining activity permit. The court adopted the “binding norm” test and held that the standard conditions constituted a binding norm, and as such a regulation and that the Department failed to comply with the Commonwealth Document Law. The commentators argue that the requirements of the proposed GP-5A are akin to “standard conditions” and establish binding norms on the operators. Just because the Department has created 18 other general permits that have not been challenged as a de facto regulation, does not mean the Department did not overstep its authority when creating the proposed general permits. (862, 1055)

Response: *Rushton* is a case where the Department was applying standard conditions to 46 individual coal mining permits that had no regulatory basis. It was not a case where, like here, the Department is issuing for use General Permits under its existing statutory and regulatory authority that allows for the use of standard terms and conditions. The General Permits are being developed under the authority of section 6.1(f) of the APCA (35 P.S. § 4006.1(f)) and section 504(d) the CAA, (42 U.S.C.A. § 7661c(d)), which authorize the establishment of a general permit program to control air contamination sources. The Department’s air quality general permit program was established in Chapter 127, Subchapter H in 1994 at 24 Pa.B. 5899 (November 26, 1994). This program was subsequently approved by the U.S. EPA as part of Pennsylvania’s SIP. See 61 FR 39594 (July 30, 1996). The Department, under section 4(1) of the

APCA, 35 P.S. § 4004(1) is authorized to implement the CAA in Pennsylvania. Furthermore, under section 6.1(f) of the APCA, the Department may grant a general permit to any source category that can be adequately controlled using standardized specifications and conditions. Moreover, all of the standard conditions in the General Permits are based on existing regulatory authority. For instance, the BAT conditions in the General Permits are premised under 25 Pa. Code § 127.1, the reporting conditions are premised under 25 Pa. Code Chapter 135, and the testing requirements are premised under 25 Pa. Code Chapter 139.

Alternatively, applicants may apply to the Department for a plan approval and operating permit instead of seeking authorization to use a general permit.

The regulation requires that all new sources control the emissions to the maximum extent, consistent with BAT as determined by the Department at the time of issuance of a plan approval. 25 Pa. Code § 127.1. BAT is an evolving standard and is defined as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The Department has evaluated various control technologies and determined BAT for specific sources emitting respective pollutants above certain thresholds when a technology was found to be technically and economically feasible.

The Department disputes the implication that the standardized terms and conditions of a general permit constitute a “binding norm” as suggested by the commentators. The use of a general plan approval or a general operating permit is not mandatory. An applicant seeking to authorize their facility may opt instead for a case-by-case plan approval, in which they must demonstrate the case-by-case BAT for methane and all other pollutants emitted by sources at the facility. Also, the operator may be exempt from permitting if the facility qualifies under the Exemptions List.

Comment 12: The commentators state that utilizing a general permit is voluntary; electing to comply with the standardized terms and conditions found in a general permit saves time and is often highly cost effective. Applicants have the option to seek individual permits if they choose or if they cannot comply with the standardized terms and conditions of the general permit. Because the individual permit process provides the Department the discretion to implement or not implement the standardized terms and conditions of the general permit, the terms and conditions do not have the nature of a rule or regulation [DEP v Rushton Mining, 591 A.2d 1168 (Pa. Cmwlth. 1991)].

The commentators state that the procedures used by the Department in proposing the GP-5 and GP-5A have been used consistently for decades. The Department is not required to submit general permits for legislative review, including review by the IRRC. Should the Department’s procedure be invalid, the Department would be required to withdraw all general permits that were issued using the same procedures. This would include eighteen general permits including the current GP-5. (1004, 1009, 1016, 1021, 1027, 1033, 1034, 1037, 1039, 1040)

Response: The Department agrees that the development of GP-5 and GP-5A is valid. On July 30, 1996, EPA codified Pennsylvania’s General Plan Approval and general Operating program in 40 CFR 52.2061 and 52.2062 (relating to operating permits and plan approvals respectively). Section 504(d) of the Clean Air Act (related to permit requirements and conditions) allows the permitting authority, after notice and opportunity for public hearing, to issue a general permit covering numerous similar sources. In addition, 25 Pa. Code § 127.611 (related to general plan approvals and general operating permits) allows the

Department to issue or modify a general plan approval or general operating permit for any category of stationary air contamination source if the Department determines that sources in the category are similar and can be adequately controlled using standardized specifications and conditions. The Department has determined that the sources located at a source category such as natural gas compression and/or processing facilities are a collection similar in nature and can be controlled with standardized specifications and conditions.

In *Rushton*, the Department established standard permit conditions in 46 individual coal mining permits through policy or as an exercise of the Department's adjudicatory power. 591 A. 2d at 1171. Here the Department is establishing standardized terms and conditions, under GPs-5 and -5A, as part of its general permit program, which is explicitly authorized under both the CAA and APCA. 42 U.S.C. § 7661c(d) and 35 P.S. § 4006.1(f). By law the Department can only issue GPs if it determines that a source category can be controlled through standardized terms and conditions. Consequently, *Rushton* is easily distinguishable from what the Department does under its GP program.

Comment 13: The commentator states that the Department has authority under the CAA and the APCA to enforce controls for methane and volatile organic compounds (VOC). The Department will enforce the federal regulations codified at 40 CFR Part 60, Subparts OOOO and OOOOa. These regulations are incorporated into Pennsylvania's regulations upon adoption under 25 Pa. Code Chapter 122.

The commentator states that in a recent press release, Secretary McDonnell acknowledged that natural gas production and pipeline transmission and infrastructure will continue to increase. In the 2014, Air Emissions Inventory, 109,555 tons of methane was reported by unconventional natural gas well sites and midstream facilities; the commentator believes that this value is under-reported. Therefore, the commentator recommends using plan approvals and operating permits to help reduce emissions. (568)

Response: The Department appreciates the commentator's concerns. The Department believes that the final general permits are protective of public health and allow for the development of the natural gas industry in a safe and effective manner. The general permits are only available to non-major facilities; major facilities are required to obtain plan approvals and Title V operating permits.

Comment 14: One commentator asks if there are other industries or sectors that must get a general air permit in order to operate. Another commentator asks why there seems to be many exclusions, such as incinerators, sand blasting units, combustion turbines, and sawmills in the proposed regulations. (931, 940)

Response: Unless a facility qualifies under the Exemptions List, the facility must obtain authorization to construct and operate sources in Pennsylvania. Authorization can be obtained through RFD, a general permit, or a plan approval. The Exemptions List also unconditionally exempts oil and conventional gas production facilities and conditionally exempts unconventional gas production facilities.

Comment 15: The commentators state that the Department is unfairly targeting a portion of a single industry for the regulation of methane emissions. Based on Pennsylvania data, methane emissions from the oil and gas sector are 30.5%. Other sources of methane include enteric fermentation (9.9%), landfills (21.1%), coal mining (30.3%), manure management (2.3%), wastewater management (3.9%), and other activities (2.0%). The commentators state that even though methane emissions from natural gas and oil systems increased threefold since the 1990's, methane emissions from 2009-2013 decreased 0.65% despite unconventional natural gas production increasing by 977%. This shows that much of the

methane emission increase predates the Marcellus Shale gas boom and likely are due to utility distribution lines, which in some cases are nearly a century old. This is because methane is the primary marketable product of the natural gas industry and therefore, operators are diligent in minimizing methane emissions since losses represent lost income.

The commentators state that it is unusual for the Department to establish standards and limitations that apply only to one of multiple sources of methane emissions. Based on U.S. EPA's 2015 Inventory of U.S. GHG Emissions, both conventional and unconventional natural gas production are only 16% of methane emissions while agricultural operations and manure management accounts for 37% of methane emissions. Methane is also emitted by natural sources such as wetlands, animals, organic decay, and natural seeps. (227, 302, 853, 867, 871, 916, 927, 928, 930, 940, 945, 950, 952, 961, 972, 974, 981, 987, 991, 994, 999, 1046-1048, 1051, 1053, 1054, 1056)

Response: DEP's Bureau of Air Quality is responsible for implementing the CAA, APCA, and the rules and regulations promulgated under these acts. Pennsylvania law prohibits the Department from regulating agricultural sources, meaning the methane emissions from agricultural sources are exempt from air quality regulations and permitting requirements. Utility distribution lines are under the jurisdiction of the PA Public Utility Commission (PA PUC). Other sources of methane listed by the commentators have been or will be evaluated independently and permitted through source specific Plan Approvals and Operating Permits.

Based on the 2015 Air Emissions Inventory, Pennsylvania's oil and gas production segment with over 130,000 wells, reported actual VOC emissions of over 795 tpy and methane emissions of 59,000 tpy. Emissions from the oil and gas industry including production, processing, and transmission reported actual VOC emissions of 6,410 tpy.

The GHG inventory in Pennsylvania shows that the largest key sources of anthropogenic methane emissions include natural gas and oil systems (30.5%), coal mining (30.3%), landfills (21.1%), enteric fermentation from domestic livestock (9.9%), wastewater (3.9%), and manure management (2.3%). Of all these major categories, natural gas and oil systems are the only areas that show significant growth, increasing threefold from the 1990s. The other major categories are either flat or slightly down from the 1990s.

Currently there are no federal regulations that require the reduction of methane emissions from coalbeds. While there are technologies available to reduce and use these gases, there are complicating factors relating to widespread use of these technologies. Some of those factors include the gas quality, especially the concentration of methane, and the presence of other contaminants. In addition, methane poses an explosive risk to miners. For these reasons, the DEP did not consider any reduction strategies for this sector.

EPA published regulations that included the reduction of methane from new municipal solid waste landfills on August 29, 2016. EPA also established emission guidelines under 40 CFR Part 60 Subpart Cf for the reduction of methane from existing municipal solid waste landfills on August 29, 2016. These federal regulations are incorporated by reference in 25 Pa. Code § 122.3. The DEP reviewed the federal regulations and how they affect the 44 municipal solid waste landfills in Pennsylvania. The DEP found that existing permit limits for these facilities were already much more stringent than the federal requirement. Therefore, no additional regulation was required.

There are no federal regulations that require the reduction of methane emissions from domestic livestock or manure management. Under Section 4.1 (relating to Agricultural Regulations) of the APCA, DEP is unable to develop rules or regulations on agricultural commodities, including livestock, unless required by the CAA or a regulation promulgated under the CAA. Therefore, DEP did not consider these sources any further as part of the methane reduction strategy.

Currently, the federal regulations related to waste water treatment do not address methane emissions. In fact, the federal regulations only relate to sewage sludge incineration and not the emissions from the water treatment tanks, weirs, or digesters which are the primary sources of methane emissions. Because there are no federal regulations related to methane in the wastewater treatment industry, DEP did not consider these sources any further.

In *Rushton*, the Department established standard permit conditions in 46 individual coal mining permits through policy or as an exercise of the Department's adjudicatory power. 591 A. 2d at 1171. Here the Department is establishing standardized terms and conditions, under GPs-5 and -5A, as part of its general permit program, which is explicitly authorized under both the CAA and APCA. 42 U.S.C. § 7661c(d) and 35 P.S. § 4006.1(f). By law the Department can only issue GPs if it determines that a source category can be controlled through standardized terms and conditions. Consequently, *Rushton* is easily distinguishable from what the Department does under its GP program.

Comment 16: The commentators state that the Department should target other industries for the regulation of methane emissions, such as cattle ranching and factory farming. (219, 3333)

Response: Section 4.1 of the APCA prohibits the Department from regulating agricultural sources, meaning the methane emissions from agricultural sources are exempt from air quality regulations and permitting requirements. 35 P.S. § 4004.1.

Comment 17: The Department must demonstrate a causal link between methane emissions in Pennsylvania and public health effects in Pennsylvania. That is, methane emissions have no measurable impact on public health so they cannot be regulated. (971, 1047, 1053).

Response: This comment is misplaced because the APCA was enacted to protect public health and to prevent air pollution. 35 P.S. § 4002. There is nothing in the APCA to suggest that the Department needs to wait until public health is affected by air pollution before it is required to act in reducing those emissions. Such a result would be antithetical to the purposes of the APCA.

As previously discussed methane is both a GHG and ozone precursor that is or may be inimical to public health or welfare. Furthermore, according the U.S. Energy Information Agency, Pennsylvania was the nation's second-largest natural gas producer for the fourth consecutive year and this industry emits 30.5 percent of all anthropogenic methane emissions in the State, which makes it the largest single category for that pollutant. Based on information from the Department's emission inventory, there are approximately 31,224 sources at 4,960 well pad facilities and 4,285 sources at 493 compressor stations. The overall methane emissions from this source category in 2015 amounted to approximately 123,081 tons in Pennsylvania, which is an increase from 2014 levels. To place this number in context, coal-fired power plants in Pennsylvania emitted 705 tons of NO_x in 2015. One peer-reviewed study indicates that new emissions data suggest that the recently instituted Pennsylvania methane emissions inventory substantially underestimates measured facility-level methane emissions by 10-40 times. See Omara, *et al.*, *Methane Emissions from Conventional and Unconventional Natural Gas*

Production Sites in the Marcellus Shale Basin, Environ. Sci. Technol. 2016, 50, 2099–2107.

Consequently, methane emissions from the natural gas sector are significant and should be addressed by the Department.

The Department finds further support to control methane emissions under both federal and state law. EPA developed several regulations that apply to oil and natural gas production sites, natural gas compression stations, processing plants, and transmissions stations; these are 40 CFR Part 60, Subparts KKK, JJJJ, KKKK, OOOO, and OOOOa and 40 CFR Part 60 Subparts HH and ZZZZ. Some of these regulations require the control of methane emissions from sources at these facilities. Other pollutants that are regulated under these standards include VOCs and hazardous air pollutants (“HAPs”). These regulations apply to all oil and gas operations in the country. The Department is required to implement these federal regulations under Section 4 of the APCA, 35 P.S. § 4004. In addition, these federal regulations are also incorporated by reference into the *Pennsylvania Code* and, as a result, are also Pennsylvania law. *See* 25 Pa. Code §§ 122.1, 124.1, and 127.35(b).

Comment 18: Some commentators contend that the Department may not include BAT determinations in these GPs because BAT is not a CAA concept, and it therefore cannot be used to reduce methane emissions from natural gas facilities. (1047, 1053).

Response: There is nothing under the APCA that limits the Department’s authority to develop BAT requirements to minor sources that are only regulated under the APCA. The Department has been making BAT determinations for all sources – minor and major – in Pennsylvania, since the BAT program was established in 1994. Section 6.6(c) of the APCA provides that “[t]he department is authorized to require new sources demonstrate in the plan approval application that the sources will reduce or control emissions of air pollutants, including hazardous air pollutants, by using the best available technology.” 35 P.S. § 6006.6. The term “air contamination source” is defined as “*any ... facility ... from ... which there is emitted into the outdoor atmosphere any air contaminant.*” 35 P.S. § 4003. Applying the common usage of the word *any* shows that the Department’s authority to require BAT conditions on new sources is unrestricted. *See* 1 Pa. C.S. § 1903(a). Moreover, the Environmental Hearing Board has indicated that the requirement to conduct a BAT analysis for new sources, like natural gas compressor stations, extends to GHGs, including methane. *Snyder v. DEP*, 2015 EHB 027.

Comment 19: Other commentators suggest that the imposition of BAT requirements under the GPs in lieu of U.S. EPA’s NSPS can only be done through the regulatory process. (1047, 1053).

Response: Both the General Assembly and the Environmental Quality Board granted the Department the authority to establish BAT requirements through the plan approval application process. 35 P.S. § 6006.6(c) and 25 Pa. Code § 127.1. No additional legal authority is needed. As previously discussed, BAT requirements can include equipment, devices, methods, or techniques as determined by the Department. 25 Pa. Code § 121.1. BAT is not a regulation, but a technical and economic feasibility analysis that is conducted on a case-by-case basis. Moreover, BAT is not in lieu of the NSPS, but is in addition to the federal standard.

Comment 20: Some commentators contend that section 4.2 of the APCA limits the Department’s authority to require control measures that are no more stringent than those required under the CAA. 35 P.S. § 4004.2. Therefore, any BAT requirement that exceed the NSPS are prohibited under the APCA. (1047, 1053).

Response: The statutory provisions identified by the commentators limit the Environmental Quality Board's authority to promulgate regulations that are no more stringent than those required under the CAA, in certain circumstances. Those provisions do not limit the Department's authority to develop BAT conditions in plan approvals. Consequently, the "no more stringent than" provision doesn't not apply to the Department's actions related to these GPs.

Justification for Exceeding Federal Requirements and Incorporation by Reference

Comment 21: The commentators state that federal regulations applicable to sources in the oil and gas industry were recently promulgated by U.S. EPA after thorough scientific study concerning the need for the regulations and the methods to achieve compliance with the requirements. These regulations were subject to public review and comment. The commentators contend that while the Department conducted scientific studies regarding the emissions from oil and gas facilities, neither the need for more stringent requirements nor an analysis of cost effective methods for achieving compliance were part of those studies.

Examples of the extra stringency added to the proposed general permits that were not adequately supported are the quarterly LDAR requirement for well sites and the 98% control requirement for methane, VOC, and hazardous air pollutants (HAP) from storage vessels and other affected sources. The commentators argue that the more stringent requirements have no benefit to the citizens of Pennsylvania and only serve to raise costs, putting Pennsylvania at a competitive disadvantage with other states. (853, 867, 871, 916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: Pennsylvania Code Title 25 requires that all new sources control the emissions to the maximum extent, consistent with the BAT as determined by the Department at the time of the issuance of a plan approval. BAT is an evolving standard and is defined as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The Department has evaluated various control technologies and determined BAT for specific sources emitting respective pollutants above certain thresholds when a technology was found to be technically and economically feasible. As part of BAT, the Department found that quarterly LDAR requirements are technically and economically feasible. Since 2013, the previous GP-5 required quarterly LDAR requirements for midstream natural gas operations.

However, based on the comments received, the 98% control requirement for methane, VOC, and HAP was revised to a 95% control requirement in the final general permits. While manufacturer-tested models typically achieve significantly greater than 95% control in practice, the control requirement was revised to allow operators to continue to benefit from the manufacturer-tested models in accordance with the federal regulations. This revision avoids additional source testing to demonstrate 98% efficiency, instead relying on the manufacturer's certification list maintained by EPA to demonstrate and maintain compliance under the federal regulations.

BAT is in addition to, and independent of, and not a substitution for the limits established under the NSPS. The NSPS establishes the minimum emission limitation that a permittee must meet. BAT establishes the maximum control that is required to be met as determined by the Department. When the Department establishes BAT it is not changing the NSPS, which is a regulatory requirement set by EPA. Rather it is requiring a permittee to go beyond the NSPS as authorized under the APCA and as required under 25 Pa. Code § 127.1.

Comment 22: The commentators state that the Department should not repeat federal regulatory text within the general permits while incorporating certain federal regulations that are typically applicable to oil and gas operations by reference as is done in Section A, Condition 8. The commentators recommend that the Department should avoid including the detailed language within the permit and simply refer to, cite, or incorporate by reference the specific compliance provisions of the applicable rule.

The commentators argue that the language in the general permits is not the same as the language in the federal regulation. This makes the altered language a stand-alone requirement, effectively duplicating the compliance assurance and increasing the administrative burden with no additional environmental benefit. An example of this is the requirements in Section C, Condition 3 and Section D, Condition 3 to maintain a daily log ‘book.’ In the federal regulation, there are no recordkeeping requirements for the drilling and hydraulic fracturing, and there are no limitations on the format of the records.

The commentators state that another reason to incorporate by reference is that doing so automatically incorporates any future changes to the federal regulations obviating the need to modify the general permits. There will be less uncertainty about interpretations issued for the federal regulations and it removes the dual federal and state requirements created by incomplete replication. (916, 919, 928, 930, 936, 944, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054, 1056)

Response: The Department agrees. In the final general permits, the federal requirements are incorporated by reference unless the requirements are warranted by the Department’s BAT determinations.

Comment 23: The commentators state that if the Department desires complete criteria in a single, standalone document to facilitate implementation, the Department should develop implementation support materials for operators and inspectors. (930, 936, 1052)

Response: If necessary, the Department will update implementation instructions or an FAQ document for the GP-5 and Exemption 38.

Permitting Natural Gas Facilities Under General Permits

Comment 24: The commentators recommend requiring natural gas facilities to obtain individual permits instead of General Permits so that the sources can be adequately regulated and provide for adequate scrutiny from public participation. In addition, the Department must conduct a review of each facility’s application to ensure that the applicant disclosed all planned emission sources and aggregated them for the facility. (15, 27, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 805, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1020, 1021, 1024, 1025, 1027, 1029, 1032-1037, 1040)

Response: The Department disagrees. The final GP-5 and GP-5A comprehensively address the sources by incorporating all applicable terms and conditions. The GP-5 and GP-5A are not applicable for sources located in major facilities. Single source determinations are made by the Department to ensure that GP-5 and GP-5A are not authorized for sources located at major facilities. The GP-5 and GP-5A are finalized after adequate public participation.

The general permit process is detailed in 25 Pa. Code Chapter 127 Subchapter H. The public has opportunity to comment on the terms and conditions of the general permit when it is initially proposed. The required 45-day comment period was extended to 120 days to ensure that all stakeholders had opportunity to comment on the terms and conditions of the general permits. The Department determines the eligibility of a facility to use the general permit, which is only applicable to minor facilities that must demonstrate on a 12-month rolling basis that the emissions are below the major source thresholds, based on the information provided in the application and including determining if the facility is subject to a Single Source Determination.

Comment 25: The commentators state that the general permits are not adequate to regulate the emissions sources covered because they cannot be adequately regulated using standardized specifications and conditions; therefore, these types of facilities should be required to obtain individual plan approval and/or operating permits. The commentators state that the more stringent BAT should be maintained, but applied to sources proposed to be covered by the general permits through individual operating permits. The commentators also state that at no time should these general permits create a permit shield that prevents the Department from reopening them to make them more stringent. (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 568, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: The Department believes that air contamination sources located at a source category such as natural gas compressor stations, processing plants, or transmission stations are a collection similar in nature which can be controlled with standardized terms and conditions under 25 Pa. Code Chapter 127 Subchapter H. General permits incorporate BAT requirements for the sources at the time of issuance. In Pennsylvania, new sources must comply with 25 Pa. Code § 127.1 where BAT is defined in 25 Pa. Code § 121.1. The applicable federal requirements serve as the minimum requirement for determining BAT. The Department may modify, suspend, or revoke the general permits for cause in accordance with Section A, Condition 6(f) of the final general permits.

Comment 26: The commentators state that U.S. EPA guidance suggests that general permits are appropriate for “source categories” not whole facilities. The sources should be “generally homogeneous in terms of operations, processes, and emissions.” This homogeneity requirement is intended to codify U.S. EPA’s enforceability principle; namely that a general permit “apply to categories of sources that are defined specifically or narrowly enough so that specific limits and compliance monitoring can be identified and achieved by all sources in the categories defined.”

The commentators argue that the proposed general permits run afoul of the reason general permits were instituted in the first place. As U.S. EPA notes, “general permits cannot be modified to accommodate individual source changes the way individual permits can be. General permits may include alternate scenarios, but source-by-source modifications are best handled by individual permits.” The issuance of a general permit is contingent on the Department performing a complex, site-specific analysis on par with what is required for an individual permit application.

Ohio’s Environmental Protection Agency (OH EPA) issued its general permits for natural gas compressors over a series of general permits applicable to each piece of equipment rather than an entire facility. This is the approach originally envisioned by U.S. EPA. When asked why it decided to implement separate general permits, OH EPA justified its approach on the determination that because “compressor stations come in a wide variety of sizes and equipment,” the “equipment ends up being unique.” West Virginia’s Department of Environmental Protection (WV DEP) also offers a general

permit that differs substantially from the one proposed by the Department. (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: As the commentators’ state, both OH EPA and WV DEP have issued general permits for these types of facilities. For compressor stations, OH EPA follows the commentators’ suggestion that individual pieces of equipment must meet limitations set forth in a specific general permit. Those individual “homogeneous” general permits are then aggregated into a master “general permit.” The Department did not opt to follow this approach because the Department determined that it was unnecessary through our experience with the GP-5, which extends back to 1997. WV DEP also determined it was unnecessary to disaggregate the individual sources, following the Department’s method of including sources commonly used at natural gas compressor facilities into a single general permit.

OH EPA and WV DEP both follow the Department’s lead in using general permits for natural gas production facilities, including aggregating commonly used sources in a single general permit.

The Department’s GP-5A is similar to both OH EPA’s GP12.1 and 12.2 and WV DEP’s GP-70A in terms of covered sources as shown in Table 1 below.

Table 1 - Sources Covered by General Permit at Natural Gas Production Facilities in PA, OH, and WV

Sources	PADEP’s GP-5A	OHEPA’s GP12.1 and GP12.2	WVDEP’s GP-70D
Glycol Dehydration Units	Yes	Yes	Yes
Natural Gas Engines	Yes	Yes	Yes
Diesel Engines	No	Yes	Yes
Microturbines	No	No	Yes
Reciprocating Compressor	Yes	Yes	No
Storage Vessels	Yes	Yes	Yes
Truck Loading	Yes	Yes	Yes
Pneumatic Pumps	Yes	Yes	Yes
Pneumatic Controllers	Yes	Yes	Yes
Fugitive Emissions	Yes	Yes	Yes
Pigging Operations	Yes	No	No
Wellbore Liquids Unloading Operations	Yes	No	No
Small Heaters	No	No	Yes
Control Devices	Yes	Flares Only	Yes

In addition, the sources listed above in bold are listed as affected sources in 40 CFR Part 60 Subpart OOOOa. The Department presumes that affected sources listed together in a federal subpart are “homogeneous” by definition. The sources list above that are not bolded show a large amount of agreement about what sources are typically found at natural gas production sites.

The Department’s GP-5 is similar to WV DEP’s GP-35D, and OH EPA’s list of sources with general permits that can be aggregated into the general permit for a natural gas compressor station; see Table 2 below.

Table 2 -Sources Covered by General Permit at Natural Gas Compressor Stations in PA, OH, and WV

Sources	PADEP's GP-5	OHEPA's GP for NG Compressor Stations	WVDEP's GP-35D
Glycol Dehydration Units	Yes	Yes	Yes
Natural Gas Engines	Yes	Yes	Yes
Diesel Engines	No	Yes	Yes
Turbines	Yes	No	Micro Only
Reciprocating Compressors	Yes	Yes	Yes
Storage Vessels	Yes	Yes	Yes
Truck Loading	Yes	Yes	Yes
Pneumatic Pumps	Yes	Yes	Yes
Pneumatic Controllers	Yes	Yes	Yes
Fugitive Emissions	Yes	Yes	Yes
Pigging Operations	Yes	Yes	Yes
Small Heaters	Yes	No	Yes
Centrifugal Compressors	Yes	No	Yes
Control Devices	Yes	Flares Only	Yes

The previous general permits, some (GP-1, GP-2, GP9, GP11) specific to a type of source and others (GP-6, GP7, GP-8, GP-10, GP-12, GP-14, GP-15, and GP-24) specific to an industry, issued by the Department all established BAT for the sources authorized under the general permit at the time of their issuance. This is also true of the proposed GP-5 and GP-5A. The BAT is clear and not subject to variation and the types of equipment and operations conducted at these facilities is known.

Comment 27: The commentator recommends the Department align the GP-5A with existing program requirements and established criteria that designate thresholds of significance for incremental emission controls. The Department should apply existing, well-documented thresholds that already exist in the U.S. EPA's Clean Air Act Subparts OOOO and OOOOa and the existing PA exemption 38. (928)

Response: The Department has maintained the exemption thresholds for oxides of nitrogen (NOx), VOC, and HAP emissions in the final Exemption 38; incorporated the federal requirements in addition to BAT requirements for new or modified sources; and provided the rationale for BAT determinations for specific source categories in the TSD.

Air Quality Permits Should Be Under the Jurisdiction of the Oil and Gas Program

Comment 28: The commentators state that the Oil and Gas Program was established in 1984 as a one stop shop for the oil and gas industry and staffed with personnel from the Bureaus of Topographic and Geological Survey, Water Quality, Waste Management, and Soil and Water Conservation. The Oil and Gas Program was given responsibility for regulation of the industry in a manner consistent with the Oil and Gas Act and the statutory, regulatory, and administrative requirements of all the programs. A Memorandum of Understanding (MOU) and decisions by the Executive Staff assured that communication between the programs occurred for the development of regulations, policies, guidance documents, and forms.

This structure is successful and efficient in many ways as permit reviews included comprehensive compliance checks for administrative and environmental violations. The number of Department field staff visiting a well site was reduced, and data management was consolidated within a single system making tracking permits, compliance, and reporting more efficient. Therefore, the commentators recommend that the Department include the responsibility for the regulation of air emissions from oil and gas activities and facilities under the jurisdiction of the Oil and Gas Program to gain overall efficiencies in administering the permitting process. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department disagrees. DEP's Air Quality program is responsible for implementing the CAA, APCA, and rules and regulations promulgated under these acts since 1972. However, the Bureau of Air Quality does coordinate with the Oil and Gas Program as appropriate. This includes implementing the federal requirements under 40 CFR Part 60 Subparts OOOO and OOOOa.

Comment 29: The commentators state that records of each well drilling operation, each hydraulic fracturing operation, and deviations and malfunctions are already submitted to the Department's Office of Oil and Gas Management which has jurisdiction for those activities. Also, the Bureau of Air Quality's requirements for site preparation seem to overlap with and may conflict with the Oil and Gas Division's requirements. The Bureau of Air Quality should not require redundant permitting requirements or reporting of information already submitted to and maintained by the Oil and Gas Division. (928, 930, 952, 987, 991, 1047, 1048, 1053, 1054, 1056)

Response: The Department disagrees. DEP's Air Quality program is responsible for implementing the CAA, APCA, and rules and regulations promulgated under these acts since 1972, including the federal requirements under 40 CFR Part 60 Subparts OOOO and OOOOa. This means that completion operations must be reported in the annual report in accordance with 40 CFR § 60.5420(b)(2) and § 60.5420a(b)(2). In response to comments received, the Department removed Sections B, C, and D and all associated requirements of the proposed GP-5A from the final GP-5A related to site preparation.

Implementation schedule for the General Permits

Comment 30: The commentators request that the Department withhold finalization of the proposed Exemptions List and general permits until after U.S. EPA finalizes its reconsideration of the federal NSPS requirements. The April 18, 2017 announcement was cited as part of the Department's rationale for the proposed revisions to the exemptions list and GP-5 and for the proposed new GP-5A for unconventional natural gas well site operations. This is understandable; however, any state oversight of federal requirements should be in harmony with federal rules. Duplicative or inconsistent regulatory requirements become a significant operational difficulty for operators. The commentators state it is reasonable for the Department to wait until the federal reconsideration proceeding concludes before finalizing the proposed Air Quality Permit Exemptions list and general permits. (987, 1047, 1053, 1054)

Response: The EPA finalized 40 CFR Part 60 Subpart OOOOa on June 3, 2016. EPA has proposed a stay of certain provisions of OOOOa while they are being reconsidered. The Department has either incorporated the respective citations by reference or established BAT requirements for these sources with the appropriate terms and conditions included in the final general permits. Any subsequent revisions by EPA will be automatically applicable for affected sources.

Comment 31: The commentators state that the Department should provide a grace period between the Exemption 38 and GP-5A compliance programs. Previous revisions to the Air Quality Permit Exemptions list were effective immediately upon publication in the *Pennsylvania Bulletin*; the proposed revisions to Exemption 38 and the requirement to obtain a GP-5A would also be immediate upon publication. This does not provide operators the time to make the required modifications to equipment to comply with or to apply for the GP-5A. The commentators also state that it is possible that an operator preparing a multiwell pad may be forced to put activities on hold to comply with GP-5A requirements. The commentators recommend delayed implementation ranging from four months to one year. (853, 867, 871, 903, 908, 921, 931, 934, 939, 960, 978, 945, 991, 994)

Response: The Department agrees that a delayed implementation period is warranted to accommodate a smoother transition, and has therefore established an effective date for Exemption 38 and the final GP-5A of August 8, 2018.

Comment 32: The commentators state that during the transition to the 2013 version of the GP-5, some permits authorizations were delayed and some operators with pending applications were forced to reapply using the new forms. The commentators recommend that any transition to a revised GP-5 should be well thought out and communicated to permittees and not result in delays in the issuance of new permits or renewals. The commentators also recommend that new application forms should not be required if the original application was submitted prior to the finalization of the general permit. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department agrees that the transition to a revised general permit must be well planned and communicated to permittees. To accommodate a smooth transition, GP-5 is effective 60 days after publication in the *Pennsylvania Bulletin*. Prior to the publication of the final revised GP-5, new application forms are not required to be submitted. However new applications are required when seeking authorizations to use the revised GP-5.

Application for the General Permits

Comment 33: The commentators suggest changing the language and requirements in the application instructions to be consistent with the general permits and to reduce administrative burden. (919, 991)

Response: The Department has revised the application instructions based on comments received.

Comment 34: The commentators state that the application form and accompanying instructions are critical components for implementing the proposed general permits. Operators experiences in the past has been that the application and instructions adopted by the Department deviated from the statutory or regulatory requirements the documents sought to implement. Even though the Department shared the drafts of the application forms and instructions, the Department should release them for public comment as recently reinforced by the IRRC on forms required in regulations. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: While the Department acknowledges that the IRRC ruling only applies to regulations, not general permits, the Department believes it is important to seek input on the application forms. The application forms were released on DEP's Air Quality Technical Advisory Committee (AQTAC) website, and input was widely sought. Based on comments received, the application instructions have

been revised. Moreover, DEP is providing an e-Permitting platform that will be tested by consultants and operators before its release on June 6, 2018.

Comment 35: The commentators recommend that the Department draft an application checklist to aid both the applicant and the permit reviewer to determine whether an application is complete. (952)

Response: The Department has revised the application forms and instructions to enable the applicant and permit reviewer to determine what constitutes a complete application. The fields on the form that are required are marked with an asterisk and the attachments checklist is in the application instructions.

Comment 36: The commentators are unclear how engines and turbines can avoid the SCR requirement using test data during the Department's review process for authorizations to use the proposed general permits. Typically, the Department relies on manufacturer guarantees rather than test data for this type of evaluation. The Department must determine a clear method to demonstrate that an engine or turbine can meet the emissions limits. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department has revised BAT for engines based on comments received. The final permit allows the operators to rely on the performance test data rather than solely on vendor guarantees as an alternative to installing SCR for the demonstration of compliance with the emission limits.

Comment 37: The commentator states if there is no public comment period to determine minor source eligibility for the proposed general permits during the application process, the Department may inappropriately authorize a facility that is major based on its PTE. Also, the U.S. EPA requires two criteria to consider a permit condition to be federally enforceable; the permit must have undergone public participation and the conditions must be enforceable as a practical matter. By denying the public the ability to comment, the Department continues to let the application seeking restriction of PTE be unenforceable. (1032)

Response: The Department disagrees. Stationary sources are considered major or minor facilities based on the emissions of criteria and hazardous air pollutants. Any facility that does not meet the emissions thresholds specified in the definition of the term "major facility" codified in 25 Pa. Code § 121.1 and 40 CFR § 52.2020(c) is treated as a minor facility.

The Department has prohibited the use of the final GP-5 for Title V facilities. Section A, Condition 10(a) of the final general permits requires the emissions from all sources and associated air pollution control equipment located at a facility to be less than the major source thresholds on a 12-month rolling sum basis. Section A, Condition 12(b) of the final general permits requires the owner or operator of the facility to maintain records that clearly demonstrate to the Department that the facility is not a Title V facility. Furthermore, Section A, Condition 10(h) of the final general permits requires the owner or operator of the facility to annually submit to the DEP a certification of compliance with the terms and conditions in the final general permits, for the previous year, including the emission limitations, standards or work practices. The final general permits include emission limits for specific emission units, facility emission limits, and adequate testing, monitoring, and recordkeeping requirements. Therefore, the emission limits established in the general permits are federally enforceable.

In addition, Section A, Condition 13(d) of the final general permits requires the owner or operator of facilities to submit to the Department, by March 1st each year, a source report for the preceding calendar year for all sources controlled under this general permit. The report shall include all emissions

information for all previously reported sources and new sources which were first operated during the preceding calendar year. The Department may revoke authorization to use the general permit if actual emissions are found to exceed any major source threshold. Furthermore, 25 Pa. Code § 127.203(e)(2) specifies that if a particular source or modification becomes a major facility or major modification solely by virtue of a relaxation in an enforcement limitation which was established after August 7, 1980, on the capacity of the source or modification to emit a pollutant including a restriction on hours of operation, the requirements of this subchapter also apply to the source or modification as though construction had not yet commenced on the source or modification.

Information, including the Review Memo prepared by the Department prior to granting authorization to use the general permit, is available to the public.

Streamlined Review and Issuance of General Permits

Comment 38: The commentators state that the Department's Oil and Gas Program has begun to accept applications and issue permits electronically. The Oil and Gas Program has also equipped field staff with portable computing devices to expedite the recording and transfer of inspection results to their supervisors in the Regional Offices. The commentators recommend that the Department's Bureau of Air Quality staff also be provided with similar electronic commerce capabilities. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department agrees and has been working toward this goal. DEP will be able to accept electronic applications through the e-Permitting system for authorization to use the general permits on June 6, 2018.

Comment 39: The commentators recommend that sources of minor significance, which are sources that meet the Department's exemption criteria, be listed as such in the general permit application. The sources would be required to meet de minimis emission levels or other exemption criteria and all applicable regulatory requirements and their emissions would be included in the facilities potential to emit calculations and the annual emission inventory. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Sources of minor significance are required to be listed in the general permit applications, without the need to complete the corresponding application section (i.e., natural gas-fired combustion unit less than 10 MMBtu/h would be listed, but no form would need completion). However, the basis for the operator's determination or the Department's RFD decision letter must be included in the listing.

Comment 40: The commentators state that the intent of a general permit program is to streamline and standardize the permit process for large numbers of similar sources seeking approvals. Standardization of the permitting process benefits both industry and the state since it ensures compliance with Air Quality regulations in a consistent manner. Other states, including Ohio, West Virginia, and Oklahoma, have successfully implemented general permit programs for oil and gas activities as an administrative registration that use permit conditions developed and vetted for activities specific to the industry.

The commentators argue, however, that the general permit process in Pennsylvania which began as an administrative review to assure that all necessary documents were provided, has become more exhaustive and, in some instances, more robust than the review for a single-source plan approval permit application. The commentators state that, as proposed, the general permits represent an overreach by the

Department prescribing to the oil and gas industry how to operate rather than simply setting standards and allowing the industry to determine how best to comply. The volume of information required as part of the permit application process as well as that required to demonstrate compliance is overly burdensome, and as such makes both general permits unworkable for both the Department and the industry. (853, 867, 871, 916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053, 1054, 1056)

Response: The final general permits have been streamlined by citing the federal requirements. As a result, the length of GP-5A has been reduced from 43 to 24 pages and GP-5 has been reduced from 45 to 28 pages.

In addition to incorporating the federal requirements by reference, the final general permits must also include BAT under 25 Pa. Code § 127.1. BAT is determined at the time of issuance of the final general permits, and it is the responsibility of the operators to determine how they will comply with the terms and conditions based on the BAT determination. Nothing in the determination requires an operator to use a specific control or technique as long as the operator ensures compliance with all terms and conditions of the final general permits.

Comment 41: The commentators state that the Department is facing resource constraints and budgetary shortfalls that are already impacting the current programs which will only get worse based on the increasing workload due to the proposed general permits. The commentators recommend simplifying the application process for the proposed general permits to reduce the burden on the Department. The commentators also recommend that the Department develop a staffing and funding plan to address the anticipated permit application demand so that authorizations may be granted within the required 30-day period. (227, 302, 707, 908, 916, 919, 920, 928, 930, 931, 934, 939, 945, 952, 961, 964, 970, 972, 974, 978, 981, 987, 990, 991, 995, 999, 1003, 1046-1048, 1050, 1053-1056)

The commentators recommend that if the Department fails to act within the 30-day requirement, the operators should be allowed to consider their application for authorization to use the general permit to be presumptively approved or to act as an “application shield”. If the permit thresholds are not met following construction under a presumptive approval the operator should be allowed 60 days to correct the deficiency. (972, 981, 987, 1055)

Response: While the Department appreciates the concern for the demand of Department resources for timely review of authorization requests, the regulations do not allow for the suggested solution. However, the Department has developed an electronic application system through the e-Permitting system to expedite review of applications. This electronic application system will be implemented on June 6, 2018, and will enable Department personnel to authorize the use of the general permits in a timely fashion.

Comment 42: The commentators state that facilities in this varied category do not lend themselves to standardized permitting and the requirement to act within 30 days is inadequate for a proper review. A typical individual air operating permit review has 60 days solely for the purposes of determining completeness of the application. Thereafter, the Department has another 18 months after the application is determined to be complete to either approve or disapprove the application. (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: The Department’s authority to issue general permits is Section 6.1(f) of the APCA, 35 P.S. § 4006.1(f) and 25 Pa. Code Chapter 127, Subchapter H (relating to general plan approvals and general operating permits). In the case of the air contamination sources identified under GP-5 and GP-5A, and as required under Section 6.1(f), the Department determined that the sources are similar in nature and can be adequately controlled using standardized specifications and conditions through the general permit process.

The Department is required to act within 30 days on an application to use the general permit in accordance with 25 Pa. Code § 127.621. The review of the application and determining whether the sources listed will be able to meet the terms and conditions of the general permit can be accomplished in this time.

The review process for an application for authorization to use a general permit differs significantly from a plan approval application, minor source operating permit application, or a Title V operating permit application. A general permit includes terms and conditions determined through the public process prior to issuance, and establishes those terms and conditions as BAT at issuance. Therefore, the application for authorization to use the general permit only requires the applicant to provide evidence that they can meet the terms and conditions. The Department reviews the application, and as stated, can deny it if incomplete, issue a Technical Deficiency Notice if additional information is required to determine whether a source and/or facility can meet the terms and conditions, or issue the authorization to use if it is determined by the review that the sources and facility can meet the terms and conditions of the general permit.

In a plan approval application, the applicant determines the BAT for each source covered by the application, with a complete analysis of what controls are available to reduce emissions to the maximum extent and their technical and economic feasibility based on site-specific conditions. The applicant lists all applicable federal and state conditions, what each source’s emissions will be, determines major or minor status, and conducts the appropriate reviews such as PSD and NSR. After the required information is included in the application, which for complex sources can be two or more three-ringed binders, it is submitted to the Department. The separate administrative completeness check is required just to ensure that the minimum required information has been provided. The technical evaluation is given such a long review time because the Department permitting engineer must review the application information and determine whether it is accurate and whether the sources in the application and the limits proposed meet all requirements, including federal and state regulations and that the BAT determination is acceptable. After the review is completed, the permitting engineer must then write the plan approval to include the terms and conditions required.

Temporary Activities and the General Permits

Comment 43: The commentators recommend using Exemption 38 to authorize construction, with a streamlined GP-5A operating permit required if the well site cannot meet the exemption criteria. This will alleviate the resource and funding constraints for the Department and industry with no reduction in environmental stewardship. The modifications to the proposed GP-5A must include removing the sections relating to sources that exist during site construction, drilling, and completion with a clear explanation of the exemption for pre-production activities and a reference to Exemption 38; limiting the scope of GP-5A to sources present at the well site during production and that are not otherwise exempt; deleting the phrase “general plan approval” and references to construction throughout the permit; changing the title of the general operating permit to “Unconventional Natural Gas Well Site Production

Operations” and adding the word “production” where necessary throughout the permit; and revising Section A Condition 6(a) to specify the application timing to read “Application for Authorization to Use GP-5A. Pursuant to 25 Pa. Code § 127.621, any person proposing to operate a source listed in Section A, Condition 4 of this General Permit at an unconventional natural gas well site shall submit an Application for Authorization to Use GP-5A to the Air Program Manager of the appropriate DEP Regional Office responsible for authorizing the use of general permits in the county in which the facility will be located within 180 calendar days after the start of flowback. If the well is shut in prior to beginning flowback, the well is not considered to be completed.” (908, 939, 972, 978, 981)

One commentator recommends including a permit-by-rule scenario, where the operator would provide general project information and anticipated schedules, along with an Exemption 38 compliance demonstration for a “typical” well in the project area. A “dry gas” and a “wet gas” check box could be included on the GP-5A permit application to designate such areas. In such cases, an administrative approval could be granted timely by the Department. The operator would be required to provide LDAR data within 60 days of the start of production. The operator would report quarterly LDAR results on an annual basis. Within 180 days following the start of production of the well, the operator would provide equipment specifications and types of facility components installed at the well site. (972, 981)

Response: Temporary activities such as site preparation, well drilling, hydraulic fracturing, completion, and work-over activities for conventional and unconventional well sites have been removed from GP-5A and are exempted from permitting under Category No. 38. There are no provisions for such a permit-by-rule approach under the Department’s current regulations. Moreover, the APCA does not authorize the Permit-by-Rule approach advocated by the commentator.

Comment 44: The commentators recommend modifying Exemption 38 as the preferred alternative to finalizing the proposed GP-5A. The modified exemption would then satisfy the needs of the public, the Department, and operators. By adding a 15-day notification requirement the Department would be made aware that development of a well site was commencing; an administrative fee could be added to the notification process to increase revenue. By adding an annual compliance statement, the Department would be made aware of the facility’s continued compliance with the conditional exemption. By maintaining the permit exemption, operators would not face delays in constructing well sites while waiting for a permit approval. This solution reduces the administrative costs and burdens on the Department and industry and keeps all environmental protections in place. (908, 939, 978, 1003)

Response: The final revised Exemption 38 does not require operators to seek authorization to use a general permit for temporary activities such as site preparation, well drilling, hydraulic fracturing, completion, and work-over activities for unconventional natural gas well sites. In addition, operators of sources that were previously exempted under the Air Quality Permit Exemptions list are not required to obtain a general permit unless a new well is drilled or fractured at the existing well site, an existing well is hydraulically fractured or refractured, a new source is added, or an existing source is reconstructed or modified. The Department did not include a commencement notification or notification fee.

Comment 45: The commentators state that temporary activities should either remain exempt from permitting or be authorized with the approval of the permit to drill and operate an unconventional well. These activities are authorized under the current Exemption 38, and the Department’s TSD notes that the emissions from fugitive particulate matter (Section B), well drilling and hydraulic fracturing (Section C), and well completions (Section D) are temporary. However, operators are required to have other permits in hand to conduct these activities. In addition, operators are required to meet all

applicable state and federal standards regardless of whether they have an air quality permit. The commentators also state that temporary activities should remain exempt from permitting because the probable delay associated with pre-construction permitting would seriously interfere with the multi-well agreements operators make with subcontractors that rent or lease equipment used in each phase of well development. This level of coordination between operators and subcontractors where vendor and rental agreements are tied to a master schedule could be severely impacted by any delay in obtaining an air permit, especially in the case of equipment breakdown or unanticipated field conditions requiring a change in equipment. Therefore, the commentators argue that a pre-construction air quality permit does not provide additional environmental benefit or additional control of air emissions for temporary activities covered in Sections B, C, and D of the proposed GP-5A and Section B of the proposed GP-5. Also, the inclusion of nonmethane sources in the pre-construction requirements seems inconsistent with the stated goal of reducing methane. (853, 867, 871, 903, 908, 916, 919, 928, 930, 931, 934, 936, 939, 950, 952, 961, 972, 978, 981, 987, 991, 994, 995, 999, 1046-1048, 1050, 1052-1054, 1056)

Response: The proposed Sections B, C, and D have been removed from the final GP-5A, and temporary activities are included in Exemption 38. Non-road engines used for drilling and hydraulic fracturing are required to meet the applicable federal regulations. The proposed Section B has been removed from the final GP-5. For both final general permits the proposed Section B was replaced with Section A, Condition 10(c)(iii) which is a citation to 25 Pa. Code §§ 123.1 and 123.2

Comment 46: The commenter recommend that Exemption 38 provides no exemptions for equipment on the well sites. All emitting equipment on well sites, that of a permanent nature involved with the production process and intermittent, involved with drilling, fracturing and workover all must be regulated. Any regulation, policy, or guidance that provides for exemptions is a literal loophole and is woefully inadequate. (9999)

Response: As per the final revised Category No. 38, the owner or operator of well site will not be required to seek authorization to use a General Permit for temporary activities such as site preparation, well drilling, hydraulic fracturing, completion, and work-over activities for conventional and unconventional well sites. Non-road engines are regulated by the federal government and states such as Pennsylvania are pre-empted from establishing more stringent emissions standards and requirements than the Federal requirements established in 40 CFR Part 85. It should be noted that the final revised Category No. 38 includes the comprehensive eligibility criteria for such exemption

Comment 47: The commentators state that unconventional development of shale gas reserves in the Appalachian Basin of Pennsylvania occurs in four phases. The first is well site construction and included the development of the well pad and construction of a permanent access road. Typically, this involves an earth disturbance of five or more acres and requires an erosion and sediment control permit; it is worth noting that other activities such as highway or land development, mining, or agricultural activities are required to obtain an air quality permit for basic earthmoving activities.

The second phase is well drilling, and typically involves drilling three to six wells. The third phase is well completion, also known as hydraulic fracturing. The first three phases generally utilize equipment that is rented or leased by the operator from a subcontractor and are only on site for a brief time. The only permanent sources from these three stages of construction are the access road, wellheads, piping, valves, and flanges.

The fourth and final stage is production, which involves installing and operating the production and processing equipment necessary to produce natural gas. This is the only equipment owned by the operator and the only permanent sources of methane emissions on the well pad.

The commentators therefore recommend that the first three phases of activity be removed from the GP5A; operators should only need to apply for the GP-5A in the production stage. (903, 908, 916, 928, 935, 939, 952, 961, 972, 978, 981, 987, 991, 994, 999, 1046-1048, 1053, 1054)

Response: The proposed Sections B, C, and D have been removed from the final GP-5A and temporary activities are included in Exemption 38. Non-road engines used for drilling and hydraulic fracturing are sources under 25 Pa. Code § 121.1 and are required to meet the applicable federal regulations. The installation and operation of equipment in the production phase must be done in accordance with Exemption 38(c), which means if the facility cannot meet the criteria therein, the operator should seek authorization through RFD, GP-5A, or plan approval prior to constructing a permanent air contamination source.

Fugitive Particulate Matter

Comment 48: The commentators state that the TSD notes the requirements of GP-12 were chosen as BAT “in order to minimize emissions due to heavy truck traffic.” However, the commentators disagree with the equivalence as coal preparation plants are estimated to have truck traffic as high as 40 trucks per hour which is much higher than the resulting truck traffic for hydraulic fracturing operations. Also, the grading and development activities associated with construction of natural gas facilities are very different than coal mining.

The compliance requirements for dust mitigation are overly burdensome; sweeping and tire wash stations are typically used for paved plant roads and are neither useful nor practical on unpaved haul roads; applying water or other chemical dust suppressants for a distance of 500 feet in each direction based on daily site conditions; the fixed 15 mph speed limit for haul roads; and the speed limit and anti-idling law signage requirements have not been shown in the TSD to reduce fugitive dust emissions. Under the Diesel-Powered Motor Vehicle Idling Act, “No requirements under this act may be incorporated into any operating permits issued by the Department under 25 Pa. Code Ch. 127.”

In addition, the notification, recordkeeping, and reporting requirements are overly burdensome, especially the requirement for a written procedures document to reduce fugitive dust, and are unrelated to the reduction of methane emissions. (916, 919-921, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1044, 1046-1048, 1053-1056)

Response: The proposed Section B was removed from the final general permits and replaced with Section A, Condition 10(c)(iii) which cites 25 Pa. Code § 123.1 (prohibition of certain fugitive emissions) and § 123.2 (fugitive particulate emissions).

Comment 49: The commentators recommend deleting Section B of the proposed general permits as it is a repeat of language in 25 Pa. Code § 123.1 and § 123.2. The Department should incorporate these sections by reference as is done in Section A, Condition 9 of the previous GP-5. (916, 919, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053-1055)

Response: The proposed Section B was removed from the final general permits and replaced with Section A, Condition 10(c)(iii) which cites 25 Pa. Code § 123.1 (prohibition of certain fugitive emissions) and § 123.2 (fugitive particulate emissions).

Comment 50: The commentator states that many well sites are used as staging sites for sand and water trucks. These sites effectively become parking lots with many idling diesel trucks; the Department must adequately regulate and enforce that well sites near family homes are not used as staging sites with trucks idling for hours on end. (1020)

Response: These types of vehicles are already subject to the Pennsylvania Diesel-Powered Motor Vehicle Idling Act, 35 P.S. § 4601. Nothing in the final general permits relieves the operator from the obligation to comply with all state, federal, and local laws, including the Pennsylvania Diesel-Powered Motor Vehicle Idling Act.

Comment 51: The commentator recommends maintaining the requirements of Section B of the proposed GP-5A to combat problems associated with dust from well drilling and fracturing activities. The commentator notes that some operators have used road-sweepers that exacerbate the dust problem because they did not use units that wets, sweeps, and contains the dust. (1020)

Response: The proposed Section B was removed from the final general permits and replaced with Section A, Condition 10(c)(iii) which cites 25 Pa. Code § 123.1 (prohibition of certain fugitive emissions) and § 123.2 (fugitive particulate emissions).

Well Drilling and Hydraulic Fracturing Operations

Comment 52: The commentators state that the Department’s TSD does not address the “proper handling” of drilling mud, drill cuttings, sand, and other proppants to prevent fugitive emissions. (916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The temporary activities during the drilling and fracturing process are covered by Exemption 38. While the sources are exempted from permitting, all applicable requirements including 25 Pa. Code § 123.1(c). § 123.1(c) requires a person responsible for any source to take all reasonable actions to prevent particulate matter from becoming airborne. § 123.1(c) also lists specific reasonable actions to prevent fugitive emissions.

Comment 53: The commentators state that requiring information pertaining to combustion engines for the development of a natural gas well site is not feasible as the drilling and fracturing operations occur over a short period of time using non-road engines that meet federal emissions requirements based on model year. The compliance, notification, recordkeeping, and reporting requirements in Section C of the proposed GP-5A do not control emissions associated with these operation, nor do they constitute a “source” under state or federal regulations. (916, 919-921, 928, 930, 949, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053-1056)

Response: The final GP-5A is not applicable to temporary activities. Nothing in the final general permits relieves the operator’s obligation to comply with all state, federal, and local laws.

Comment 54: The commentators state that the temporary activities in Section C of the proposed GP-5A should not be included within the scope of the final general permit as it overlaps and causes potential

conflict with regulatory requirements established by DEP's Office of Oil and Gas Management. The Bureau of Air Quality should not require redundant notifications and Department management should figure out how to communicate and share this information internally. (916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053-1056)

Response: The final GP-5A is not applicable to temporary activities. Nothing in the final general permits relieves the operator's obligation to comply with all state, federal, and local laws.

Comment 55: The commentators state that the language of this requirement describing the installation of "new equipment" as a trigger for LDAR is an incorrect application of 40 CFR § 60.5365(i). The Department should maintain consistent language and incorporate the federal requirements by reference to avoid confusion and inconsistencies. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The final general permits have been revised appropriately as recommended by the commentators; however, the requirement in question is in Section A, Condition 10(d). The Department maintains that, consistent with 25 Pa. Code § 121.1, the installation of new equipment which requires authorization under a general permit would be subject to the revised LDAR requirements in Section G of the final general permits. Nothing in the final general permits relieves the operator's obligation to comply with all state, federal, and local laws.

The final GPs, Section A, Condition No. 10(d) dealing with fugitive emissions requirements are modified as follows: "The owner or operator of an existing facility where a new source is installed or there is a modification of an existing source, shall comply with the applicable BAT requirements established in this General Permit."

Comment 56: The commentators state that the language of this recordkeeping requirement describing a log "book" is an example of why the Department should maintain consistent language and incorporate the federal requirements by reference to avoid confusion and inconsistencies. (916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053, 1054, 1056)

Response: Section C of the proposed GP-5A has been removed from the final GP-5A.

Comment 57: The commentators state that the Department should require natural gas-fired engines as opposed to diesel non-road engines. All diesel-fired non-road engines should be required to use ultra-low sulfur diesel and meet U.S. EPA's Tier 4 standards as a BAT requirement. (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1020, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: The CAA under Section 209(e), 42 U.S.C. § 7543(e), preempts states such as Pennsylvania from adopting independent BAT standards for non-road engines such as diesel non-road engine-powered drill rigs and fracturing pumps. In addition, it is not appropriate to mandate the use of non-road engines that fire a specific fuel.

Comment 58: The commentator expressed support for the Department's requirement for well pad operations to obtain a permit prior to drilling, which greatly improves oversight of emissions from these sources. (137)

Response: The proposed Section C has been removed from the final GP-5A and temporary activities are included in Exemption 38. Non-road engines used for drilling and hydraulic fracturing are sources under 25 Pa. Code § 121.1 and are required to meet the applicable federal regulations. The installation and operation of equipment in the production phase must be done in accordance with Exemption 38(c), which means if the facility cannot meet the criteria therein, the operator should seek authorization through RFD, GP-5A, or plan approval prior to constructing a permanent air contamination source.

Well Completion Operations

Comment 59: The commentators recommend revising Section D of the proposed GP-5A to adopt the Center for Responsible Shale Development Standard 9. This is because the Department only requires a “general duty to safely maximize resource recovery and minimize releases to the atmosphere” and allows gas to be flared when it is “technically infeasible” to collect the gas or use it at the well site as fuel or another beneficial purpose. (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: The proposed Section D was removed from the final GP-5A; these activities are covered in Exemption 38. The operators are required to comply with all state and federal requirements. Federal NSPS OOOOa requires Reduced Emissions Completions (REC), also known as “Green Completion” which has been required in Exemption 38 since August 10, 2013. The REC minimizes methane emissions to the atmosphere.

Comment 60: The commentators state that including temporary activities in an air permit is inconsistent with air permitting practices, especially considering well completions are “sources” under state or federal regulations. The commentators state that WV DEP and OH EPA do not include these activities in their well pad permits. (991, 1003)

Response: In 25 Pa. Code § 121.1 a “source” is defined as an “air contamination source” which in turn is defined as “any place, facility, or equipment, stationary or mobile, at, from, or by reason of which there is emitted into the outdoor atmosphere any air contaminant.” In addition, well completions are regulated in 40 CFR Part 60 Subparts OOOO and OOOOa at § 60.5375 and § 60.5375a. The proposed Section D was removed from the final GP-5A; these activities are covered in Exemption 38. Nothing in the final general permits relieves the operator’s obligation to comply with all state, federal, and local laws.

Comment 61: The commentators state that Section D of the proposed GP-5A had many requirements that were unclear due to language that was inconsistent with the federal requirements. The 24-hour flowback notification for completion is redundant to the 48-hour notice required under 40 CFR Part 60 Subparts OOOO and OOOOa; so are the recordkeeping and reporting requirements. The commentators also state that requiring closed system flowbacks require a tremendous amount of capital so many operators simply flare the methane in early flowback. (916, 919, 928, 930, 952, 961, 964, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053-1056)

Response: In accordance with 40 CFR § 60.5420(a)(2) and 40 CFR § 60.5420a(a)(2), completion notifications are required to be submitted to the Administrator, which is the Department. The notification under Act 13 of 2012 satisfies this condition in accordance with 40 CFR § 60.5420(a)(2)(ii)

and 40 CFR § 60.5420a(a)(2)(ii). However, Section D has been removed from the final general permits and well completions are included in Exemption 38.

Reduced Emissions Completions (REC), also known as “Green Completion” has been required in Exemption 38 since August 10, 2013. The techniques are identical to 40 CFR § 60.5375(a)(1) through (4).

Comment 62: The commentators state that the language of this recordkeeping requirement describing a log “book” is an example of why the Department should maintain consistent language and incorporate the federal requirements by reference to avoid confusion and inconsistencies. (919, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: Section D of the proposed GP-5A has been removed from the final GP-5A.

Notification, Recordkeeping, and Reporting Requirements

Comment 63: The commentators ask what analysis the Department performed to justify the burdensome notification, recordkeeping, and reporting requirements that are typically mandated through the rulemaking process. The commentators recommend reducing this administrative burden by incorporating federal regulations by reference, reducing the number of notifications required, and reducing the amount of recordkeeping required. (227, 715, 853, 867, 871, 916, 919, 928, 930, 943, 952, 961, 972, 974, 981, 987, 991, 992, 999, 1046-1048, 1053, 1054, 1056)

Response: In response to comments, the Department reevaluated and simplified these requirements by removing the redundancies. The notification, recordkeeping, and reporting requirements in the final General Permits were determined to satisfy 25 Pa. Code § 127.12b and § 127.441, which include all federal notification, recordkeeping, and reporting requirements.

Comment 64: The commentators argue that the Department has included numerous notifications within the proposed general permits that would not provide information that would be useful in compliance assurance activities or for any other purpose. The commentators recommend that the Department should consider the timeliness and purpose for every notification, and if none is found, the notification should be removed from the general permits. In addition, any notification that is a duplication of a federal requirement should also be removed from the general permit.

In addition, the commentators recommend consolidating notifications for an entire well site rather than requiring each source or activity to be individually reported. (916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053, 1054, 1056)

Response: In response to comments, the Department reevaluated the notification, recordkeeping, and reporting requirements. As a result, the final general permits have been simplified by removing redundant notification requirements.

Comment 65: The commentators concur that including blowdown emissions in periodic inventory reporting provides the Department with information needed to assess the significance of these emissions. However, the proposed blowdown notifications add significant operator burden and the Department has not considered those compliance costs or justified the need.

Also, the commentators state that the general permits do not define the terms ‘scheduled’ or ‘unscheduled’ as they pertain to blowdowns. The commentators believe that planned maintenance shutdowns would be considered a ‘scheduled’ blowdown, requiring advanced notice but not being classified as a malfunction. In contrast, the commentators believe that a change in compressor operation to respond to pipeline demand, an event beyond the operators’ control, would be considered an ‘unscheduled’ blowdown, thereby being classified as a malfunction. This is an absurd result, as classifying standard operations and safety-related practices as malfunctions would result in a deluge of notifications to the Department. This is likely to result in daily notifications for most operators and force operators to consider changes in safety best management practices (BMP) increasing operational risk in an effort to decrease reporting obligations. (928, 930, 936, 952, 987, 1047, 1048, 1052-1054, 1056)

Response: In the final general permits, blowdown notifications are required in accordance with the GP5 Malfunction Reporting Instructions. This eliminates notifications for scheduled and unscheduled blowdowns provided that the emissions from the blowdown activities do not result in an exceedance of the permit limits or create an offsite risk.

Comment 66: The commentators state that the information requested by the Department is of little use and its collection will not serve to improve public health, safety, or the environment. For example, under the proposed GP-5A the pumping service providers must track the refueling of all auxiliary completion related equipment with off-road diesel engines. Over three weeks during the winter of 2017, one operator calculated that with morning and evening refueling for 63 pieces of equipment there are 2,646 record entries, which had to be documented even in sub-zero wind-chill conditions. The recordkeeping requirements should be limited to those required in the federal regulations unless there is a compelling need for the information. (916, 919, 928, 930, 936, 952, 961, 964, 972, 981, 987, 991, 999, 1003, 1046-1048, 1052-1056)

Response: The final general permits include all terms and conditions needed to protect public health and the environment. This includes notification, recordkeeping, and reporting requirements that are based on federal regulations and 25 Pa. Code §§ 127.12b, 127.12c, 127.441, and 127.442. Some recordkeeping requirements have been removed.

Comment 67: The commentator recommends that the Department consider the burden and additional cost it places on well operators and those who have to perform recordkeeping tasks in the field. Daily logs do not benefit the Commonwealth’s citizens nor the environment. Tracking the use of diesel fuel on a Marcellus Shale well pad does nothing to reduce methane emissions, NO_x, carbon monoxide (CO), VOC, nor HAP; methane does not form by burning longer chain hydrocarbons.

The commentator states that the industry is already using U.S. EPA Tier 2 non-road engines and is transitioning towards Tier 4 non-road engines. These engines must pass emission tests before being sold; why does industry have to repeat this testing? A list of non-road engines should suffice for recordkeeping; if not, the commentator suggests requiring an annual emission test like those required for annual car inspections in more densely populated areas around the Commonwealth. (964)

Response: The final general permits include all terms and conditions needed to protect public health and the environment. This includes notification, recordkeeping, and reporting requirements that are based on federal regulations and 25 Pa. Code §§ 127.12b, 127.12c, 127.441, and 127.442. Some recordkeeping requirements have been removed.

Comment 68: The commentator states that in Section K, Condition 3(a)(vi)(A)(5)(i) the requirement for operators to address the way they will ensure “adequate thermal background” is equivocal because OGI reveals hydrocarbons, which are known to absorb infrared in a very narrow band of wavelengths, where an adequate thermal background exists. The commentator is curious what impact this requirement has on LDAR surveys, and believes the only way to ensure an adequate thermal background would be to conduct aerial LDAR surveys viewing towards the ground. (1032)

Response: In the proposed general permits, this condition was incorporated verbatim from the federal requirements for a monitoring plan; the Department incorporated this condition by reference in the final general permits.

Comment 69: The commentator believes that compliance can be efficiently demonstrated by maintaining records available upon request by the Department and by summary annual reporting. (928)

Response: The final general permits include all terms and conditions needed to protect public health and the environment. This includes notification, recordkeeping, and reporting requirements that are based on federal regulations and 25 Pa. Code §§ 127.12b, 127.12c, 127.441, and 127.442. Some recordkeeping requirements have been removed.

Comment 70: The commentators state that the annual reporting provisions should be removed from both general permits, especially regarding requirements duplicative of federal requirements and existing obligations to submit the annual emissions inventory. As the delegated authority for implementing federal requirements in Pennsylvania, the Department already receives all notifications and annual reports pursuant to the CAA making most of the reporting requirements redundant and unnecessary. In addition, most of the requirements of the annual report or annual compliance certification of Section A, Condition 12(c) of the proposed general permits are submission of records compiled in accordance with Section A, Condition 11 of the proposed general permits for sources in the following Sections. Any records not already in the Department’s possession can be made available to the Department upon request. (916, 919, 928, 930, 944, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053-1056)

Response: The notification and annual reporting requirements are not redundant since the GP-5 and GP-5A required a single report satisfying both applicable federal and state requirements. In addition, the annual emissions inventory report is required under 25 Pa. Code § 135.3 (related to reporting).

Comment 71: The commentator suggests editing Section P, Condition 4 of the proposed GP-5A to remove “...well drilling and hydraulic fracturing operation...” and add “...wellbore liquids unloading operations...” (972, 981)

Response: The terminology in this condition has been corrected in the final GP-5A.

Comment 72: The commentators state that the burden associated with annual reporting is further compounded by the fact that the Department proposed the due date coincident with the due date for the annual Air Emissions Inventory. Requiring both reporting programs to be due at the same time will require operators to increase staff and strain Department resources for processing. (919, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The final general permits require the annual report date to coincide with the anniversary of the receipt of authorization to use the general permit unless otherwise approved by the Department. The owner or operator may request an alternate schedule for submitting annual reports to the Department.

Comment 73: The commentators state that operators already track all liquid waste (flowback and produced water) generated and transported and report to the Department. Requiring duplicate reporting is unnecessary when the information is being provided to a different department within the PA DEP. (901, 902, 907, 909, 913, 914, 918, 923, 925, 932, 933, 938, 948, 951, 954, 955, 959, 965, 966, 969, 975, 979, 980, 982-984, 986, 993, 996, 1001, 1055)

Response: The requirement to track the tanker truck load-out operation details, including the type and volume of liquids loading, has been corrected to reflect it only applies to operations that loadout from condensate storage vessels, i.e., those that exceed the control thresholds.

Permit Modifications

Comment 74: The commentators state that the Department should make allowances for operational flexibility. As proposed, the general permits do not allow modifications at a site without preapproval. The commentators propose that a list of minor modifications should be developed and allowed without the need to obtain reauthorization. Among these minor modifications should be the removal and installation of components such as flanges and valves and the replacement of engines that break down or reach the end of their useful life. (916, 928, 934, 952, 961, 972, 981, 987, 991, 994, 999, 1046-1048, 1053, 1054)

Response: In response to comments received, the final general permits allow operators to modify a facility without reauthorization provided the conditions of Section A, Condition 15, which are based on 25 Pa. Code § 127.449 are met. The only exception is if a new engine or turbine is required to install SCR as a control, in which case the operator must apply for a reauthorization. In addition, modifications to a facility during temporary operations are covered by Exemption 38.

Compliance and Enforcement Issues

Comment 75: The commentators state that while the general permits are required under 25 Pa. Code Chapter 127 Subchapter H to comply with “the terms and conditions of the general plan approval or general operating permit” these requirements are weaker than those for individual operating permits. Individual operating permits require that “A person may not cause or permit the operation of a source subject to this article unless the source and air cleaning devices identified in the application for the plan approval and operating permit and the plan approval issued to the source are operated and maintained in accordance with specifications in the application and conditions in the plan approval and operating permit issued by the Department. A person may not cause or permit the operation of an air contamination source subject to this chapter in a manner inconsistent with good operating practices.”

General permit holders are not expressly required to comply with the specifications in an application. This is especially problematic because in a general permit process many of the specifications, limits, and conditions applicable would be contained in the application and correspondence materials with the Department and not in the general permit itself. Even though the Department’s general permit program is incorporated into Pennsylvania’s SIP, because the limits and conditions applicable to a natural gas facility authorized by a general permit would not undergo public comment, the limits and conditions

would not be federally enforceable as a practical matter. In addition, the proposed general permits fail to require the public notice and participation process for the site-specific restrictions and conditions that would be applicable and cannot practically include federally enforceable requirements for each facility in the general permit itself.

The commentators state that a facility that would be designated as a major source based on its potential to-emit (PTE) should be ineligible for the general permits. While the Department requires operators of a facility permitted under the general permits to maintain records on a 12-month rolling sum basis for emissions to ensure the facility is under the major source thresholds, monitoring for compliance is not easy unless operational restrictions are included in the general permits. However, the site-specific nature of the operational restrictions to maintain minor source status and therefore the applicability to a general permit is not practically enforceable.

In addition, the commentators state that when actual emissions exceed major source thresholds on a 12 month rolling sum basis, eligibility for the general permits must be immediately suspended. The facility may still apply to be a synthetic minor source, but must do so by reapplying for a state only operating permit and listing the measures the operator will employ to maintain the synthetic minor status. (15, 27, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 805, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1029, 1032-1037, 1040)

Response: The Department included Section A, Condition 10(c) in the final general permits which states, “All sources and associated air pollution control equipment located at a facility shall be” [at (ii)] “Operated and maintained in accordance with the manufacturer’s specifications, procedures, and recommended maintenance schedule, as provided in the Application for Authorization to Use [GP-5 or 5A], or an alternate procedure approved by the Department that achieves equal or greater emissions reductions in accordance with 25 Pa. Code § 127.12b.” This condition is identical to the one the commentators state must be included in individual operating permits.

The commentators are incorrect in their assertion that the terms and conditions of the general permits are not enforceable as a practical matter. The terms and conditions of the general permit include short-term (in the form of emissions limitations on specific source types) and long-term (in the form of facility-wide emissions limits) requirements, which are all federally enforceable. The terms and conditions were proposed and received comment by the public, and therefore have met the requirement to make the conditions enforceable.

The application materials are not used to determine site-specific limitations because of the nature of the general permit which establishes standardized conditions to be used regardless of location. The specifications of the application are used by the Department to determine the eligibility of the operator to use the general permit, and do not modify in any way the terms and conditions of the GP-5. If the operator were to operate a source in a manner inconsistent with the specifications of the application, they are in violation of this condition, in addition to any other terms or conditions the operator may have violated.

In addition, stationary sources are considered major or minor facilities based on actual emissions or the PTE for criteria and hazardous air pollutants. A facility that does not meet the actual emission or PTE specified in the definition of “major facility” codified in 25 Pa. Code § 121.1 and 40 CFR § 52.2020(c) is treated as a minor facility. The Department prohibits the use of the final general permits for Title V

facilities as evidenced by Section A Condition 10(a), which requires emissions from all sources and associated air pollution control equipment at the facility to be less than the major source thresholds on a 12-month rolling sum basis; Section A Condition 12(b), which requires the operator to maintain records that clearly demonstrate the facility is not a Title V facility; Section A Condition 10(h), which requires the operator to submit a certification of compliance with the terms and conditions of the general permit annually; and Section A Condition 13(d), which requires the operator to submit an air emissions inventory to the Department annually. Together these conditions ensure the emission limits established in the general permits are federally enforceable. This information, including the Review Memo prepared by the Department prior to granting authorization to use the general permit, is available to the public.

Comment 76: The commentators state that companies have been acquiring GP-5 permits as minor sources, but then increasing emissions through permit modifications shortly thereafter. This could result in circumvention of NSR or PSD requirements. U.S. EPA specifically highlighted as its first factor for determining circumvention, an operator's submission of multiple permit applications in a short time frame. The commentators provide several examples where multiple permits were issued in a relatively short period of time, beginning with authorizations to use the GP-5, that could be evidence of circumvention. (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: Consistent with 25 Pa. Code § 127.216, expansion of a facility over time would not constitute circumvention unless it can be demonstrated that the pattern of ownership or development was intentionally designed to avoid PSD or NSR. If a facility becomes major through an expansion, the Department considers whether the pattern of ownership or development constitutes circumvention. Because plan approvals and operating permits are individual permits, the public can comment on the possibility of circumvention.

Comment 77: The commentator states that the Bernville Compressor Station located in Berks County, emitted 61 tons of VOC in a single incident lasting less than one hour. This is above the major source threshold for VOC; although Bernville is already permitted as a major facility and incurred a violation for the incident, what would have happened if this incident occurred at a facility authorized under a general permit? Would the eligibility for the general permit be immediately suspended? What would happen if an operator reports emission amounts for a facility that exceed the major source threshold to the Air Emissions Inventory. (1032)

Response: On October 29, 2012, the Texas Eastern Bernville Compressor Station experienced an emergency shutdown. The VOC release was estimated at 61.31 tons. The company stated that the increased emissions were due to a suction valve that failed to close because the operator failed to properly engage the valve assembly after recent maintenance. The Department sent the company a NOV for this incident on December 4, 2012. The company sent the Department the required NOV response letter dated December 13, 2012, which stated that to prevent future incidents of this nature, they have revised their training and maintenance procedures to include a lockout tag on all valves associated with the maintenance task. This will clearly identify which valves must be returned to their in-service state prior to task completion. The Department imposed a civil penalty of \$15,000 on Texas Eastern for this incident in a consent assessment executed on April 17, 2013.

For facilities authorized under a general permit, the Department would take an enforcement action that may include a civil penalty. Based on the site-specific facts, a determination would be made whether the facility's authorization to use the general permit would need to be revoked.

Comment 78: The commentators state that the general permits cannot adequately regulate natural gas facilities because they deprive citizens of any formal notice or comment period prior to issuance. Public participation is the lynchpin of both federal and state environmental laws. The CAA and APCA require a 30-day public comment period prior to issuance of an individual major air pollution permit. Site-specific minor source permits also require a 30-day public comment period prior to permit issuance. In fact, Section 160(1) of the CAA “establishes a statutory policy of providing for informed public participation in the permitting process,” and Section 165(a)(2) categorically precludes the issuance of a PSD permit absent an opportunity for the public to review the decision and submit comments. Because Pennsylvania's regulations fail to require public notice or comment for authorization to use a general permit, operators can use the general permits to avoid the public participation process entirely.

The commentators state that Pennsylvania's regulations for plan approvals do provide that the Department will prepare a notice on actions to be taken for certain sources and for “other sources for which the Department has determined there is substantial public interest or for which the Department invites public comment.” Plan approval public notices must state that a “30-day comment period, from the date of publication, will exist for the submission of comments,” and the notice must include “the ending date for the receipt of written comments or written protests.” (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 568, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040, 1835)

Response: The Department offers a robust public comment period during the drafting of all General Permits as required under 25 Pa. Code § 127.612 and 25 Pa. Code § 127.632. Specifically, for the proposed general permits, the minimum 45-day comment period was lengthened to 120 days. The Department received over 9,357 comments from the public, the comments of whom are summarized within this C/R Document. All comments were considered and responded to, and where it was merited, changes were made to the proposed general permits. Additionally, the Department proposed a second 45-day comment period on March 31, 2018 for the revised general permits for which a second C/R Document was prepared.

In addition, as part of the general permit application, operators must notify the local municipality and county, including a description of the proposed sources and/or modifications, prior to submitting the application to the Department. The proof of municipal notification is required to accompany the application for authorization to use a general permit. However, there is not a formal public comment period for the authorization because the terms and conditions of the general permits have been established with public participation prior to issuance and are not subject to alteration. Any operator that cannot or will not abide by the terms and conditions of the general permit will not be granted authorization to use the general permit and would be required to submit a site-specific plan approval application. The public would be able to participate in the site-specific plan approval process through the normal comment period.

The public comment period for general permits have their own public notice and review period, which was extended for these general permits to nearly triple the required length. Notice was given in 47 Pa. B. 733 that the Department proposed a new GP-5A and revisions to GP-5 with comments accepted until Wednesday, March 22, 2017. In 47 Pa. B. 1235, notice was given that the comment period was extended

until Monday, June 5, 2017. Both notices fulfilled the requirements for a comment period with a clear ending date for receipt of written comments or written protests.

Comment 79: The commentators state that the clear intent of the CAA is to encourage public participation in permitting decisions and enforcement. The citizen suit provision of the CAA allows any person to commence a civil action against any person including government instrumentalities for alleged violations of an emission standard or limitation or an order issued by the Administrator or State with respect to such. The legislative history of the CAA explicitly recognizes that it is “too much to presume that [agencies]...however well-staffed or well-intentioned...will be able to monitor the potential violations of all requirements of the CAA,” and that noncompliance will always exist to a degree “far beyond the capacity of the Government to respond to.” (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 352, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: The Department is authorized under Section 6.1 of the APCA and implementing regulations in 25 Pa. Code Chapter 127, Subchapter H (relating to general plan approvals and general operating permits) to issue general plan approvals and general operating permits for any stationary air contamination source category if the Department determines that the source category can be adequately controlled using standardized specifications and conditions.

The Department provided adequate time for the public to submit their comments on the proposed general permits and Exemption 38 as detailed in the previous responses to comments. The Department received over 9,357 comments from the public, the comments of whom are summarized within this document. All the comments were considered and responded to, and where it was merited, changes were made to the proposed general permits.

In addition, as part of the general permit application, operators must notify the local municipality and county, including a description of the proposed sources and/or modifications, prior to submitting the application to the Department. The proof of municipal notification is required to accompany the application for authorization to use the general permits. General permits and authorizations to use the general permits are appealable and permit terms are enforceable as discussed in responses to prior comments.

Comment 80: The commentators are concerned that the Department’s Bureau of Air Quality staffing for monitoring emissions, permitting, and enforcement are inadequate. In 2016 Secretary John Quigley testified to this fact before the Senate Majority Policy and Senate Democratic Policy Committees. It was reported in 2017 by the *Pennsylvania Environmental Digest* the EPA has cautioned the Department on staffing inadequacies in the Bureau of Air Quality. The commentators are convinced that the Department is in violation of the CAA and APCA and needs to adequately fund and staff the Bureau to fulfill its mandate to protect the public health by limiting criteria pollutants and GHG. (35, 228, 568, 1020)

Response: The Department appreciates the concern for the demand of Department’s resources for the effective implementation of permitting and enforcement of the general permits for natural gas operations.

The Department will have adequate resources for an effective implementation of the program; to this end, the Department developed an electronic application system through an e-Permitting platform to

expedite review of applications. This electronic application system will enable Department personnel to authorize the use of the general permits in an efficient manner.

Comment 81: The commentators state that the oil and gas industry has proved many times that they are incapable and unwilling to monitor themselves. The Department has not taken a properly active role in enforcing U.S. EPA's oil and gas regulations at 40 CFR Part 60 Subpart OOOO nor has the Department conducted Air Quality inspections to verify compliance with Subpart OOOO. There is no mechanism to register which wells are subject to Subpart OOOO, and the Department has not acknowledged that unconventional oil and gas wells have the same types of equipment as other facilities that are required to obtain air permitting. (786, 1032, 3333)

Response: The Department has evaluated well completion data reports that are tracked by the Oil and Gas Program and compared the data to information that the Bureau of Air Quality has, including compliance demonstration reports required by Exemption 38 and annual emissions reports that have been required by Air Quality since 2012. 40 CFR Part 60 Subpart OOOO requires that performance test results be submitted to EPA's Central Data Exchange, which is accessible by the Department. The Department has sent Notice of Violations to well operators for over 200 wells and executed many civil penalty agreements with Oil and Gas operators.

Comment 82: The commentator recommends that the Department require records to be maintained if the facility is in operation and for five years after the end of production since general permits last forever. The public should also have access to the records as it would allow them to follow their exposure history due to specific sites. (568)

Response: The general permits are in effect unless and until the Department modifies, suspends, or revokes them. However, operators that apply for authorization to use the general permits are only granted authorization for a term of five years. Except for confidential information as described in 25 Pa. Code § 127.12(d), all records, reports or information obtained by the Department or referred to at public hearings shall be available to the public, see 25 Pa. Code § 127.12(c).

Comment 83: The commentators recommend that the Department require operators that violate the law to immediately cease operations and take enforcement actions with severe penalties for the infringement. (19, 1271)

Response: The Department understands the concern about compliance and intends to effectively monitor operations under these general permits and the conditional permit exemption. The Department will take compliance and enforcement actions when it discovers violations which can vary depending on the severity of the violation.

Malfunction Reporting Requirements

Comment 84: The commentators ask what analysis the Department performed to justify the mandatory reporting of any malfunction or anomaly, regardless of whether it resulted in any emissions. (853, 867, 871, 919)

Response: The notification, recordkeeping, and reporting requirements in the proposed general permits were determined to satisfy 25 Pa. Code § 127.12b and § 127.441, which included all federal notification, recordkeeping, and reporting requirements. However, due to substantial comment, the Department has

reduced the number of these requirements. Nothing in the final general permits relieves the Responsible Official from the obligation to comply with all applicable federal, state, and local laws and regulations.

Comment 85: The commentators state that deviation reporting is unnecessary as it is specific to Title V source reporting, which is not appropriate for minor source authorizations or compliance activities. (916, 919, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053-1055)

Response: “Affected sources” are required to meet all applicable state and federal requirements, including recordkeeping requirements for deviations for certain sources. For minor facilities, the federal requirements are the same with the only difference being a minor facility does not require a permit. However, in Pennsylvania, minor facilities are required to obtain a permit unless they are exempted. The deviation definition has been removed in the final general permits and defaults to the definition in the applicable federal subparts.

Comment 86: The commentators state that adopting the definition of ‘malfunction’ in Section A, Condition 3, would result in a significant increase in the number of notifications and reporting associated with blowdown events. The commentators agree that the emissions from blowdowns should be included in the annual emissions inventory report, but disagrees that notification requirements should be adopted. The commentators also note that the TSD does not articulate a reasoned basis to require blowdown notifications. (930, 936, 944, 1052)

The commentators point out that there are many reasons for blowdowns, generally for safety, and that blowdowns should not be considered malfunctions. Examples of when blowdowns may be required include when pressurized equipment is evacuated to conduct maintenance during planned or unplanned maintenance shutdowns and when pipeline demand changes, resulting in equipment being taken offline and depressurized for safety. In some cases, facilities may experience daily blowdowns or even multiple blowdowns per day, as part of standard operations. (930, 936, 1052)

By classifying these types of events as malfunctions, the operators would be obligated to report under Section A, Condition 10(d)(ii) of the proposed general permits. The notification requirements as proposed would likely create a significant compliance burden. Operator experience is that blowdowns from standard operations do not trigger complaints from the public. If the Department has records of public complaints, they should be discussed with industry so a reasonable notification process can be developed to address concerns about blowdowns. For example, notification should be limited to emergency shutdowns and planned outages for major maintenance with a defined de minimis notification threshold to prevent excess notifications. (930, 936, 1052)

Response: In the final general permits, blowdown notifications are required in accordance with the GP5 Malfunction Reporting Instructions. This eliminates notifications for scheduled and unscheduled blowdowns which do not result in an exceedance of the permit limits or create an offsite risk. Unplanned emergency shutdown events that result in a potential exceedance of permit emission limits or create an offsite risk are required to be reported. The required unscheduled blowdown must be notified to the Department because of uncertainty of emissions involved during the unscheduled blowdown. Process equipment incidents, or air pollution control equipment shutdown or reduction in control which results in methane, VOC, NO_x, CO, HAP, or Formaldehyde emissions that exceed the general permits’ emissions limits or requirements are reportable.

Comment 87: The commentators state that the definition of “malfunction” is vague and overbroad. The notification, recordkeeping, and reporting requirements for malfunction should only be required if the malfunction causes an increase in emissions or creates a hazardous situation with respect to public safety or the environment. The commentators recommend using the current GP-5 Malfunction Reporting Instructions document as guidance as it was developed in cooperation with the Department and industry. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053-1055)

Response: The terms “deviation” and “malfunction” are defined in the federal regulations. The requirements are not limited to Title V permits because there is an uncertainty of emissions involved in any malfunction. The notification and reporting requirements for a malfunction are consistent with federal regulations and the GP-5 Malfunction Reporting Instructions.

Comment 88: The commentator states that controller malfunction records that are identified in LDAR inspections should satisfy the recordkeeping requirements through the survey record. These records are available to the Department upon request, so reporting should not be required. (1003, 1055)

Response: To provide adequate information, malfunctions must be reported in accordance with Section A, Condition 11(c) of the final general permits. The GP-5 Malfunction Reporting Instructions should be used for guidance on notification, recordkeeping, and reporting.

Comment 89: The commentator commends the Department on the malfunction reporting requirements of the proposed general permits. However, the commentator recommends changing all malfunction notifications to mandatory one-hour reporting and not allowing operators to judge whether the malfunction and resulting emissions pose “imminent danger” to health and safety. Personnel on-site do not have the information and expertise necessary to make that determination, nor do operators conduct immediate air sampling to identify the composition of gases emitted after a malfunction occurs. (1021, 1037)

Response: Imminent danger is clearly laid out in the GP-5 Malfunction Reporting Instructions. There is no “grace period” with reporting malfunctions. Malfunctions that may cause imminent danger are required to be reported within one hour to both the County Emergency Management Agency and the Department’s 24-hour Emergency Hotline. Malfunctions that do not create imminent danger are required to be reported within 24 hours.

BAT Determinations

Comment 90: The commentators state that the analyses presented in the Department’s TSD that accompanied the proposed general permits did not adequately justify certain controls as BAT. In some cases, the lack of justification was due to an inadequate cost-effectiveness analysis, in others because BAT was based on incomplete or inaccurate data. Economic factors such as the interest discount rate for capital investment and the estimated equipment life were apparently omitted from the analyses. (853, 867, 871, 916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: New sources are required to control the emission of air pollutants to the maximum extent, consistent with the BAT as determined by the Department. BAT is defined in 25 Pa. Code § 121.1 as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or

may be made available. The applicable emission limits of Federal NSPS and NESHAPS will serve as a baseline for determining the BAT.

The resources utilized in the determination of BAT for GP-5 and GP-5A include the BAT included in the plan approvals which are determined on a case-by-case basis, general permits, and other permits issued by other states, for similar sources. The Department also evaluated vendors' guaranteed emission limits, available stack test data, and stakeholders' submitted data for the applicable sources.

The emission limitations included in the GP-5 are determined by the Department to be technically and economically achievable. In addition, these emission limitations are determined to be sustainable during the life of the unit. The Department has determined that the emission limitations in the final GP-5 constitute BAT.

Cost-Effectiveness Thresholds

Comment 91: The commentators state that the cost-effectiveness thresholds used by the Department have no apparent rationale and do not appear to be applied consistently. In addition, the proposed cost thresholds are much higher than those used in the recent RACT II rulemaking and in other general permits. The commentators recommend remaining consistent with other rules and general permits and use a range of \$5,000 to \$6,500 per ton of NO_x removal. (916, 919, 928, 930, 936, 944, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054)

Response: Nearby states such as New Jersey routinely require controls with cost-effectiveness values around \$10,000/ton. More importantly, U.S. EPA determined that \$10,000/ton was cost-effective for best available control technology (BACT) for the control of NO_x emissions from petroleum refineries. See the Memorandum of John S. Seitz to Air Division Directors, re: BACT and LAER for Emissions of Nitrogen Oxides and Volatile Organic Compounds at Tier 2/Gasoline Sulfur Refinery Projects (January 19, 2001).

The Department does not have a bright-line number for a case-by-case RACT II determination. The RACT threshold applied to existing sources is generally lower than the BAT threshold applied to new sources. The Department does not see any need to limit the cost-effectiveness range as suggested by the commentators for the determination of BAT for new sources in the final general permits.

Multi-Pollutant Approach to Evaluating Cost-Effectiveness

Comment 92: The commentators state that the Department should not apply a multi-pollutant approach when establishing cost-effectiveness thresholds or evaluating the cost-effectiveness of controls. This multi-pollutant approach is inconsistent with how BACT is determined in 40 CFR Part 52, which is how the Department has traditionally implemented BAT. Even if the Department asserts a multi-pollutant approach is warranted, the evaluation should include all pollutants, not just those that are reduced. (916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The Department disagrees. The Department did consider multipollutant for a single control system in the past BAT determination. If a single control system is designed to reduce multiple pollutants, it is appropriate to consider the reduction of all pollutants for the investment of a single control system for the evaluation of BAT.

The Exemption 38 finalized in 2013 required 95% control of any emission unit exceeding emission thresholds of 2.7 tpy of VOC, 0.5 tpy of single HAP, and 1.0 tpy of total HAP. It should be noted that not a single plan approval was submitted for an unconventional natural gas well site despite the requirement to install 95% VOC control on storage vessels and other equipment. This means either the installation of control is cost effective, or that the sources in question emit less than 2.7 tpy of VOC, 0.5 tpy of single HAP, and 1.0 tpy of total HAP.

Statutory/Regulatory Authority

Comment 93: The commentators recommend that rather than expanding the applicability of GP-5 to include transmission stations, the Department should instead offer a separate permit for these facilities. By including transmission stations in the proposed GP-5, additional requirements are created that affect all three types of facilities. One example of this is the federal requirements for natural gas processing plants that now appear to apply to both compressor stations and transmissions stations in the proposed GP-5. The commentators recommend incorporating the requirements to remove this confusion. Another example is that transmission stations generally require higher total site horsepower than gathering or midstream facilities and have available grid power and access to pipeline quality gas so are likely to require ultra-low NO_x limits to remain below the major source threshold. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1045-1048, 1053, 1054)

Response: The Department does not believe transmission sources need to be in a separate general permit. The source categories in GP-5 are also applicable to sources located at gas transmissions facilities. Therefore, GP-5 included sources located at gas transmission facilities. In lieu of seeking authorization to use GP-5, the owner or operator of sources located at gas transmissions facilities may apply for source specific plan approvals and operating permits.

The Department has incorporated the federal requirements by reference except where a BAT determination was made and found to be more stringent than the federal requirements. The Department also evaluated engines with a wide range of horsepower used at natural gas production, compression, and transmission facilities. The Department has determined different BAT for various size categories covering engines located either at midstream or transmission facilities. The owner or operator of the respective facilities must comply with the applicable requirements.

Comment 94: The commentators recommend deleting or clarifying the applicability of the proposed general permits to “new or modified” facilities as it raises questions concerning existing facilities. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Modified facilities are those that drill a new well, hydraulically fracture a new well, hydraulically fracture or refracture an existing well, or install a new source at a GP-5A applicable facility or those that install a new source at a GP-5 applicable facility. This means a modified facility that is not capable of meeting the conditions of Exemption 38(c) should obtain a GP-5A. A modified facility subject to the previous GP-5 should apply for the final GP-5 prior to modification. A modified facility subject to the final GP-5A or GP-5 should apply for a new authorization unless the modification meets the de minimis requirements of Section A, Condition 15.

Comment 95: The commentators state that with data suggesting emissions from transmission stations are significant, it is critical for the sources to be subject to control and monitoring requirements. By

adopting these requirements Pennsylvania will be on par with other leading states, and the commentators support the Department in this decision. (1026, 1041)

Response: The Department appreciates the comment and agrees. The sources at natural gas transmission stations must meet all recordkeeping, reporting, monitoring, and testing requirements of the finalized GP-5.

Applying BAT to Existing Sources

Comment 96: The commentators recommend removing the applicability dates for all equipment so that all equipment at a facility would be subject to the same, most stringent, BAT standard. This is especially true for controlling methane emissions as the proposed general permits are the first to introduce a methane standard. (568, 1020)

Response: All sources are required to implement BAT pursuant to 25 Pa. Code § 127.1 upon construction or modification. For plan approvals, 25 Pa. Code § 127.1 requires BAT to be determined by the Department at the time of issuance of the plan approval. BAT is not an evolving standard, meaning a source installed under one BAT determination is not required to change to a more stringent standard. However, if the source must be replaced or modified, it will be required to meet the current BAT applicable to the source.

Comment 97: The commentators state that the proposed requirements based on construction date is critical to maintain. The relocation of units within Pennsylvania and modification to existing units should not trigger this section as neither relocated units nor modified units would increase the operator's emissions. Both relocated and modified units would potentially require far more extensive cost and effort to retrofit. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: Relocating an existing piece of equipment within a facility does not constitute new construction. However, relocating from one facility to a new facility constitutes construction of a new source and triggers the BAT requirement. Each federal subpart has its own applicability, which may be based on the manufacture date.

Voluntary Measures as BAT

Comment 98: The commentators recommend that the Department consider performance standards that have been voluntarily implemented by unconventional natural gas well site operators to qualify as BAT. The Center for Responsible Shale Development (CRSD) has developed performance standards that “are designed to be more stringent and in-depth than those required by state and federal governments.” Four companies that operate in Pennsylvania follow CRSD's performance standards and are “Certified Responsible.” This strongly suggests that the equipment, devices, methods, and techniques that are required by the standards are “available” within the meaning of BAT.

The equipment, devices, methods, and techniques required by CRSD's performance standards would minimize the emissions of air contaminants to a greater extent than the proposed general permits. The Department's TSD does not indicate it considered CRSD's performance standards when establishing BAT and creating the terms and conditions in the proposed general permits. The Department should determine whether CRSD's performance standards are BAT and revise the proposed general permits accordingly. (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632,

690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: The CRSD's voluntary performance standards are generally less stringent than the terms and conditions of the final general permits. A comparison of CRSD, EPA and state standards is available on the Department's website, under the Methane Reduction Strategy page, see Briefing Paper - Appendix.

Methane Control

Comment 99: The commentators state that the proposed general permits establish a 200 tpy threshold for permitting emissions of methane and are concerned that establishing a threshold through the general permits, rather than a formal rulemaking process subject to the full administrative process established by the Commonwealth of Pennsylvania, sets an onerous precedent. U.S. EPA has not established a National Ambient Air Quality Standard (NAAQS) for methane or for CO₂ equivalent. The proposed 200 tpy methane *de minimis* threshold does not have a basis in underlying federal or state regulations.

The TSD indicates that the threshold was established by back-calculating a methane limit from the VOC threshold of 2.7 tpy and a factor based on an analysis of natural gas methane and VOC content. The analysis used a very limited sample of gas composition analyses and no information was provided as to how these samples were selected or whether they are typical of natural gas composition. Two averages were derived, an average *de minimis* value based on the individual calculated and a *de minimis* value based on an average gas composition. The 200 tpy *de minimis* threshold was derived from the average gas composition and appears to have been arbitrarily selected based on subjective opinion.

The commentators recommend the Department perform additional analysis as part of a separate rulemaking to determine whether a limit is appropriate and, if so, to justify the methane threshold which triggers air permitting requirements. In the interim, the commentators recommend that the proposed general permits continue to adopt the existing VOC emission threshold of 2.7 tons per year to determine permit applicability. (853, 867, 871, 916, 919, 928, 930, 936, 944, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1056)

Response: The process for determining the methane control threshold is shown in Appendix A of the TSD. The analysis was expanded from the TSD proposed on February 4, 2017, based on comments received. Questionable gas samples were discarded and new gas samples were incorporated. In addition, all units are clearly indicated in the analysis.

The discussion can be found under Table 10, which shows the results of the calculations performed. The 200 tpy methane control threshold is one of four tests; others are 2.7 tpy VOC, 0.5 tpy of a single HAP, and 1.0 tpy of total HAP to determine if glycol dehydration units, storage vessels, pumps, and pigging operations require the installation of control. Emissions greater than or equal to any one of the limits requires that the source be controlled. The Department's BAT is applicable to each source or an emission unit, not to an entire facility, which is why 200 tpy is a source or unit-specific threshold and not a facility-wide control threshold.

Comment 100: The commentators state it is inappropriate to calculate a *de minimis* amount of a pollutant by merely considering the ratio of emission rates of that pollutant and another pollutant from the same source. The 200 tpy of methane threshold equates to approximately \$200,000 in damage, at \$1,000 per ton of methane which is a central estimate of damage as determined by U.S. EPA in their

social cost of methane calculations. The commentators state that such extensive damage cannot be considered de minimis.

The commentators recommend that the Department improve the proposed general permits by significantly lowering the methane control threshold for glycol dehydration units, storage vessels, and pigging operations. (3-8, 11-14, 17, 18, 20-22, 24, 25, 28, 29-31, 35, 36, 38-40, 43-46, 48, 49, 51-53, 55-57, 59-61, 63-65, 67, 69-72, 74-79, 82-86, 89-96, 99, 101-104, 106-109, 111, 113, 116, 117-119, 121, 122-145, 147, 148, 150-152, 155-169, 172-176, 178-190, 192-200, 202-205, 207-219, 221-224, 228-231, 234-239, 241-245, 247, 250, 251, 253-255, 257, 258, 261-271, 273-280, 283, 285, 287, 289, 291-300, 303-305, 308-310, 312, 314-322, 324-327, 329-334, 336-339, 342-344, 347-349, 351, 352, 354, 356-358, 360, 362, 363, 366, 367, 369-374, 376, 380, 384-387, 389-391, 393-406, 408, 409, 411-414, 417-419, 421, 423-425, 427-436, 439-442, 445, 448-459, 461-470, 474, 475, 477-481, 484-488, 490, 492-495, 497-499, 501, 502, 504-517, 519-525, 527-534, 536-544, 546-550, 552-554, 556-563, 565-568, 571-575, 577-580, 582, 583, 585-591, 593-595, 599-604, 607-613, 616-620, 622-624, 627-631, 633-639, 641-643, 645-649, 651-665, 667-669, 671-674, 677, 679-683, 685, 687-689, 691-705, 708-710, 712-714, 717-728, 730-732, 735-745, 747, 749, 750, 752-755, 756, 759-763, 765-768, 770, 771, 773-776, 779-783, 786-799, 802, 807-809, 811, 813, 815-817, 819-825, 827-839, 842, 845-852, 875, 876, 878-899, 1004, 1007-1009, 1014, 1017, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037-1040, 1042, 1057-2335, 4602, 4629-5105)

Response: EPA used a Social Cost for Methane of \$1,000 (in 2012 \$ per metric ton) at a discount rate of 3% in the rulemaking of NSPS Subpart OOOOa for oil and gas industries. EPA's social cost for methane ranges from \$1,000 to \$2,800 for various discount rates. The estimate of \$2,800 is the 95th percentile of the social cost for methane. EPA's conclusion is largely based on its use of a model called the Social Cost of Methane. EPA used this model to place a present-dollar value on projected future benefits to the climate from reducing methane emissions. Based on the model and the three percent discount rate that EPA used in the cost effectiveness analysis, EPA determined that every ton of methane emissions that this rule prevents was worth \$1,100 in 2015.

The Department used a conservative measure of \$1,000/ton methane reduced as cost effectiveness threshold for feasibility of methane reduction measures. The 200 tpy methane control threshold is one of four tests; others are 2.7 tpy VOC, 0.5 tpy of a single HAP, and 1.0 tpy of total HAP; to determine if glycol dehydration units, storage vessels, pumps, and pigging operations require the installation of control. Emissions greater than or equal to any one of the limits requires that the source be controlled. The Department's BAT is applicable to each source, not to an entire facility, which is why the 200 tpy threshold is a source-specific and not a facility-wide control threshold.

The detailed analysis is included in the TSD.

Comment 101: The commentators state that Department asserted in the TSD that 200 tpy of methane is the equivalent of 2.7 tpy of VOC. However, this analysis assumes they are equivalent in terms of cost which the Department must conduct an analysis to determine if this is true. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department does not assert that 200 tpy of methane is equivalent to 2.7 tpy VOC. The Department showed, by way of engineering calculations, that an emitted gas stream of a certain composition would emit 2.7 tpy VOC and 200 tpy methane. The Department considered the costs for VOC and methane separately.

Comment 102: The commentator states that for BAT “the emission limitation included in the general permits must be technically and economically feasible and must be sustainable during the life of the air pollution source.” The Department has not demonstrated this criterion for several requirements; for example, well pad sources and compressor station sources, to a lesser extent, may exceed an uncontrolled 200 tpy methane PTE initially, but may drop off over time. This reduction in emissions should be included in the Department’s evaluation of the expected life of the equipment. (919)

Response: The emission limitations included in the general permits are technically and economically feasible, and the limits are sustainable during the life of the air pollution source through proper maintenance of the source and associated control. A reduction in the throughput of a source due to declining well pressure has no bearing on whether a control device will be effective; in fact, the reduction in volume will result in an additional reduction in emissions. However, if the operator desires to remove a control, they may submit a plan approval application to determine a case-by-case BAT.

Comment 103: The commentators state that methane emissions have been reduced as a co-benefit of utilizing controls principally designed or intended to reduce other emissions. The Department should recognize these co-benefits, which are already being realized in Pennsylvania through Exemption 38. Although the federal regulations on which Exemption 38 is based were promulgated to reduce VOC emissions, they have served to also reduce methane as they originate from the same hydrocarbon stream. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The Department agrees that controlling VOC will help control methane. However, for dry gas well sites, there is minimal VOC in the gas stream, which may allow the owner or operator to install and operate high methane-emitting sources without triggering VOC control. Under Exemption 38(c) and GP-5A, the owner or operator will be required to install and operate control on an individual source when methane emissions will exceed 200 tpy.

General Requirements

Comment 104: The commentators state that the General Requirements section should provide overall facility requirements and clarity in terms of language and definitions. For many parts of this section, the Department has tried to combine definitions and requirements from multiple federal regulations, which leads to confusion. In addition, the Department notes the federal regulations as the basis for the state regulatory language; when these federal regulations are modified, it raises a question of regulatory authority and a resulting need to modify the general permit to maintain applicability. For these reasons, the commentators recommend that the Department incorporate the federal regulations by reference. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053-1055)

Response: The Department has incorporated the federal regulations by reference except where a BAT determination was made and found to be more stringent than the federal requirements.

Definitions

Comment 105: The commentator states that if the Department’s intent was to take various federal definitions and create one definition for industry to follow to reduce confusion, although the commentator appreciates the intent, the result just leads to an additional definition to comply with. Also, if one of the federal definitions were to change, then industry would still have to comply with the

revised federal definition. Therefore, the commentator recommends the Department simply cite the existing defined terms. (1055)

Response: As stated in Section A, Condition 3 “Words and terms that are not otherwise defined in this General Permit shall have the meanings set forth in Section 3 of the APCA (35 P.S. § 4003) and Title 25, Article III including 25 Pa. Code § 121.1 unless the context indicates otherwise.

The meanings set forth in applicable definitions codified in the Federal Code of Regulations including 40 CFR Part 60, Subparts KKK, JJJ, KKKK, OOOO, and OOOOa or 40 CFR Part 63, Subparts HH and ZZZZ shall also apply to this General Permit.” The definitions included in GPs assures compliance with all applicable state and federal requirements. Federal definitions are used for the applicable federal requirements. The definitions provided in the final GPs and at 25 Pa. Code § 121.1 are used for applicability of the state requirements.

Comment 106: The commentator states that the terms “*blowdown*” and “*venting*” should be defined as “*releases to atmosphere of pressurized natural gas.*” The commentator states that it will not be possible to comply with the proposed GP-5A requirements unless these terms are defined. (1003)

Response: The Department disagrees; not every word must be defined. Blowdown and venting are self-explanatory, blowdowns being a venting operation conducted to purge gas from equipment that is idled or being prepared for maintenance. Venting is releasing pressurized natural gas to the atmosphere.

Comment 107: The commentators state that the definition of “coal bed methane” in the previous GP-5 is sufficient and should not be changed. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department agrees. In the final version of GP-5, the Department has reverted to the definition of coal bed methane found in the previous GP-5.

Comment 108: The commentators state that the Department blends language from more than ten regulatory references and at least five federal subparts to provide the definitions of “*difficult-to-monitor*” and “*unsafe-to-monitor.*” The current GP-5 currently requires facilities to meet applicable federal regulations, which would include definitions referenced by those programs. It should be noted that these regulatory definitions typically apply only to a leak detection and repair program that uses Method 21. For facilities that perform LDAR in accordance with the current GP-5, which is based on FLIR/OGI technology, these definitions have limited applicability. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department agrees and has removed the definitions of “difficult-to-monitor” and “unsafe-to-monitor” from the final version of the general permits.

Comment 109: The commentators state that the definition appears to be a blend of six regulatory definitions found in 40 CFR Part 60 Subparts VV, VVa, KKK, OOOO, and OOOOa and 40 CFR Part 63 Subpart HH. These federal Subparts are already referenced in the previous and proposed GP-5. The commentators recommended a new definition for facilities subject to a GP-5-only monitoring program and not a federally regulated program.

The commentators state that the definition of “*fugitive emissions component*” is inconsistent with the definition in 40 CFR § 60.5430a because, as written, it does not exclude covers, closed vent systems, thief hatches, or other openings on a controlled storage vessel. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: As stated in Section A Condition 3 “Words and terms that are not otherwise defined in this General Permit shall have the meanings set forth in Section 3 of the APCA (35 P.S. § 4003) and Title 25, Article III including 25 Pa. Code § 121.1 unless the context indicates otherwise.

The meanings set forth in applicable definitions codified in the Federal Code of Regulations including 40 CFR Part 60, Subparts KKK, JJJJ, KKKK, OOOO, and OOOOa or 40 CFR Part 63, Subparts HH and ZZZZ shall also apply to this General Permit.” The definitions included in GPs assures compliance with all applicable state and federal requirements. Federal definitions are used for the applicable federal requirements. The definitions provided in the final GPs and at 25 Pa. Code § 121.1 are used for applicability of the state requirements.

Comment 110: The commentators suggest the definition of “*gob gas*” in the current GP-5 is sufficient, and should not be changed. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: There is no definition of “*gob gas*” in the current GP-5. One was added to the proposed GP-5 for clarity, and the definition was included in the final GP-5.

Comment 111: The commentators suggest that the definition of “*haul road*” be deleted as Section B is not appropriate as BAT for GP-5 sources and should be removed, and the definition would not be needed if the proposed alternative language for control of fugitive particulate emissions is adopted. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department has removed the definition of “*haul road*” from the general permits as Section B, relating to Fugitive Particulate Matter has been removed and replaced with a citation to 25 Pa. Code §§ 123.1 and 123.2 in the final general permits.

Comment 112: The commentators recommend that the definition of “*leak*” be altered, and if the suggested definition is not adopted, it is recommended that the definition of “*leak*” be made consistent with the federal definition. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The leak definition is consistent with the federal definition for fugitive emissions. The Department has excluded releases from any equipment or component designed by the manufacturer to protect the equipment, controller and personnel, and to prevent ground water contamination, gas migration, or an emergency situation. The Department will not allow operators to exclude detected leaks by switching detection methods mid-inspection.

Comment 113: The commentators state that the definition of “*leak*” does not match the definition given in Section K Condition 1(d). The definition in this section includes any detectable release, while Condition 1(d) gives a threshold of 500 ppmv for instrument detection. (919, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department appreciates the comment and has corrected this oversight in the final general permits.

Comment 114: The commentator states that there is no definition for “*modification*,” which is of critical importance to existing sources. Understanding what constitutes a “*modification*” is vital to industry as certain modifications will require existing sources to apply for and obtain the general permit. The term “*modification*” is defined differently across the spectrum of state and federal regulations; specifically, a modification under 40 CFR Part 60 is not necessarily a modification under the new source review regulations or Pennsylvania’s plan approval regulations. The commentator points out that it appears the GP-5A is attempting to accommodate both definitions, and as such, the Department should clearly define what constitutes a modification and the associated permitting obligations triggered by modifying an existing affected source. (1055)

Response: The definition of modification found in 25 Pa. Code § 121.1 applies.

Comment 115: The commentators state that the definitions for “*natural gas compressor station*,” “*natural gas processing plant*,” “*natural gas transmission station*,” and “*point of custody transfer*” provide no additional clarity or import to the GP-5 and suggest that they be removed. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department disagrees; the definitions for these terms have been added for clarity.

Comment 116: The commentators state that the definition for “*natural gas compressor station*” includes compressor stations that compress coalbed methane and gob gas. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: This is correct and consistent with the previous GP-5.

Comment 117: The commentators suggest that the definition of “*pigging operations*” be replaced with a definition of “*pigging vessel*.” This is to clarify to the permitting engineers that the volume and operating conditions for the entire pipe and launching/receiving vessels are not required to calculate emissions. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The purpose of the definition of “*pigging operation*” is to describe the operation and not to instruct how to calculate emissions. As a result, the Department will not make the requested change.

Comment 118: The commentators agree with the definition of “*sour gas*” and do not find any conflict with other regulatory requirements. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department appreciates the comment.

Comment 119: The commentator states that the definition for “*start of production*” should not limit well flow to temporary equipment to only 30 days, as it is not always possible to meet this limit. (919)

Response: The definition is to clarify the term “*start of production*,” which is only used to determine when to start an instrument-based LDAR program. There is no impact on exceeding 30 days other than operators have 60 days from the 31st day of selling gas through temporary equipment to conduct the first instrument-based LDAR survey.

Comment 120: The commentator states that the definition of “well completion” is a point in time (i.e., “the beginning of the flowback period...”). This differs from the federal definition of a “well completion” as “...the process that allows the flowback of...” Such reinterpretations of existing definitions may lead to confusion for both the industry and the Department. (1055)

Response: The Department agrees. The final GP-5A does not have a separate definition for “well completion.”

Comment 121: The commentator suggests adding a definition for “*wet gas*.” (972, 981)

Response: The final general permits do not include a definition for the term “wet gas” because there are no requirements explicitly needed for “wet gas” operations.

Applicability/Scope

Comment 122: The commentators show support for the applicable sources, but recommend that the requirements should be extended to include transmission and distribution pipelines. However, the commentators believe that all methane emissions from operations, production, completion, and transmission are major sources of pollution and should be required to obtain plan approvals and Title V operating permits. (491, 568, 1038)

Response: Utility distribution lines and transmission pipelines are under the jurisdiction of the PA Public Utility Commission or the US Department of Transportation. Applicants must demonstrate to the Department’s satisfaction that their facility is minor to be eligible for a general permit. Major sources are required to obtain plan approvals and operating permits in accordance with 25 Pa. Code Chapter 127.

Comment 123: The commentators state that the proposed GP-5A applies to unconventional natural gas wells. The commentators recommend that the GP-5A also apply to unconventional wells that also produce oil. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The definition of “unconventional well” specifically excludes wells that produce oil (see 58 PA.C.S § 3203). GP-5A was developed in conjunction with Exemption 38 which exempts oil wells from permitting.

Comment 124: The commentators recommend adding categories for facility gas releases from blowdowns that are not from an emission source covered in one of the existing 14 operations or emission sources in Section A Condition 4 and from maintenance, startup, or shutdown operations or clarifying where the emissions fit into the proposed GP-5. (930, 936, 1052)

Response: The Department has substantially revised the blowdown requirements, obviating the need to add a new category. Blowdowns are required to be reported in accordance with the GP-5 Malfunction Reporting Instructions.

Comment 125: The commentators recommend that the GP-5A should only be applicable after permanent operations have commenced. Temporary activities, such as those covered in Sections C and D of the proposed GP-5A, should not be included. This is primarily because, as written, the GP-5A would require the identification of production equipment specifications before the well characteristics are known. This would create additional burden for both industry and the Department, as frequent

amendments would have to be filed as actual equipment requirements become known. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department concurs. Sources covered under Sections C and D of the proposed GP-5A have been included in Exemption 38 and removed from the final GP-5A.

Comment 126: The commentators state that the current GP-5 has no references to pigging operations, and the commentator is unclear what federal regulations are being referenced in the Department's comment on pigging operations in the Basis Document. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department's referenced comment starting with "*Slightly modified from the current GP-5 to reflect updates to federal regulations...*" applies to the entire list, not just pigging operations. This comment refers to dehydrators, engines, turbines, reciprocating and centrifugal compressors, storage vessels, fugitive emissions components, controllers, and enclosed flares and other emission control devices as applicable sources that existed in the previous GP-5 that were reexamined in the context of 40 CFR Part 60 Subpart OOOOa. Subpart OOOOa also required the addition of pumps to the applicability list "*...and Department BAT analyses.*" Fugitive particulate matter, combustion units, tanker truck load-out operations, and pigging operations were examined and added to the applicability list in the context of BAT as required in 25 Pa. Code § 127.1.

Comment 127: The commentators support the inclusion of transmission stations in the final GP-5. (56, 410, 916, 928, 952, 961, 972, 981, 987, 991, 999, 1019, 1046-1048, 1053, 1054)

Response: The Department appreciates the support for this inclusion.

Comment 128: The commentators support the inclusion of pigging operations in the final general permits and reciprocating compressors and wellbore liquids unloading in the final GP-5A. (8, 25, 32-34, 42, 43, 49, 51, 54, 56, 59, 75, 78, 91, 94, 97, 98, 102, 107, 112, 116, 127, 132, 137, 153, 166, 178, 190, 191, 202, 219, 225, 239, 240, 243, 255, 270, 272, 273, 288, 282, 309, 325, 332, 336, 348, 351, 357, 365, 376, 391, 393, 401, 415, 418, 431, 440, 444, 446, 454, 459, 479, 482, 487, 490, 496, 500, 526, 543, 569, 578, 592, 600, 638, 644, 651, 670, 672, 673, 686, 689, 711, 720, 730, 731, 742, 745, 757, 760, 763, 775, 780, 796, 806, 822, 823, 828, 832, 845, 1019, 8754-9357)

Response: The Department appreciates the support for the inclusion of pigging operations in the final general permits and reciprocating compressors and wellbore liquids unloading in the final GP-5A.

Prohibited Use of the General Permit

Comment 129: The commentators note that a facility that produces or processes sour gas is not authorized to use the proposed GP-5. The commentators state that while the Department does not approve of the use of sweetening units for sulfur removal, the regulatory basis for this requirement is not clear. The commentators recommend that the Department revise this section to make it clear that the proposed GP-5 cannot be used to permit sweetening units. It should be noted that the processes permitted in the proposed GP-5 do not produce sour gas. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department is aware that the GP-5 applies to compression, processing, and transmission facilities and that none of these facilities produce sour gas. The use of the GP-5 is still prohibited for use by any of these facilities that process sour gas.

The Department does not disapprove of the use of sweetening units for sulfur removal. However, sour gas is rare in the Marcellus region, and facilities that produce or process sour gas warrant additional evaluation. Because these sources are not able to be addressed in the same standardized permit conditions, these general permits are not available for facilities handling sour gas.

Section A, Condition 4(a) clearly states that sweetening units are not applicable sources under the general permits.

Comment 130: The commentator commends the Department for including the provision against circumvention. (1032)

Response: The Department appreciates the comment.

Comment 131: The commentators recommend that the Department clarify or delete Section A, Condition 5(d) of the proposed GP-5A because it interferes with the ability of an operator to drill additional wells at an existing production location. It is not uncommon for an operator, based on economics, business plan, and other considerations, to drill one well on a pad and then return several years later to construct additional wells. As written, this requirement seems to prevent this. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: This condition is consistent with 25 Pa. Code § 127.216 and was included in the previous GP-5. Phased construction over time based on the factors listed in the comment would not constitute circumvention unless it can be demonstrated that the pattern of development was intentionally designed to avoid NSR. NSR only applies to major facilities, which are ineligible to use the general permits.

Authorization to Use the General Permit

Comment 132: The commentators state that Condition 6 does not specify how the Department will grant authorization or the timeline to expect a response after submitting an initial application. The current GP-5 suggests that an actual permit will be issued but does not clearly state if authorization is required following an application or if non-response from the Department after a given period of time constitutes authorization to use GP-5. (930, 936, 1052)

Response: When a complete application is received, the Department is required to take an action within 30 days as specified by 25 Pa. Code § 127.621(c). Notification to the operator of their authorization to use the general permits will be given either through the ePermit system or via mail.

Comment 133: The commentator states that “modification” has been defined in 25 Pa. Code § 121.1. Contrary to this definition, in its Exemption 38 FAQ document, the Department has identified scenarios where in-kind changes or like-for-like changes of equipment are deemed a modification. This creates uncertainty to operators as to when a modification has been made and requires reapplication. In addition, for scenarios where the operator is not increasing the emissions of the facility, the commentator recommends that notification to the Department is sufficient in lieu of a permit application. Requiring a permit application is not an effective use of Department resources for minor administrative changes

associated with an in-kind change. Absent the installation of additional equipment or replacing equipment with new equipment with higher emission, there is no need for the Department to conduct a full permit application review. (991)

Response: In accordance with 25 Pa Code Chapter 127, the Department considers the installation of “in kind” replacement of sources as new sources subject to BAT requirements. The final general permits allow replacement of equipment at the facility with identical equipment if the owner or operator complies with the requirements of 25 Pa. Code § 127.449(a), (b), and (d) through (i). The equipment being replaced needs to meet the current applicable BAT compliance requirements. The owner or operator must submit written notification in accordance with the additional information such as the manufacturer, model, rated capacity, and serial number of the equipment; and a certification from the owner or operator that the equipment will meet all applicable terms and conditions of this General Permit. The notification must be signed by a Responsible Official and acknowledge that the certifying party is aware of the penalties for unsworn falsification to governmental authorities as established under 18 Pa. C.S. § 4904. The certification must also state that based on the information and belief formed after reasonable inquiry, that the information in the notice is true, accurate, and complete; and the notice must identify and describe the pollutants that will be emitted as a result of the de minimis emissions increase and provide emission rates in tons per year and in terms necessary to establish compliance with any applicable requirements. The new Authorization to Use GP-5A is required for any engine requiring the installation of SCR to control NO_x emissions.

Comment 134: The commentators state that Condition 6(b) is another example of the Department requiring immense detail to activities that do not warrant the scrutiny. The typical 18-month lapse of construction limit does not account for the unique situations found at well sites. Although it is not common, it is possible for there to be an 18-month lapse between the drilling and completion of a well. While the Department allows for an extension if the request for extension is submitted at least 30 days prior to the end of the 18-month lapse, a complete permit application would be required if the request is denied. These commentators recommend striking the 18-month requirement, one commentator suggested replacing it with “at the end of the 5-year term” and states that operators should have the flexibility to begin and complete construction at any time within the 5-year window. (919, 928, 930, 952, 972, 981, 987, 1047, 1048, 1053, 1054, 1056)

Response: As required in 25 Pa. Code Section 127.13, if the construction, modification or installation is not commenced within 18 months of the issuance of the plan approval or if there is more than an 18-month lapse in construction, modification, or installation, a new plan approval application or extension request is required. Therefore, if there is a lapse in construction for more than 18-months the operator should request an extension with proper justification.

Comment 135: The commentators state that the proposed GP-5 and GP-5A require a complete permit reapplication when facility ownership is transferred. The commentators recommend that the Department handle change of ownership via a notification process similar to that currently implemented in other states. The commentators state that even with the improved change of ownership process, the standard application fee would still apply. One commentator recommends that the Department create a simple form to address transfers that will capture the relevant owner and operator information to affect a quick and efficient transfer of the permit from one entity to another. There can be an associated fee; however, the commentator suggests that the full application fee of \$1,700 seems unjustified for a simple permit transfer. One commentator recommends that transfer of ownership should not impose incremental

controls when there is no change in equipment or operations and should not trigger re-permitting. (916, 928, 930, 949, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The Department included an abbreviated change of ownership process that does not include reapplication unless the facility undergoes modification or requires a single source determination. See Section A, Condition 6(d) of the final general permits for details including the required fees.

Comment 136: The commentators appreciate the addition of administrative amendments to the proposed GP-5. However, the commentators state that the associated fee under Section A Condition 7 appears to have been taken from the fee used for minor modifications. It is the understanding of the commentators that minor modifications cannot be done under the GP-5 and that an administrative amendment under a plan approval is processed without charge. Therefore, the commentators recommend that the Department remove the fee for administrative amendments. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The administrative amendment fee of \$300 from 25 Pa. Code § 127.702(g)(3) is for a source proposing a change in ownership of a plan approval as per Condition No. 6(e). A fee of \$375 from 25 Pa. Code § 127.703(b)(3) is for extension, modification, revision, renewal, and reissuance of an operating permit. The Department used the lesser of the two fees as the administrative amendment fee for GP-5 and GP-5A. A change of ownership is an administrative amendment as per §127.450(4).

General Permit Fees

Comment 137: The commentators ask what fees must accompany each permit application and what analysis was done to justify the amount of each fee. The commentators also ask what authority the Department has to impose a fee outside of the rulemaking process. Other commentators state that the Department does not have the statutory or regulatory authority to impose an Administrative Amendment Fee of \$300. The authority to impose and set the amount of each fee is established in 25 Pa. Code Chapter 127. This chapter does not establish an Administrative Amendment Fee. The commentators recommend removing this fee as it is not authorized. One commentator asks what is the operational need for the Department to draw annual fees from the GP-5A? The Department would, for example, collect \$34,000 in fees from each operator that drills on 20 new well pads per year. (853, 867, 871, 916, 919, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The fees are applied in accordance with 25 Pa. Code Chapter 127 Subchapter I. These fees provide necessary funds for the Department to ensure review of annual reports, review of annual emissions inventory reports, inspections, review of stack test results, and other functions associated with the general permit. Even with these fees, the Department will not collect enough funds to defray the expenses associated with permitting and exempted activities. Administrative Amendment Fee of \$300 applies for activities identified in Section A, Condition No. 6(e). This fee is in accordance with § 127.702(g). The annual operating permit administrative fee of \$375 applies to all operating permits including GP-5A which is in accordance with § 127.703(c).

Applicable Laws

Comment 138: The commentators state that the language “Wherever possible, the terms and conditions of this General Permit have been streamlined to satisfy both federal and state requirements,” has no value and should be removed. The commentators further state that requiring applicants to comply with

“local laws” is beyond the scope and authority of a general permit and should be removed. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department agrees and has removed this language from the final general permits.

Comment 139: The commentators state that, as proposed, the GP-5 would include coverage of gathering compressor stations, processing plants, and transmission compressor stations; however, the cited federal regulations are not clearly identified as to their applicability to various operations. For example, portions of 40 CFR Part 63 Subpart HH are copied into Section D. However, these requirements are not applicable at transmission compressor stations past the point of custody transfer. The permit conditions do not account for this distinction. Another example is that LDAR requirements that are applicable at processing plants have separate and distinct requirements as outlined in 40 CFR Part 60 Subparts KKK, OOOO, and OOOOa. The Department has failed to account for this distinction appropriately and has applied LDAR provisions recently finalized in OOOOa for compressor stations to processing plants. The commentators state that in the GP-5A, Section A Condition 8(b) correctly incorporates by reference certain federal regulations that apply to operations located at well sites or pigging stations. The commentators recommend that incorporation by reference be used as duplication of the specific requirements is unnecessary. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The final GPs are revised to incorporate federal requirements by reference wherever applicable. In addition to NSPS Subpart OOOOa requirements, state BAT requirements are included in the GP-5. There is no functional difference between glycol dehydrators located at a gathering compressor station or transmission compressor station. Thus, GP-5 includes BAT requirements for sources irrespective of the fact, whether they are subject to NSPS requirements or not.

Compliance Requirements and Compliance Certification

Comment 140: The commentators recommend that the language of the current GP-5 be maintained and clarification be added that the proposed GP-5 may replace existing requirements with requirements that the Department deems to be equivalent. This could include monitoring and recordkeeping requirements for which the current GP-5 provides equivalent language regarding compliance and emission reporting. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The final GP-5 requirements apply for new or modified sources. Existing facilities that apply for renewal shall comply with the monitoring, recordkeeping, and reporting requirements of the final GP-5.

Comment 141: The commentators state that toxicity science and public health research has emphasized that peaks in air pollution exposures often trigger respiratory and cardiac emergencies. Therefore, the proposed general permits should require the forecast of risk of exposure to toxic doses of hazardous chemicals over both short- and long-term exposure, reflective of the current science of toxicity. Currently, an applicant is only required to submit PTE reports measured in tons per year, and only accountable for one year rolling average actual release amounts. In contrast, OSHA and other agencies consider toxic exposure in parts per million over a given number of hours. The proposed permits should require applicants to use new simulation techniques to estimate public exposure in relevant time and space with consideration for topographic or meteorological conditions that might enhance exposure. (27, 805)

Response: Forecasting risk and exposure is generally only done for major facilities subject to PSD, which requires modelling and risk determinations. Minor sources, which are the only sources eligible to apply for the general permits, are typically not required to perform the expensive modelling. The applicants are required to submit actual emission reports, measured in tons per year on a 12-month rolling basis, to ensure the facility is a minor source.

Comment 142: The commentators state that Section A, Condition 9(b) only allows two scenarios to stay below the emission rates listed in Condition 9(a) of the proposed GP-5. This limits the possibility for process improvements or other means that may result in reduced emissions. The commentators recommend that this requirement be removed. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department has revised this condition to allow for process improvements and other means of emissions reductions in addition to limiting facility throughput and hours of operation as methods to constrain emissions.

Comment 143: The commentators state that under the proposed general permits, sources and associated air pollution control equipment located at a facility shall be operated and maintained in such a manner that malodors are not detectable outside the property of the owner or operator on whose land the facility is being operated in accordance with 25 Pa. Code § 123.31. This requirement is difficult for industry to comply with and for the Department to enforce due to the subjective nature of what is malodorous and the variability of the sense of smell between people. The commentators suggest deleting the odor requirements from the general permits and developing recommendations through the technical guidance process that provide protocols for complaint response, testing procedures, and suggested corrective actions if odors are an issue at a facility. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: 25 Pa. Code § 123.31 is an applicable requirement for all facilities in Pennsylvania, except for odors from the production of agricultural commodities in their unmanufactured state on the premises of a farm operation. As an applicable requirement, it is listed in the permit for ease of reference and to make compliance easier for the permittee and enforcement easier for the Department. It would still be an applicable requirement if it was deleted from the permit, and would likely be the source of contention between the permittee, the public, and the Department. Therefore, the Department maintains this condition in the permit. Moreover, any potential odor complaints will be handled on a case-by-case basis.

Comment 144: The commentators ask what authority the Department relies upon for conditioning receipt of an air quality permit on adherence to federal, state, or local noise limitations. The commentators ask what is the correlation between noise levels and ambient air quality and why the Department only imposes such standards on the oil and gas industry. (853, 867, 871)

Response: The Department removed the noise requirements from the final general permits.

Comment 145: The commentators state that Section A, Condition 9(d) of the proposed GP-5 is inconsistent with 40 CFR Part 60 Subpart OOOOa. Specifically, it references 40 CFR § 60.5365a(i) which refers to well sites and therefore is not applicable to the GP-5. Also, the terms of the modification states "...where new equipment is installed..." which is inconsistent with 40 CFR § 60.5365a(j) which refers to compressor stations. The modification only applies if it is the installation of a new compressor, or replacing a compressor that results in an increase in total horsepower. The terms of the modification

are also inconsistent with 40 CFR § 60.5365a(f) which only applies to the addition or replacement of equipment for process improvement that requires capital expenditure as defined in 40 CFR § 60.5430a at processing plants. In addition, the Department does not evaluate the impact of applying leak detection standards as currently proposed to equipment that is neither new nor modified when existing facilities are required to renew their GP-5 permit. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054, 1056)

Response: The final GPs, Section A, Condition No. 10(d) dealing with fugitive emissions requirements are modified as follows: “The owner or operator of an existing facility where a new well is drilled, hydraulically fractured hydraulically refractured or where new equipment is installed or a modified an existing source shall comply with applicable BAT requirements established in this General Permit.”

Comment 146: The commentators state that Section A, Condition 9(d) of the proposed GP-5A states that “the owner or operator of an existing facility where a new well is drilled or hydraulically fractured, an existing well is hydraulically refractured, or new equipment is installed becomes a modified facility with respect to the fugitive emissions components requirements of Section K. The Department should require operators who modify a facility to bring other equipment, especially pneumatic controllers and wet seal centrifugal compressors, at the site into compliance with the new source standards under the proposed GP-5A. At a minimum, the Department should ensure that emissions from controllers at modified sites be minimized by applying the standards for emissions to both continuous-bleed and intermittent-bleed controllers; require LDAR to ensure that intermittent-bleed devices do not bleed continuously, that continuous-bleed devices do not vent excessively, and that controllers do not leak from places other than the vent port; and that facilities with available power, whether grid power or generated on site, install zero-bleed controllers. This is similar to Wyoming Department of Environmental Quality’s requirement as described in Oil and Gas Production Facilities: Chapter 6 Section 2 Permitting Guidance. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039, 1040, 1042)

Response: The final GPs, Section A, Condition No. 10(d) dealing with fugitive emissions requirements are modified as follows: “The owner or operator of an existing facility where a new source is installed or there is a modification of an existing source, shall comply with the applicable BAT requirements established in this General Permit.”

Comment 147: The commentators understand the purpose of the anti-backsliding provision in the current GP-5 which states that a source “...shall continue to comply with the BAT requirements established in the previously issued plan approval if they are more stringent than the BAT requirements established in this General Permit.” However, the proposed GP-5 goes beyond BAT requirements, including recordkeeping, administrative requirements to stay below a major source threshold, or a regulatory requirement which has been modified through the regulatory process. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The recordkeeping requirements are necessary to assure the proper operation of the source as specified in 25 Pa. Code §§ 127.12b(a) and 127.441(a) and (c). A general plan approval or general operating permit is not mandatory. The owner or operator can apply for a state only operating permit to incorporate existing permit requirements for a case-by-case determination of § 127.441(a) and (c).

Comment 148: The commentator states that the compliance demonstration provisions from 40 CFR Part 60 Subpart OOOOa are replicated in the general permit. The commentator recommends incorporating the provisions by reference rather than listing them in detail in the permit. (919)

Response: The Department prefers listing the requirements in detail to clarify the obligations of the permittee and to provide transparency so the Department, permittee, and the public can easily identify those obligations.

Comment 149: The commentators state that the requirement to submit a report compiled of nearly all records maintained is unduly burdensome for minor source facilities and inconsistent with other general permits and minor source plan approvals administered by the Department. Much of the information pursuant to compliance with federal requirements is already provided to the Department. Therefore, the commentators recommend removing the annual certification and reporting provisions from the general permits. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department is the delegated Administrator of the federal regulations and is aware that operators submit reports to the Department to comply with those regulations. However, the Department finds the manner in which this information is submitted to be unmanageable and attempted to streamline the requirements to reduce the administrative burden on both the operator and the Department. Rather than file separate reports in accordance with the many applicable federal regulations, some of which are required more frequently than once each year, the Department opted to consolidate them into a single report. The submission of records as part of the annual report is consistent with the federal regulations, and only apply to the records collected for the term of the annual report.

Compliance with the terms and conditions in the General Permit is prescribed under 25 Pa. Code Section 127.622 (relating to compliance with general plan approvals and general operating permits). The compliance certification requirement in GP-5 provides a means to certify compliance with the terms and conditions in the General Permit. Alternatively, applicants may submit an application to DEP for a Plan Approval and Operating Permit instead of seeking authorization to use GP-5.

Comment 150: The commentator states that each operator is likely to have numerous GP-5A's regulating well sites within their programs. The commentator asks if the Department would consider an annual certification covering the operator's entire program or portion of a program (i.e., multiple GP-5As) in lieu of individual annual compliance certifications for each facility? (972, 981)

Response: This concept exists under 40 CFR Part 60 Subparts OOOO and OOOOa. However, the Department has difficulty reviewing the contents of a report that covers hundreds of facilities in a meaningful way. In addition, similar provisions do not exist in other applicable subparts (i.e., 40 CFR Part 60 Subparts JJJJ, KKKK, etc.). Therefore, the Department prefers an annual compliance certification report be submitted individually for each facility.

General Notification Requirements

Comment 151: The commentators state that the Department has included numerous notifications within the draft GP-5 and GP-5A that would not provide useful information for compliance assurance activities and lack a tangible utility. The commentator recommends that unless there is a demonstrated timely and mandatory need for the information, the notification requirements should be minimized to reduce the

administrative burden on operators and the Department. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The redundant notification requirements have been removed from the final general permits.

Comment 152: The commentator states that Section A, Condition 10(d)(ii) and Condition 10(e) requires notifications related to emergency shutdowns, unscheduled blowdowns or venting, and scheduled blowdowns or venting. These notifications will create a situation where many operators are contacting the Department on a daily basis, which will be overwhelming to both the operators and the Department. (939)

Response: The final general permits add clarification that blowdown notifications are required in accordance with the existing GP-5 Malfunction Reporting Instructions. This eliminates notifications for scheduled blowdowns provided that the emissions from the blowdown activities do not result in an exceedance of the permit limits or create an offsite risk.

Comment 153: The commentator states that the relationship between wells and compressor stations are significant and can impact air emissions. If a compressor station is down, gas cannot be transmitted from connected wells, allowing pressure to build at wells and requiring gas to be released to relieve the pressure. The relationship is important for auditing Air Emissions Inventory Data and estimating PTE at a well site. The commentator therefore suggests that the GP-5 and GP-5A must require reporting of the well/compressor station relationship. (1032)

Response: Single source determinations arise when air contamination sources under common control are located on one or more contiguous or adjacent properties. These determinations will continue to be made on a fact-specific and case-by-case basis. The impact of a compressor station shut down on the adjoining wells may be minimal, as the wells will be shut-in. This standard practice will result in a minor increase in well pressure, but not result in emissions to the atmosphere. Shut-in wells are still subject to the applicable LDAR requirements.

Municipal Notification

Comment 154: The commentator asks if municipal notification required for obtaining a Permit to Drill and Operate an Unconventional Well is adequate to satisfy Section A, Condition 10(a). (972, 981)

Response: The Department would accept a copy of the notification used for obtaining a Permit to Drill and Operate an Unconventional Well as proof of municipal notification provided that the notification meets the requirements of 25 Pa. Code §§ 127.43a and 127.413. This amounts to including a statement that the operator is seeking a general plan approval and general operating permit for the facility with a description of the sources and operations to take place. However, the Department questions whether an operator will have adequate knowledge of what sources will be installed at the facility this far in advance of installing production equipment.

Comment 155: The commentators state that there is no requirement for PTE amounts to be listed in municipal notifications. One commentator adds that the statement required by 25 Pa. Code § 127.43a is missing from the general permits, where the authority for the 30-day comment period comes from Act 14 of 1984 (State Government Cooperation with Municipalities). Other commentators state that the municipal notification requirements should be enhanced to provide sufficient basis for local

governments to determine the impact of air pollution. The notification associated with Act 14 is needed to allow townships to prepare for routine air emissions and accidents. (27, 805, 1029, 1032)

Response: Municipal notifications are not required to list potential emissions, only the sources to be constructed or modified at the facility (see 25 Pa. Code § 127.43a and § 127.413). The Department requires municipal notification for GP-5 and GP-5A, but does not require the 30-day comment period listed in 25 Pa. Code § 127.43a and § 127.413 because the general permits already underwent a 120-day comment period followed by an additional 45-day comment period. Another reason the Department does not require the additional 30-day comment period upon municipal notification is because the Department only has 30 days to act in accordance with 25 Pa. Code § 127.621(c).

Construction Notification Requirements

Comment 156: The commentators are concerned that the term “source” is not properly defined. The notification requirement for sources in this section should be limited to permanent equipment at the facility, and equipment used for temporary activities should be exempt for this requirement. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053, 1054)

Response: The term “source” is defined in 25 Pa. Code § 121.1. Under the final revised Category No. 38 Exemption, the owner or operator of a well site is not required to seek authorization to use a general permit for temporary activities such as site preparation, well drilling, hydraulic fracturing, completion, and workover activities for conventional and unconventional well sites.

Comment 157: The commentators state that the five-day prior notification requirement for the date of the initial commencement of construction, the completion of construction, and the accounting of lapses in construction of 18 months or more is unduly burdensome to the operator and the Department, given the number and types of equipment located at compressor stations and processing plants. Unless there is a demonstrated timely and mandatory need for the information, the requirements should be minimized to reduce the burden on operators and the Department and so only the most relevant information is collected. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: In the final general permits, this condition only requires notification five days prior to commencement of operation of a source, with the completion of construction date included in the notification. The accounting of lapses in construction of 18 months or more is a regulatory requirement at § 127.13.

Comment 158: The commentator states that the notification requirements of this section are more stringent than the federal requirements. In 40 CFR § 60.7(a) a notification is only required 15 days after construction is completed and after initial startup. In 40 CFR § 63.9(b)(4)(v) a notification is only required 15 days after initial startup. The commentator recommends revising the notification requirements for GP-5 to be consistent with other applicable reporting requirements and to allow sufficient time to accurately complete notifications. (930)

Response: In the final general permits, the condition only requires notification five days prior to commencement of operation of a source, with the completion of construction date included in the notification. The five-day notification is consistent with the prior version of GP-5.

Comment 159: The commentators state that construction needs to be defined in the context of Section A, Condition 10(b)(i) and (ii). (972, 981)

Response: The term “construction” is defined in 25 Pa. Code § 121.1. However, in the final general permits, the condition only requires notification five days prior to commencement of operation of a source, with the completion of construction date included in the notification.

Comment 160: The commentator states that the Bureau of Air Quality must publish to the Internet an Electronic Notifications Report allowing query-able access to all notifications of change of status similar to the Office of Oil and Gas Management. (1032)

Response: At the current time, the Bureau of Air Quality does not have a database to store notifications received; however, the Bureau is in the process of moving its operations to be more accessible. The commentator’s suggestion will be considered appropriately.

Commencement of Operation Notification Requirements

Comment 161: The commentators state that when multiple sources at a facility are subject to different commencement of operation schedules, written notice shall be submitted to the Department five days prior to the commencement of operations of each source. Given the number of sources typical at operations at well sites, compressor stations, and processing plants, the Department is underestimating the burden to process these notifications. The commentators state the five-day prior notification is inconsistent with the two-day pre-notification of flowback requirement in 40 CFR Part 60 Subparts OOOO and OOOOa. (916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: In the final general permits, the condition only requires notification five days prior to commencement of operation of a source, with the completion of construction date included in the notification. The five-day prior notification is consistent with the prior version of GP-5.

Under the revised Exemption 38, the owner or operator of a well site will not be required to seek authorization to use a general permit for temporary activities such as site preparation, well drilling, hydraulic fracturing, completion, and work-over activities for conventional and unconventional well sites. Therefore, notification is not included for the flowback under the final general permit.

Comment 162: The commentators state that multiple copies of the same notice or report in both electronic and hard copy is excessive and cumbersome to manage. A single point of contact and report format is needed to have a successful notification program. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: In the final general permits, only one notification must be made, in writing, to the appropriate Air Program Manager.

Malfunction Notifications

Comment 163: The commentators suggest removing the sentence “This also includes any emergency shutdown or unscheduled blowdown or venting.” from Section A, Condition 10(d)(ii). (930, 936, 1052)

Response: The Department agrees. This sentence has been removed from the final general permits.

Comment 164: The commentators recommend that the Department decline to adopt the proposed notification in Section A, Condition 10(d)(i) for the “exceedance of 50% of the lower explosive limit.” Other commentators state that the 24-hour reporting requirements for malfunctions, emergency shutdowns, unscheduled blowdowns, and unscheduled venting will create a situation where many operators are contacting the Department daily. The commentators recommend that this requirement be removed and replaced with recordkeeping that can be made available for inspection purposes.

The commentators are confused about the following additions to malfunction reporting: unscheduled blowdowns, unscheduled venting, emergency shutdowns, and exceedances of 50% of the lower explosive limit. The commentators state that the Department is requiring four separate malfunction reports: a telephone call or email within 24 hours of discovery, a written report within five days, a telephone call or email within 24 hours of when corrective measures have been implemented, and a written notice within five business days of when corrective measures have been implemented. This is burdensome, and the commentators recommend that the proposed GP-5 requirements be consistent with the referenced GP-5 Malfunction Reporting Instructions. (908, 916, 928, 930, 936, 949, 952, 961, 972, 978, 981, 987, 991, 999, 1003, 1046-1048, 1052-1054)

Response: The condition has been revised in the final general permits to incorporate the existing GP-5 Malfunctions Reporting Instructions document which was developed in coordination with industry stakeholders. Operators using the existing GP-5 have been meeting these requirements since July 22, 2015, when the document was posted at the Department’s website.

Comment 165: The commentator states that if the inclusion of unscheduled blowdowns in the notification requirements is to address public inquiries regarding blowdowns, the Department should provide the details of public inquiry, particularly the number and substance of such inquiries. (916)

Response: The Regional Offices have received frequent inquiries from the public regarding blowdowns. The substance of the inquiries is whether the Department is aware of this activity, whether the activity is authorized, and the details of the event.

Comment 166: The commentator asks the Department if the operator may provide a single notification to comply with Section A, Condition 10(d)(ii) and (v) if the malfunction does not pose an imminent danger and is corrected within 24 hours. (991)

Response: A single notice for a malfunction and corrective actions can be given within 24 hours. However, a written report in accordance with Section A, Condition 11(c) must still be provided within five days.

Comment 167: The commentator states that in Section A, Condition 10(d)(ii) an example of a malfunction that does not pose imminent danger is an emergency shutdown. It is good engineering practice to review your process and identify and install mechanisms to provide shutdown in the event of a deviation of an operational parameter. These devices are often called emergency shutdown devices; however, the goal of the devices is to shut down the facility or specific equipment when operational parameters are moving outside of the acceptable tolerances. Because the shutdown occurs within acceptable tolerances, they are not malfunctions, and as such do not warrant Department notification. (991)

Response: The condition has been revised in the final general permits to incorporate the existing GP-5 Malfunctions Reporting Instructions document, which was developed in coordination with industry stakeholders. Operators using the existing GP-5 have been meeting these requirements since July 22, 2015, when the document was posted at the Department's website.

Unplanned emergency shutdown events are only required to be reported if they result in a potential exceedance of the permit emission limits or create an off-site risk. Planned or required emergency shutdowns accounted for in the application and that do not result in an exceedance of emission limits are also not required to be reported.

Comment 168: The commentators state that the malfunction notifications require notification within 1 hour or 24 hours of discovery, depending upon the severity followed by a written submittal within five business days. There is also no indication of the environmental benefit and what action the Department will take in response to each notification. Also, no distinction is made, so this potentially includes excessive pneumatic controller venting; which begs the question, what constitutes excessive venting? (919, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: Process equipment incidents, or air pollution control equipment shutdown or reduction in control which results in methane, VOC, NO_x, CO, HAP, or formaldehyde emissions that exceed the general permit emission limits or requirements are reportable. For continuous bleed pneumatic controllers, emissions exceeding 6 scf/h would be considered excessive venting.

Comment 169: The commentator states that as currently worded, all minor blowdowns during scheduled LDAR repair inspections and other routine maintenance would need to be reported under this malfunction provision. If the scope of this notification requirement is not changed, the Department and the County Management Agency would be inundated with thousands of notifications and will be unable to distinguish between significant and insignificant events. (1003)

Response: Repairs and routine maintenance require coordination, and are therefore planned events. Planned blowdowns are not required to be reported unless the emissions exceed permit limits or create an off-site risk.

Comment 170: The commentators state that it is not clear what "unscheduled" means and what constitutes an unscheduled venting or blowdown. These events do not necessarily reflect an abnormal or unsafe event or result in a permit exceedance. Blowdowns or venting associated with normal operation, maintenance, or LDAR should be excluded from the notification requirements and remain as a recordkeeping requirement. (916, 1003)

Response: The word "unscheduled" means what is unplanned or not scheduled, whereas "scheduled" means planned, such as releases to accomplish routine repair and preventative maintenance. The Department requires that malfunctions must be reported in accordance with the GP-5 Malfunction Reporting Instructions. Unplanned emergency shutdown events that result in a potential exceedance of permit emission limits or create an off-site risk are required to be reported. The unscheduled blowdown must be reported to the Department because emissions during the unscheduled blowdown are uncertain for any particular event. Process equipment incidents, or air pollution control equipment shutdown or reduction in control which results in methane, VOC, NO_x, CO, HAP, or Formaldehyde emissions that exceed the general permits' emissions limits or requirements are reportable.

Scheduled Blowdown or Venting Notification Requirements

Comment 171: The commentators state that blowdowns typically result in minimal emissions, and result from routine maintenance in order to provide a safe work environment for maintenance personnel or from dynamic balancing across the pipeline system due to fluctuations in market demand. The 24-hour notice requirement would severely impact operational flexibility and is overly burdensome.

The records of these events are already maintained and the emissions from these events are already reported. Anything in addition to these requirements is excessive and without environmental benefit. The Department is not going to show up regularly to monitor normally scheduled operational activities; therefore, the notification requirements should be removed from the permit. The notification serves no practical purpose and imposes significant burden on the operator and the Department considering that this requirement could result in thousands of daily calls as some facilities must blowdown daily or even multiple times per day. (916, 919, 928, 930, 936, 949, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1052-1054, 1056)

Response: The condition has been removed from the final general permits. Planned blowdowns are not required to be reported unless the emissions exceed permit limits or create an off-site risk. Planned or required emergency shutdowns accounted for in the application and that do not result in an exceedance of emission limits are also not required to be reported.

Recordkeeping Requirements

Comment 172: The commentators state that the information required to be maintained in records is of little use to the Department and will not serve to improve public health, safety, or the environment. The commentators recommend that recordkeeping be made consistent with federal regulations for sources regulated by a federal rule. For sources not regulated by federal requirements, the Department should consider and justify the burden and benefits associated with the data being requested. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The recordkeeping requirements included in the GPs are not new but based on existing applicable requirements. The notification, recordkeeping, and reporting requirements are based on applicable federal regulations and 25 Pa. Code §§ 127.12b (plan approval terms and conditions), 127.12c (plan approval reporting requirements), 127.441 (operating permit terms and conditions), and 127.442 (operating permit reporting requirements).

Comment 173: The commentator notes that the Department identifies that all records should be maintained onsite or at the nearest local field office. In many cases, well sites are remote and conditions are not conducive to maintaining hardcopy files at the location. As such, it is unreasonable to expect all records to be maintained on site. In addition, local field offices are generally utilized as a maintenance and operations location, which again may not be conducive to storing a large amount of hardcopy records. The commentator recommends that the operator be able to maintain the records as they see fit and make them available to the Department upon request. (991)

Response: The requirement is consistent with the federal requirement for recordkeeping. § 60.5420 (c) requires the records to be either onsite or at the nearest local field office for at least 5 years.

Comment 174: The commentators state that requiring operators to maintain records of emissions that are already submitted through AES should not be adopted. If retained, the requirement in Section A Condition 11(b) that emissions shall be calculated on a monthly basis should be clarified to be actual emissions. As written, the commentators contend, the language implies that the PTE calculations that document the nonapplicability of Title V should be updated monthly. By definition, PTE should not change frequently. (930, 936, 1052)

Response: The emissions calculated monthly to determine compliance with Section A, Condition 10(a) are now clearly stated to be actual emissions in Section A, Condition 12(b) in the final general permits. The emissions reported through AES for the Air Emissions Inventory report also have required recordkeeping (see 25 Pa. Code § 135.5). If properly maintained, one set of records should satisfy both requirements.

Reporting Requirements

Comment 175: The commentators object to many of the reporting requirements in the proposed GP-5 based on the Department's right to request additional information to determine compliance with the permit. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: As part of its duties as Administrator of the federal regulations, the Department is required to collect information from owners and operators. The Department is also collecting additional information that will help it determine compliance with the permit.

Comment 176: The commentators state that the annual report or annual compliance certification required by the proposed general permits would include nearly all the records of the recordkeeping requirements. Many of the recordkeeping requirements are similar to or a copy of existing federal requirements. The commentators point out that, as the delegated Authority for implementing federal requirements in Pennsylvania, the Department already receives all notifications and annual reports pursuant to federal CAA programs, making these requirements redundant and unnecessary. The commentators recommend removing the annual reporting requirements, especially those duplicative of federal requirements. The commentators also recommend removing the requirement to submit all of the proposed records, and instead allow them to be made available if or when requested by the Department. The commentators propose, as an alternative to the annual reporting requirements, a compliance certification like that found in 2700-PM-BAQ0205 that is included in the current GP-5. In the event that the annual report is maintained, the commentators recommend that it not be due the same day as the annual emissions inventory. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: As the delegated authority, the Department is required to receive the notifications and reports required under the federal regulations. The annual report is not duplicative of federal requirements; only one report needs to be drafted and submitted. The Department is merely setting out the format and schedule to manage the anticipated increase in submissions. The intent of the recordkeeping requirements is to provide the basis for the annual report and emissions calculations, which is why some of the reporting requires submission of the relevant records. It should be noted that only the portion of the records that correspond to the reporting period are required to be submitted. The unified schedule for the annual report and the annual emissions inventory report was originally thought to be helpful as one could potentially inform the other. Based on these comments, the Department has revised the Condition No. 13(c) of Section A in the final GPs.

Comment 177: The commentators state that Section A Condition 12(b) refers to federal reporting obligations. Because GP-5 and GP-5A are minor source permits, the commentators question whether state delegation precludes the need to submit NSPS and NESHAP-related material to EPA. If adopted, this requirement should clarify that all “copies of all requests, reports, applications, submittals, and other communications” relating to federal NSPS and NESHAP requirements “shall also be submitted to the EPA.” (930, 936, 1052)

Response: As the delegated Authority, the Department receives all NSPS and NESHAP-related submittals. Some federal regulations also require submittal to EPA, see 40 CFR § 60.5420a(b) and (b)(11). Note that there is no distinction for reporting between major and minor sources. However, other federal regulations do not require submittal to EPA, see 40 CFR § 60.775. The intent was to make a single report that could be submitted to both agencies, or that could be easily edited by dropping sections not required before submitting it to EPA.

Comment 178: The commentators state that the Department should not require hard copy submissions of a report if it has been submitted electronically. The commentators state that the Department has been migrating to electronic reporting and that reporters that use this option should be allowed to forgo submitting a hard copy. Annual reports have been submitted electronically without a corresponding hard copy for the past three years. If a hard copy is required, the permit should not specify that the annual report must be submitted by “hand-delivery, courier, or sent by certified mail.” The commentators contend that simply stating that a hard copy must be submitted is sufficient; however, if language must be maintained in the general permit, it should follow the language from Title V permits which states generally that hard copies “shall be postmarked or hand-delivered.” (930, 936, 972, 981, 1052)

Response: The language has been revised in the final general permits to allow annual reports to be submitted “either in electronic format, by hand-delivery, courier, or sent by certified mail, return receipt requested.”

Comment 179: The commentators state that several portions of Section A, Condition 12(c) are extraneous or redundant. Section A, Condition 12(c)(viii) requires “The identification of each term or condition of the GP-5 that is the basis of the certification, the compliance status, and the methods used for determining the compliance status of the source, currently and over the reporting period as identified in Sections B through O of this General Permit.” This appears to be duplicative of the compliance certification required by Section A, Condition 9(h) and Condition 12(c)(vi). Other duplicative reporting requirements to be included in both the annual report of Condition 12(c) and the annual emissions inventory report of Section A, Condition 12(d) are: the VOC emissions calculations using GRI-GLYCalc for dehydrators under Section D, Condition 4(a); the records of actual fuel usage for reciprocating engines under Section E, Condition 4(b); the records of actual fuel usage for turbines under Section F, Condition 4(b); and the records of the emissions from each pig chamber under Section O, Condition 4(a). (930, 936, 1052)

Response: Section A, Condition 10(h) Certification of Compliance Form (2700-PM-BAQ0205) is required as part of the annual report required in Section A, Condition 13(c). Condition 13(c)(vii) and (viii) may be met by submitting the Certification of Compliance Worksheet used to fill out the Certification of Compliance Form. The commentator is correct that information may be submitted in two different reports at two different times. This is because in Condition 13(c), permitting staff will be examining the information in the context of compliance with the general permit, and in Condition 13(d),

inventory staff will be examining the information in the context of the annual emissions inventory. The operators are not required to perform multiple calculations or duplicate their work; they are required to submit that work in two separate reports and formats.

Comment 180: The commentators state that the annual report goes beyond the requirements of the current GP-5, the related NSPS or NESHAPs, and the required submissions for a Title V PAL facility. The commentators recommend maintaining the current GP-5 reporting requirements, including submission dates, separate reporting, and the compliance statement worksheet. The commentators point out that while operators maintain the documentation necessary to determine compliance, not all of these records should be required to be submitted.

One commentator states that Annual Operating Reports are unnecessary and overly burdensome for general permits. Emissions data is already reported on March 1st of each year; the only other information required are a compilation of notifications already made and periodic testing data, which is sent at the time of testing rather than the end of the year. This creates excessive work for both industry and the Department with no additional environmental benefit. (916, 919, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The annual reports such as annual inventory and annual compliance certification are the existing requirements in the existing GP-5. The GP-5 also requires that the operator submit the reports required by federal regulations such as NSPS and NESHAP to EPA and the Department. The final general permits streamlined the federal and state reporting requirements for simplicity and to prevent duplication. The final general permits also removed much of the extra reporting requirements, bringing the requirements more in line with the federal requirements.

Comment 181: The commentators state that the reporting requirements should include a list of all connected wells and relevant emissions from each well. This is because an analysis for one well's emissions is unique and cannot be extrapolated to match another well nearby. In addition, dehydrator emissions calculations are dependent upon gas analysis figures for the input stream, and the true gas analysis figures cannot be reliably verified without knowing which wells are connected and having reliable gas analysis figures for each connected well. (27, 805, 1029)

Response: The Department requires a representative gas analysis for each facility to be submitted as part of the application for authorization to use the general permits. This is sufficient to estimate actual emissions from specific sources such as dehydrators.

Comment 182: The commentators suggest changing the date the annual emissions inventory report is due to after March 1st as many operators have several other reporting obligations at that time. For many operators, the same personnel are responsible for drafting these reports. (930, 936, 1052)

Response: The March 1st deadline for the air emissions inventory report is required by 25 Pa. Code § 135.3 and cannot be changed in a permit condition. However, § 135.3(c) allows the operator to request an extension from the Department with reasonable cause.

Comment 183: The commentators state that Section A, Condition 12(d) does not include the requirement to report PM-Condensable. PM-Condensable is a standard pollutant reported within AES*Online. (930, 936, 1052)

Response: Both PM₁₀ and PM_{2.5}, which are required to be reported under Section A, Condition 13(d) of the final general permits, include both filterable and condensable emissions. See definition of condensable particulate matter under 25 Pa. Code § 121.1.

Comment 184: The commentator points out that Section A, Condition 12(d) states “Emissions data including, but not limited to, the following shall be reported...” This open-ended statement indicates that the Department has the discretion to expand the list of emissions that are subject to monitoring, reporting, and control under the permit. Permits are intended to provide certainty of the applicable requirements to the permittees. Discretionary provisions such as this open the door for inconsistencies from one Region to another, which is a longstanding problem. The commentator recommends removing the phrase “including, but not limited to” to provide certainty and consistency. (991)

Response: The final GPs’ Condition No. 13(d) is a requirement under Section 135.3. The owner or operator of a facility shall submit to the Department by March 1st of each year, a facility inventory report for the preceding calendar year for all sources controlled under GPs. This condition provides flexibility for the owner or operator to report any additional pollutant emitted from the facility. Therefore, the condition has been retained.

Comment 185: The commentator states that the Department should allow emissions calculations to be based on the previous quantification and knowledge of similar operations and equipment during the reporting period rather than to require specific and separate accounting of emissions from individual events and components at the site. Most emission inventories today are based on estimated counts, production rates, and emission factors and are not determined for individual pieces of equipment and activities. The commentator sees no practical benefit in deviating from this existing practice. Also, daily computations should not be required, and the Department should clearly state that records for emission calculations should only include all in-scope emissions and activities as part of annual reporting. (928)

Response: Requirements for daily records and computations have been removed from the final general permits. The Department disagrees that emissions calculations based on previous quantifications should be allowed because operating conditions of the sources are not identical in time or location. Actual emission calculations are important as they are used to determine compliance with Section A, Condition 10(a). The Department has provided flexibility on estimating actual emissions by using vendor’s guaranteed data, emission factors, or other generally accepted engineering calculations.

General Comments on Source Testing Requirements

Comment 186: The commentators recommend removing the two decimal places in the proposed emission standards, especially for existing standards as the significant figures increase the stringency of the limitations. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1000, 1046-1048, 1052-1054)

Response: The final GPs include NO_x emission limits with two significant figures (e.g. 2.0 or 0.25) which is consistent with NSPS emission standards. However, the standards for existing sources are unchanged in the final GP-5.

Comment 187: The commentators recommend not requiring a stack test if a portable monitor shows a concentration within the instrument’s margin of error. This should not automatically require a performance test unless there is a potential exceedance. Alternatively, it should be acceptable to

document maintenance to the engine and perform periodic monitoring to verify the maintenance was effective. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The Department has removed this requirement from the final general permits.

Comment 188: The commentators state that multiple copies of the same notice or report in both electronic and hard copy is excessive and cumbersome to manage. Since the Department began migrating to electronic reporting, annual reports have been submitted electronically without hard copies for three years. The commentators recommend that electronic submissions for source testing also be allowed to forgo submitting hard copies. The commentators suggest that the Department have a single point of contact and report format to have a successful notification and reporting program. (916, 919, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054)

Response: This requirement is from the Source Testing Manual and is consistent with the requirements implemented for all permits including plan approval, state-only operating permits, and Title V operating permits. The final GPs clarify the hard copy and electronic report requirements at Section A, Condition No. 14(e).

Comment 189: The commentator notes that requiring the operator to provide the Department with hard copies of reports is redundant. On at least two occasions, the commentator submitted hard copies as required where the Department alleged that the documents were not received. When provided with the documentation demonstrating submission to and receipt by the Department, the Department requested that the commentator resubmit hard copies. (991)

Response: The requirement to submit the documents by a traceable method is to provide the operator with a measure of protection. If a document is somehow lost, and proof of submittal is shown, the operator will not be subject to a violation.

Source Test Protocols and Test Notifications

Comment 190: The commentators recommend that the requirement to submit a test protocol be 30 days prior to testing, consistent with the Department's "Source Testing Manual, Revision 3.3, November 2000" or 45 days prior to testing, consistent with recently issued Title V operating permits. The commentators also recommend removing the requirement to not commence emissions testing prior to receipt of a protocol acceptance letter as it exposes operators to a risk of not being able to complete the required testing despite the protocol being submitted within the required timeframe. (916, 919, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054)

Response: Based on the comments received, Condition Nos. 14(f) and (e) are revised. The Department has offered a flexibility for a test protocol submission in the final general permits. Owing to resource limitations, the Source Testing Section may need a longer period to review test protocols. There should be no requirement to have an approved protocol, prior to testing, for the reasons stated.

Comment 191: The commentators state that if the standard protocol is not utilized, that operators should be allowed to submit a single procedural protocol for approval for multiple tests of sources which may then be referenced in the pre-test notice as authorized in the Source Testing Manual. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Based on the comments received, Condition Nos. 14(f) and (e) are revised. The Department has offered flexibility for a test protocol submission in the final general permits.

Source Test Completion Notifications and Test Reports

Comment 192: The commentators state that Section A, Condition 13(g) of the proposed general permits creates additional tracking and reporting requirements with no environmental benefit and may be unnecessary as there are provisions for delay or Force Majeure under the federal regulations. If the requirement is not removed, the commentators recommend making a single electronic notification as per Section A, Condition 10(b)(iv) as opposed to submitting as required in Section A, Condition 13 (d). (916, 919, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: This requirement is from the Source Testing Manual and is consistent with the requirements implemented for all permits including plan approval, state-only operating permits, and Title V operating permits. The electronic notifications consistent with Section A, Condition 10(b)(iv) of the proposed general permits have been removed from the final general permits.

Force majeure only applies to a delay in the performance of the test; this condition only applies after the test is completed. Notification that testing will be conducted affords the Department the opportunity to oversee the testing, to ensure that it is conducted properly. Approval to travel (to observe) may take a minimum of 30 days.

Standardized Performance Test Procedures

Comment 193: The commentators recommend that the Department allow a full performance test to be used in lieu of periodic monitoring using a portable analyzer as allowed in the current version of the GP5. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: It is the Department's intent that testing and monitoring be used to determine compliance with engine emission requirements. Testing, which is federally required on a specific schedule, is the primary method of compliance. To this end, any performance test resets the periodic monitoring clock to zero hours. The 2,500-hour periodic monitoring interval is to supplement and fill-in the periods between the performance tests. With a performance test interval of 8,760 hours, the operator should conduct three monitoring events; the "fourth" monitoring would occur 2,500 hours after the performance test.

Comment 194: The commentators recommend that all EPA-approved alternative and conditional methods should be approved for use without a pre-test protocol unless there are deviations from the written method. EPA-approved alternative methods have been accepted for use in 40 CFR Parts 60, 61, and 63 without further EPA approval. EPA CTM historically has been accepted for use in state and federal rules and should not require additional approval from the Department. This includes, but is not limited to, ALT008, ALT-046, ALT-059, ALT-078, ALT-104, ALT-106, CTM-035, and M-323 for engines and Method 20 for turbines. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054, 1056)

Response: Alternative test methods may be approved by the Department through the protocol review process on a case-by-case basis.

Comment 195: The commentators state that the proposed general permits use Method 323 in the Standardized Performance Test Procedure outlined in Condition 5(b)(iv)(D) of Section E of GP-5 and in Section G of GP-5A. The commentators illustrate many difficulties which would make Method 323 both expensive and challenging to complete at remote facilities. Method 323 was developed as a backstop to address concerns about the availability and cost of Extractive Fourier Transform Infrared (FTIR) testing when 40 CFR Part 63 Subpart ZZZZ was adopted in 2002. FTIR contractors are now readily available, less costly, and less time consuming; therefore, the commentators recommend incorporating Method 320 in the Standardized Performance Test Procedure. (916, 930, 936, 1052)

Response: The Department agrees that Method 320 of 40 CFR Part 63 is a viable performance test method for determining formaldehyde emissions from natural gas-fired engines, when utilizing formaldehyde for the required dynamic spiking (unless EPA provides written guidance to the contrary) and it has been incorporated in the final GP-5.

Standardized Periodic Monitoring Procedure

Comment 196: The commentators recommend including a provision to alter the frequency of portable analyzer tests with the Department's written approval from the previous GP-5 into the final general permits. This allows operators to reduce the frequency of portable analyzer tests, and therefore the economic burden, after successful demonstration of compliance. (916, 930, 936, 1052)

Response: As per Section C, Condition 1(d)(v)(C), the Department may reduce the frequency of portable monitoring based on the test results. The purpose of periodic monitoring is to ensure continued compliance (after completion of a compliance test). Changing the frequency of testing, based on how close the historical results are to the emission standard, is reasonable. This will provide an additional incentive to facilities to minimize their emissions.

Comment 197: The commentators request that the procedure for periodic monitoring remain as stated in the current GP-5, including the requirement to submit the test protocol 30 days in advance. It is unclear why an additional 30-day notification is required for test protocol review. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Division of Source Testing and Monitoring needs 60 days to review alternative periodic monitoring procedures.

Engines

Comment 198: The commentators state that the inclusion of 40 CFR Part 63 Subpart ZZZZ requirements add confusion for those engines that satisfy such requirements by complying with 40 CFR Part 60 Subpart JJJJ. The commentators recommend removing the Subpart ZZZZ requirements. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The testing requirements satisfy the Department's requirements as well as the requirements for both 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 63 Subpart ZZZZ.

Comment 199: The commentators state that the testing methods described in 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 63 Subpart ZZZZ should be standard. The commentators state that the

Department should not require a testing protocol for these methods, and that they should be incorporated into the GP5 by reference. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Based on the comments received, Condition Nos. 14(f) and (e) are revised. The Department has offered flexibility for a test protocol submission in the final general permits. Evaluation of the test protocol for acceptability is dependent on the specific details of the testing, not simply the test methods, which have not and could not be reasonably incorporated into any GP.

Comment 200: The commentators recommend that ASTM-6348 should be allowed for NMNEHC and HCHO measurement as it is allowed under 40 CFR Part 60 and 40 CFR Part 63. Excluding this method limits the number of testing firms to select from and potentially requires multiple tests to prove the same results from the same component. There is no scientific data to invalidate the results from this method. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department agrees that Method 320 of 40 CFR Part 63 is a viable method for determining formaldehyde, methane, and ethane concentrations in the exhaust of natural gas-fired engines and has been incorporated as such in the final GP-5. While these methods excel in speciated VOC measurements, Method 320 is not a robust total VOC measurement method and is not appropriate for the determination of compliance with a total VOC or NMNEHC emission limit.

Comment 201: The commentator recommends removing Condition 5(c) of Section E of the proposed GP5 and Section G of the proposed GP-5A. Compressor engines do not operate at steady state, and the load can increase based on continued development of a field by bringing new wells into production and decrease based on a natural decline in production over time. Tracking load to this level of detail is onerous and creates little environmental benefit. The current GP-5 already requires testing every 2,500 hours and additional testing should not be required. (919)

Response: The previous version of GP-5 required a performance test for engines greater than 500 bhp every five years; 40 CFR Part 60 Subpart JJJJ requires performance testing for the same engines every 8,760 hours of operation or every three years; 40 CFR Part 63 Subpart ZZZZ requires certain engines to conduct performance testing annually. The only requirement based on a 2,500-hour interval is for periodic monitoring.

However, in all cases, the performance testing and the periodic monitoring is required to be conducted at “the highest achievable load.” Condition 5(c) of Section C of the final general permits requires a new performance test if, and only if, an operator exceeds “the highest achievable load” plus 10% from the previous performance test. If an operator conducts the performance tests within 10% of an engine’s maximum rated load, this provision is not likely to be applicable.

Comment 202: The commentators state that the requirement for conducting a performance test if any operation is above 110% load is not found in either 40 CFR Part 60 Subpart JJJJ or 40 CFR Part 63 Subpart ZZZZ. In practice, the requirement would be excessive and of no value. For example, if an engine operated at 111% of the highest achievable load one day out of the calendar year, the operator would be required to perform a test that would provide no useful information. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The emissions profile of an engine varies with the operating load. If an engine is tested at 75% load, which is supposed to be representative of normal operating conditions (i.e., “highest

achievable load”), and then operates at 100% load, it is within the Department’s authority to request a stack test based on this new operating level. However, if the engine is tested at 100% load, and then operates at a lower load (i.e., 75% load) with occasional excursions to higher load, there is no requirement for an additional stack test if the excursion is no more than the tested load plus 10%.

Comment 203: The commentator states that there are many hurdles to overcome in using ASTM-D6522 such as the required linearity checks, heated sample line, EPA Protocol G1 or G2 gases, and tedious data calculations. This method is reasonable for an annual reference test method, and is listed as a permissible option in 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 63 Subpart ZZZZ for the required performance tests. The commentator recommends including other options such as Emissions Measurement Center Conditional Test Methods CTM-030 and CTM-034 or operator developed test methods that provide the same quality of periodic monitoring. The commentator also recommends a way to allow operators to request alternative periodic monitoring techniques so that it is not required to request the alternative procedure every quarter. (1045)

Response: The Department agrees that ASTM D6522-11 is currently the appropriate method revision, but disagrees that there is an issue using ASTM D6522 if operated and calibrated according to the method and manufacturer’s recommendations. Fresh air purge requirements are addressed in ASTM D6522-11 and most analyzer manufacturer’s operational literature. Calibration gasses are required to be chosen according to the requirements of ASTM D6522 where average measured readings for each test run are between 25% and 125% of the upscale calibration gas or not more than twice the concentration equivalent to the upscale calibration gas.

Comment 204: The commentators state that electro-chemical cell performance degrades with extended exposure to low oxygen samples such as rich-burn engine exhaust. This is acknowledged in ASTM D6522-11 (9.3.1), and often requires longer purge time between runs to pass bias checks before the next run or before post-test calibrations can be completed. In addition, ASTM D6522 also has detection issues at concentrations below 50 ppm. Calibration gas availability can also be limited due to the range of exhaust concentrations and calibration span limitations. This may require a technician to carry several different bottles in different concentration levels which could trigger PennDOT requirements for transport.

In addition, the proposed requirement does not specify which revision of ASTM D6522, of which there are multiple, should be used; the commentators recommend ASTM D6522-11. This revision states that linearity checks are waived given the presence of manufacturer’s documentation thereby saving the operator from having to perform those checks if the instrument’s documentation states it is linear. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Portable gas analyzers have been used for monitoring NO_x emissions since the mid 1990’s for implementing the NO_x RACT rule. Therefore, the Department disagrees that there is an issue with using ASTM D6522.

The Department agrees that ASTM D6522-11 is currently the appropriate method revision, but disagrees that there is an issue using ASTM D6522 if operated and calibrated according to the method and manufacturer’s recommendations. Fresh air purge requirements are addressed in ASTM D6522-11 and most analyzer manufacturer’s operational literature. Calibration gases are required to be chosen according to the requirements of ASTM D6522 where average measured readings for each test run are

between 25% and 125% of the upscale calibration gas or not more than twice the concentration equivalent to the upscale calibration gas.

Comment 205: The commentators state that stability checks are difficult to repeat in field conditions due to small temperature fluctuations in the cells and the low concentrations being measured. If the calibration gas is 100 ppm, operators are required to measure the calibration gas for a minimum of 15 minutes with a reading deviation of no more than 1% of the gas concentration. If the reading fluctuates more than 1 ppm, the operators are required to run 30 minutes with a deviation not to exceed 2% of the span gas calibration. Electrochemical cells and analyzers may not have a resolution in less than 1 ppm, increments making them difficult to use in field conditions; the limits should be increased to make the method appropriate. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: If the requirements of ASTM D6522 cannot be met, the Department would recommend using other instrumentation capable of meeting the requirements specified in Methods 7E, 10, and 3A.

Controls

Comment 206: The commentators state that Conditions 5 and 6 of Section N of the proposed general permits outline federal testing and monitoring requirements from 40 CFR Parts 60 and 63. However, there are numerous sources covered by GP-5 not subject to federal control standards. Similarly, existing equipment authorized under the previous GP-5 that will be transferred to this permit reference this section for monitoring, recordkeeping, and reporting requirements and would require significant retrofits for equipment not subject to federal emission standards. For such sources, the control device requirements should remain the same as the previous GP-5; for sources subject to federal requirements, the requirements should be incorporated by reference. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: Existing equipment authorized under the previous version of GP-5 is not required to be tested again unless it is modified. The frequency of performance testing may be altered during re-authorization of the general permit.

Comment 207: The commentator states that Condition 5 of Section N of the proposed general permits only applies to combustors; this should be clarified in the general permit language. (1003)

Response: Section J, Condition 4 in the final general permits has been revised to clarify that performance testing requirements are applicable to enclosed flares and other combustion devices and vapor recovery devices.

Comment 208: The commentators state that visible emissions surveys and associated recordkeeping and reporting should not be required for natural gas operations and natural gas-fired combustion units. (930, 936, 1052)

Response: The final general permits do not require any specific visible emissions observation requirement for natural gas combustion units. If visible emissions monitoring is performed, it must be determined by the method described in 25 Pa. Code § 123.43. Nothing in the general permits relieve the responsible official of the obligation to comply with all state, federal, and local laws and regulations.

Combustion Units

Comment 209: The commentators state that performance testing and periodic monitoring requirements should reflect the exemption for gas-fired combustion units rated less than 10 MMBtu/h. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Section C, Condition 1(a)(i)(C) of the proposed GP-5 applies to a combustion unit greater than or equal to 10 MMBtu/h. The performance testing and periodic monitoring requirements do not apply to the combustion unit rated less than 10 MMBtu/h since it is exempted.

Comment 210: The commentators state that large plant process heaters can ramp up for testing; smaller units at well pads and compressor stations do not typically monitor load. The commentators recommend eliminating Section C Condition 5(c) of the proposed GP-5. (916, 919, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Performance tests must be performed within 10% of the highest achievable load, and units that exceed the highest achievable load plus 10% must conduct a new performance test at the higher level. The operators may choose a method such as heat input to represent load during testing of the unit; therefore, no change to this requirement was made in the final general permits.

Comment 211: The commentators recommend removing the particulate matter (PM) testing requirement from the permit. Natural gas-fired combustion units emit negligible PM emissions, and the costs associated with filterable and condensable PM testing greatly exceed any potential benefit for quantifying emissions.

The commentators state that while PM performance tests have been required in recent permits, the PM emissions from natural gas-fired sources are very small and difficult to accurately measure without significantly increasing testing costs. In addition, there are method biases that have proven to be significant when measuring the ultra-low levels of PM from combustion turbines. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054, 1056)

Response: The Department agrees. Due to very low PM emissions from natural gas-fired units and the associated costs for source tests for such emissions, the PM testing requirement has been removed from the final general permit.

Turbines

Comment 212: The commentators point out that Section F Condition 6(c) of the proposed GP-5 inadvertently refers to “engine,” which should be replaced with “turbine.” (930, 936, 1052)

Response: The Department corrected this error in Section M Condition 4(c) of the final GP-5.

Glycol Dehydration Units

Comment 213: The commentator states that units that are constructed after the applicability date of the revised general permits will be required to meet a 98% control efficiency. This should be changed to a 95% control efficiency requirement because current units that are relocated are not able to meet that level of control because it has been industry standard to achieve 95% control. In addition, condensers are

listed as an option, but it is frequently difficult for condensers to achieve 98% control, especially for methane. Condensers may achieve a 95% control efficiency for heavier liquids (VOCs). The commentator recommends that 95% control be maintained as BAT. (919)

Response: Based on the comments received, the 98% control requirement for methane, VOC, and HAP was revised to a 95% control requirement in the final general permits. While manufacturer-tested models typically achieve significantly greater than 95% control in practice, the control requirement was revised to allow operators to continue to benefit from the manufacturer-tested models in accordance with the federal regulations. This revision avoids additional source testing to demonstrate 98% efficiency, instead relying on the manufacturer's certification list maintained by U.S. EPA to demonstrate and maintain compliance under the federal regulations.

Comment 214: Several commentators state that the revised BAT analysis does not support reduction from 5 tpy of VOC to the de minimis threshold of 2.7 tpy VOC for requiring emission controls. The Department assumes a credit for the removal of 2.7 tpy of VOC in the BAT economic viability analysis; if this interpretation is correct, and controls are required for de minimis pollutant quantities, the de minimis threshold will be removed. The commentators recommend that the control threshold remain at 5 tpy of VOC. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Exemption 38, finalized in 2013, required 95% control of any emission unit exceeding emission thresholds of 2.7 tpy VOC, 0.5 tpy single HAP, and 1.0 tpy total HAP. Despite the requirement to install 95% VOC control on storage vessels and other equipment, no individual site plan approval has been submitted for an unconventional natural gas well site since 2013. This means either the installation of control is cost effective, or that the sources in question emit less than 2.7 tpy VOC, 0.5 tpy single HAP, and 1.0 tpy total HAP.

Comment 215: The commentator states that methane emissions from glycol dehydration units can and should be controlled by 98%. (1026)

Response: Based on the comments received, the 98% control requirement for methane, VOC, and HAP was revised to a 95% control requirement in the final general permits. While manufacturer-tested models typically achieve significantly greater than 95% control in practice, the control requirement was revised to allow operators to continue to benefit from the manufacturer-tested models in accordance with the federal regulations. This revision avoids additional source testing to demonstrate 98% efficiency, instead relying on the manufacturer's certification list maintained by U.S. EPA to demonstrate and maintain compliance under the federal regulations.

Comment 216: Several commentators state that the control threshold and emission reduction requirements are unclear. Do uncontrolled emissions from the glycol dehydrator include both the still vent and the flash tank? It appears that the controls for the unit are limited to the dehydrator still vent. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The glycol dehydration process vent includes both a still vent and a flash tank vent. Since emissions from a flash tank are typically routed to a reboiler, the final general permits address the emissions from a glycol dehydrator still vent stream.

Comment 217: The commentator states that, as written, the 200 tpy methane threshold could be based on either actual or potential emissions.

It is important that the Department clarify that for existing glycol dehydrators with an operational history, this should be based on actual emissions. Using potential emissions could give a false indication that control is cost-effective when it is in fact cost prohibitive. (919)

Response: The final general permits clarify that the emission thresholds are not based on uncontrolled emissions. Existing glycol dehydrators are not required to install controls based on the 200 tpy methane control threshold unless they undergo a modification.

Comment 218: The commentator states that the 200 tpy threshold applies on an uncontrolled basis and, if triggered, requires 98% control. This might eliminate flash tank technology as an option; flash tanks allow partial recovery of natural gas from the fat glycol before it enters the regenerator. The recovered natural gas may then be routed to fuel gas for the dehydrator reboiler or other combustion equipment. In the Department's GP-5 and Exemption 38 FAQ document, flash tanks are identified as "a piece of process equipment" which implies that the flash tank's emissions would be included in the glycol dehydrator's uncontrolled emissions. (919)

Response: The final general permits clarify that the emission thresholds are not based on uncontrolled emissions. Flash tank and reboiler emissions are included as part of the glycol dehydrator's emissions. The flash tank emissions are typically routed to the reboiler for fuel and are controlled in accordance with 40 CFR Part 60 Subparts OOOO and OOOOa and 40 CFR Part 63 Subpart HH. The requirement for 98% control has been revised to 95% control in the final general permits.

Comment 219: The commentator states that the proposed general permits apply to units that are constructed in specified timeframes. It is critical that the Department maintain this applicability. Relocated units should not trigger this section, nor should modified units. Relocating or modifying units does not increase an operator's emissions, and requiring them to be retrofitted with controls would potentially cost much more and require much more effort than for new construction. It is good practice for operators to relocate under-utilized or unused equipment to new locations, and if the Department eliminates this economic benefit, the costs should be re-evaluated in the TSD. (919)

Response: Relocating an existing piece of equipment within a facility does not constitute new construction. However, relocating from one facility to a new facility constitutes construction of a new source and triggers the BAT requirement. Each federal subpart has its own applicability, which may be based on the manufacture date.

Comment 220: Several commentators state that it appears the Department intends to grandfather certain operations, consistent with the BAT previously established. However, it is not clear how dehydration facilities authorized under a state-only operating permit that later converts to a GP-5 will be handled and what standards they would be required to meet. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: BAT is determined at the time of issuance of a plan approval, so dehydration units installed within the given time periods will meet the requirements of their respective section of the general permits. However, the general permits cannot be used to relax BAT or other emission limitations or requirements previously established through the air quality permitting process.

Comment 221: Several commentators state that the uncontrolled single HAP emission rate thresholds of 0.5 tpy and total uncontrolled HAP emission rate thresholds of 1.0 tpy of Section F Condition 1(c) of

GP-5A are inconsistent with the Air Quality Permit Exemptions list, which includes limits of 1.0 tpy for a single HAP and 2.5 tpy for total HAPs. The TSD does not discuss nor justify the need for or cost effectiveness of controls for sources with emissions below the level currently exempted in the exemptions list. The thresholds in GP-5A should be consistent with the exemptions list. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The Department disagrees. The previous version of Exemption 38, which has been in place since August 10, 2013, includes emissions thresholds of 0.5 tpy (1,000 lb) single HAP and 1.0 tpy total HAP; these thresholds are unchanged. The thresholds in GP-5A are consistent with the exemptions list.

Comment 222: Several commentators state that the requirement to use only enclosed flares in Section D Condition 1(c)(i)(A) is a significant change from the current GP-5, and no justification for the requirement is provided in the TSD. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Since August 10, 2013, Exemption 38 requires an enclosed combustion device, including an enclosed flare to be used for all permanent flaring operations at a wellhead or facility. These flaring operations are to be designed and operated in accordance with the requirements of 40 CFR § 60.18. It was determined that if enclosed flares are required for permanent installations at well sites, it would also be appropriate for compressor stations, processing plants, and transmission stations.

Comment 223: Several commentators state that Section D Condition 1(c)(ii)(B) provides the option to maintain emissions below a certain emission threshold. If those are then exceeded, the units would have to meet the applicable control requirements. The installation of a control device would require a modification to the permit. Therefore, this condition should include a clarification that controls should be installed within 180 days of issuance of a revised permit for the installation of the control device or provide an avenue to install controls without prior Department approval. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Based on the comments, the final general permits do not include this condition. However, the owner or operator must operate and maintain the unit in such a manner that malodors are not detectable outside the property of the owner or operator on whose land the facility is being operated in accordance with 25 Pa. Code § 123.31. The general permits require the operation to emit below the applicable control thresholds or meet the control requirements. An additional 180-day period will not be granted for an installation of a control device.

Comment 224: Several commentators state that flash tanks and pumps are part of the package glycol dehydrator and not subject to “their respective Sections.” The reference to these types of units should be removed from this requirement, especially considering that flash tanks are considered “a piece of process equipment” and that the pumps are typically electric or energy exchange pumps, and not pneumatic. (916, 919, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Installation of flash tank separators on glycol dehydrators reduces methane, VOC, and HAP emissions and saves money. Recovered gas can be recycled to the compressor suction and/or used as a fuel for the reboiler and compressor engine. Section I of the final general permits is applicable to natural gas-driven diaphragm pumps. In the final GPs, Section B(1)(d) references associated equipment as controllers, pumps, and fugitive emissions components.

Comment 225: The commentators state that Section F Condition 1(f) should be revised to read “Associated equipment, such as reboilers (Section E), controllers (Section L), and fugitive emissions components (Section K) are subject to the requirements of their respective Sections.”. The other commentator states that rich glycol flash tanks are coded vessels that are integral to the dehydration unit operation and are not hydrocarbon storage vessels subject to Section I. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: In the final general permits Section B, Condition 1(d) references associated equipment as controllers, natural gas driven pneumatic pumps, and fugitive emissions components.

Comment 226: Several commentators state that pumps used within a dehydration unit are powered by natural gas, but are not considered “pneumatic pumps” under 40 CFR Part 60, Subpart OOOOa. Motive gas from these pumps will be released either through the rich glycol flash tank or the glycol regenerator as part of the larger integrated unit. Therefore, these pumps should not be subject to Section M. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The final general permits require operators to comply with the applicable pump requirements of 40 CFR Part 60 Subpart OOOOa. However, the Department also included a control requirement for any pump that exceeds the control thresholds.

Comment 227: Several commentators state that the replication of 40 CFR Part 60 Subpart HH should be removed and incorporated by reference. (919, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: These requirements were incorporated by reference in the final general permits.

Comment 228: The commentators state that glycol dehydration units provide a direct pathway to the atmosphere for any hydrocarbons captured by the glycol when the water is boiled off from the wet glycol. The commentators are concerned that these emissions are estimated through software such as GRI-GlyCalc as the estimation is only valid for the input gas analysis. One commentator states that there is no scientific basis to assume that gas analyses are constant over a geographic region or over time. The commentators allege that the Department is not reviewing Air Emissions Inventory Data, not reviewing gas analyses used in the GRI-GlyCalc, nor requiring emissions calculations based on measured numbers. The dehydrator emissions can only be estimated based on the gas chemistry for each well. Scientific studies clearly show that gas chemistry is not constant for adjacent wells and certainly not across a region. Thus, dehydrator and compressor emissions must be specified based on the gas chemistry for each well as part of the permit. The emissions must be monitored to prove that they are within the predictions of the general permit. The technology for this is available and affordable for gas companies and is simply the cost of doing business with highly variable polluting products such as shale gas and oil. (27, 805, 1029, 1032)

Response: The Department agrees that the gas analysis is critical for estimation of emissions. The final general permits require the operator to submit representative gas analyses with their application. Emissions calculations are required to be performed for glycol dehydration units using software such as GRI-GlyCalc.

Comment 229: The commentator states that the Department needs to proactively be on the lookout for the malodor nuisance from dehydrators to maintain the public’s ability to enjoy their property in

summer. The commentator recommends that the Department conduct regular inspections of this equipment. (1020)

Response: The owner or operator must operate and maintain in such a manner that malodors are not detectable outside the property of the owner or operator on whose land the facility is being operated in accordance with 25 Pa. Code § 123.31 odor emission limitations). Any potential issues will be handled on a case-by-case basis.

Comment 230: The commentator states that glycol dehydrators in particular have proved to be of concern to many of our members who have encountered strong odors from them on well pads and seen thick black liquid oozing out from under them. We are concerned that some operators appear to use older versions of such equipment, often rusty looking or repainted units. We'd like to see all equipment on the well sites regulated and all emissions accounted for, not just equipment associated with new wells or new itself. In lieu of that, if present equipment fails, then the same standards that pertain to new units should apply. What we don't want to see is more junk hauled here from played-out areas, painted up and passed off as acceptable (functioning well enough to adequately serve their purpose, but perhaps no longer functioning well in terms of emissions), until they malfunction and more outdated, nearing end of life equipment is brought here to replace them. (1019)

Response: The owner or operator must operate and maintain in such a manner that malodors are not detectable outside the property of the owner or operator on whose land the facility is being operated in accordance with 25 Pa. Code § 123.31 (odor emission limitations). BAT is determined at the time of issuance of a plan approval, so dehydration units installed within the given time periods will meet the requirements of their respective section of the general permits. However, the general permits cannot be used to relax BAT or other emission limitations or requirements previously established through the air quality permitting process.

Older equipment that is installed at a new facility must meet the same BAT as a new source.

Stationary Natural Gas-Fired Spark Ignition Engines

Comment 231: The commentator states that, as written, the engine requirements of Section G of GP-5A would apply to engines used in drilling and completion operations. The Department did not justify expanding the applicability of the requirements to temporary-use engines in the TSD. The commentator recommends removing temporary activities from the scope of the GP-5A. (919)

Response: The Department disagrees that Section G of GP-5A applies to engines used in temporary activities. The title of this section states, "Stationary Natural Gas-Fired Spark Ignition Internal Combustion Engines." The GP-5A does not apply to temporary activities, including nonroad engines used at well sites. These activities are addressed in Exemption 38. Non-road engines are required to meet the applicable federal regulations.

Comment 232: The commentator suggested that the Department eliminate differentiation between rich burn and lean burn combustion and recommended different emissions limits for various size categories to allow the free market to choose the best technology to meet the established limit. The commentator also suggests removing the requirement to install SCR technology from engines rated from 3,000 hp to 6,500 hp. SCR systems cause higher greenhouse gas emissions due to CO₂ from urea production,

transport, and decomposition into ammonia. SCR technology does not favor fuel flexibility which is required in many gas compression systems and has large economic and operational impacts.

The commentator also proposes an alternate “competitive market” approach and suggests the Department require (1) 0.30 g/bhp-h NO_x emission limit for engines rated between 1,875 hp to 2,500 hp, (2) 0.50 g/bhp-h for engines rated between 2,500 to equal to or greater than 6,500 hp until January 1, 2020 and 0.30 g/bhp-h thereafter, and (3) 0.05 NO_x emission limit for engines rated at greater than 6,500 hp. The commentator states that the rationale for moving the SCR class to 6,500 hp is that engines of this size are most likely to be installed at facilities that will not require flexibility to operate on a variety of unrefined field gas and it is much more cost-effective. (926)

Response: The Department disagrees. The definition of BAT is very broad and includes “equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available.” 25 Pa. Code § 121.1. There is precedent in establishing BAT limitations specific to a source based on fuel, technology, or other factors. Also, the requirement for installing SCR has been revised and is not required for engines of any size if they can meet 0.3 g NO_x /bhp-h or less. Only engines over 2,370 hp with 0.5 g NO_x /bhp-h are required to install SCR; operators that do not believe SCR is cost effective for their facility may instead apply for a case-by-case plan approval. The emission limit included in the final GPs is both technology and vendor neutral. The Department does not endorse any specific vendor or technology to meet the emission limit. Furthermore, BAT is intended to be technology forcing to prevent, reduce or control emissions of air contaminants to the maximum degree possible.

Comment 233: The commentator recommends that the Department consider a 150 hp threshold for exclusion from keeping engine logs and emissions accounting for such things as light plants and other small engines. (928)

Response: The Department believes that most of the light plants utilize non-road engines and are exempted from permitting under Exemption 38. However, emissions from these engines must be accounted for in the annual inventory reporting.

Comment 234: Several commentators state that the primary NO_x control technology for engines provided in the GP-5 analyses is low NO_x combustion using the preferred approach of “pollution prevention” through combustion-based emissions controls. Incremental emission reductions are nominal and of questionable environmental benefit. In addition, SCR causes additional negative environmental and energy impacts from ammonia emissions and from reagent and catalyst lifecycle impacts. The issues alone warrant reconsideration of the Department’s determination that SCR should be required in some cases. (930, 936, 1052)

Response: Based on the comments received, the Department believes that a 5 ppm_{dv} limit may not always be achievable; therefore, the Department has revised the ammonia slip limit to 10 ppm_{dv} corrected to 15% O₂.

Comment 235: The commentator states that requiring the use of SCR by specific horsepower threshold hinders the development of reciprocating engine technology. Consideration should be given to the US Department of Energy’s focus on improving overall system efficiency; SCR systems reduce overall engine efficiency when one considers electrical requirements, the impact on safety and emissions in the

event of malfunction, and the acquisition and operating costs. Engine manufacturer research and development efforts to maximize engine efficiency with the co-benefit of incremental uncontrolled emissions reductions on engines rated at or greater than 3,000 hp will likely cease due to a compulsory SCR requirement. (1045)

Response: The Department disagrees with the commentator that requiring the use of SCR by specific horsepower threshold will hinder the development of reciprocating engine technology. The Department has revised the cut off size to 2,370 hp and requires SCR unless the engine can comply with the 0.3 g/bhp-hr NO_x emission standard.

Comment 236: Several commentators request that the Department clarify that Section G of GP-5A does not apply to two-stroke engines. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Other than the definitions in 40 CFR § 60.4248, there are no instances when the word “stroke” appears in the regulation. Therefore, the requirements of 40 CFR Subpart JJJJ are applicable to all engines, whether they be four-stroke lean burn, two-stroke lean burn, or four-stroke rich burn.

Comment 237: Several commentators request clarification on what triggers the start of “construction” for this section. It is unclear as to whether this is the date of order from the manufacturer, the date the unit was permitted, the date of the on-site installation, or the date that installation of the engine began at the facility. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Construction as it is defined in 25 Pa. Code § 121.1 is the date that installation of the engine began at the facility. Construction does have a separate meaning under 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 63 Subpart ZZZZ; however, for BAT purposes, an engine installed at a site must meet the appropriate BAT for its date of installation.

Comment 238: Several commentators state that the proposed general permits apply to units that are constructed in specified timeframes. It is critical that the Department maintain this applicability. Relocated units should not trigger this section, nor should modified units. Relocating or modifying units does not increase an operator’s emissions, and requiring them to be retrofit with controls would potentially cost much more and require much more effort than for new construction. (919, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: This is inconsistent with the application of BAT as required under 25 Pa. Code § 127.1. While the emission unit is not new, installation at a new facility requires the emission unit to meet BAT appropriate for the date of installation.

Comment 239: Several commentators recommend stating the emission limitations for engines in both g/bhp-h and ppm_{dv}, utilizing the conversion factor found in 40 CFR § 60.4244. This will aid in field testing to establish compliance limits, particularly when using portable analyzers. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1045-1048, 1053, 1054)

Response: The emission limitations are stated in g/bhp-h. As the commentator states, the conversions found in 40 CFR § 60.4244 may be used to convert the measured ppm_{dv} into the applicable g/bhp-h limits.

Comment 240: Several commentators state that Condition 1(a)(i) defines emissions limits “while operating at rated bhp and speed.” The performance test requirements in Condition 5(b)(i) require testing “within 10% of the highest achievable load.” For consistency, the emission limit should indicate that emission limits apply at rated bhp and speed or the highest achievable load. (930, 936, 1052)

Response: Section C Condition 1(a)(ii) states that the operator must ensure that at operating conditions less than rated capacity, the engine shall on a lb/h basis emit no more than it would emit at rated bhp and speed.

Comment 241: The commentator states that, as proposed, Section G Condition 1(b) of GP-5A would retroactively include sources that were constructed under Exemption 38 before and after the August 10, 2013 conditional exemption. The Department has not justified such a retroactive requirement. (919)

Response: For the period between February 2, 2013, which was the initial date that GP-5 was no longer available for use at a natural gas production facility, and the effective date of the GP-5A, the emissions requirements for engines that were not installed under a plan approval come from 40 CFR Part 60 Subpart JJJJ. The table was constructed from the requirements of 40 CFR § 1045.105 and 40 CFR § 60.4233(d) and (e). This has been incorporated by reference in the revised GP-5A. This is not a retroactive requirement, as Subpart JJJJ has been in effect since January 2008 and has requirements for engines manufactured on or after June 12, 2006.

Comment 242: Several commentators state that Section G Condition 1(b)(i) implies that an operator could not move an older engine from one facility to another, even though moving the engine would not trigger construction, modification, or reconstruction under 40 CFR Part 60 Subpart JJJJ. The Department should clarify this subsection. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: While it is true that moving an engine from one facility to another does not trigger construction, modification, or reconstruction under Subpart JJJJ, installing an existing engine at a new facility triggers the definition of construction in 25 Pa. Code § 121.1. This is why an engine installed at a facility must meet the current level of BAT.

Comment 243: Several commentators state the proposed GP-5 emission standards for existing natural gas-fired spark ignition internal combustion engines adds significant figures to the limits in the current GP-5. For example, 2.0 g/bhp-h NO_x is now 2.00 g/bhp-h NO_x; this change results in more restrictive limitations for existing engines and more restrictive control requirements. The commentators recommend maintaining the limitations as written in the current GP-5. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The final GPs include NO_x emission limits with two significant figures (e.g. 2.0 or 0.25), which is consistent with NSPS emission standards. However, the standards for existing sources are unchanged in the final GP-5.

Comment 244: The commentator states that in Section E Condition 1(c)(ii) of GP-5 and Section G Condition 1(c)(ii) of GP-5A, the Department requires an ammonia slip of 5 ppm for SCR systems. Major emission sources, which have better opportunity for sophisticated process control instrumentation, using SCR for NO_x control are often required to achieve 10 ppm ammonia slip. Both limits are unreasonable for small units in the oil and gas industry. The commentator recommends removing the ammonia slip requirement. (919)

Response: Based on the comment, the Department has revised Ammonia slip to 10 ppmdv in the final general permits.

Comment 245: Several commentators state that 0.5 g/bhp-h is an acceptable NO_x limit for engines rated at or greater than 1,875 hp. These engines are available from a wide variety of engine manufacturers. This limit would avoid impacts to individual engine manufacturers' competitiveness. The Department will not attain the anticipated outcomes associated with tightening NO_x emissions limits from lean burn engines rated at or greater than 1,875 bhp. Operators will be encouraged to install multiple, smaller engines that could achieve the same collective horsepower with limits of 0.5 g/bhp-h NO_x versus installing a single, larger unit triggering the 0.05 g/bhp-h NO_x limit. In addition, there are technical challenges related to replacing engine models to meet 0.5 g/bhp-h or less NO_x emission guarantee. Existing engines that undergo a replacement in kind cannot be based solely on make and model as the configuration of the entire engine package includes the engineering of connections and other considerations that the Department has not accounted for in the proposed requirements. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1045-1048, 1053, 1054, 1056)

Response: The Department disagrees. The definition of BAT is very broad and includes "equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available." 25 Pa. Code § 121.1. There is precedent in establishing BAT limitations specific to a source based on fuel, technology, or other factors. Also, the requirement for installing SCR was revised in the final general permits, and is not required for engines of any size if they can meet 0.3 g NO_x/bhp-h or less. Only engines over 2,370 hp with 0.5 g NO_x/bhp-h are required to install SCR; operators that do not believe SCR is cost effective for their facility may instead apply for a case-by-case plan approval.

Comment 246: Several commentators request clarification as to what information or documentation would be required for submittal in a permit application to satisfy the Department that an engine will comply with a NO_x limitation that is lower than the manufacturer's guarantee. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: This requirement has been removed from the final general permits.

Comment 247: Several commentators request that this requirement specify that these emission limits apply at maximum load. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: All emission limits (except those in Condition 1(a)) are required to be met at all operating conditions.

Comment 248: The commentator states that the table in Section E Condition 1(c)(i) contains emission rates for natural gas-fired spark ignition internal combustion engines constructed on or after the effective date of the proposed GP-5. The emission rate for NMNEHC excluding formaldehyde as propane is given as 0.70 g/bhp-h for lean burn engines rated at less than 100 hp. This is inconsistent with the TSD, which lists the same emission limit as 0.20 g/bhp-h. The TSD states that the uncontrolled weighted average emission rate was 1.6 g/bhp-h for THC and assumed 90% of THC was methane and ethane (0.20 g/bhp-h NMNEHC). The Department then states that an oxidation catalyst is determined to be BAT for this category of engines and that 50% control of NMNEHC should be assumed; this would yield an emission limit of 0.10 g/bhp-h for NMNEHC. Please clarify the applicable emission limit. (930)

Response: The inconsistency for lean burn engines was an error in the transcription of the proposed limit; however, the requirements for engines rated less than 100 bhp have been removed and replaced with the requirements for 40 CFR Part 60 Subpart JJJJ.

Comment 249: Several commentators state that visible emissions surveys and the associated recordkeeping and reporting should not be required for natural gas operations and natural gas-fired engines. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054)

Response: The visible emission surveys and the associated recordkeeping and reporting requirements have been removed from the final general permits.

Comment 250: Several commentators state that the current GP-5 does not require the installation of fuel meters. The proposed GP-5 should not require the installation of fuel meters, instead allowing the use of other process information, such as manufacturer-provided brake-specific fuel consumption and operational data, to calculate fuel use. The commentators note that operating control systems are sometimes programmed to calculate fuel use based on hours of operation and heat rate. In addition, Section E Condition 1(d) as proposed would require existing engines to be retrofitted with a fuel meter, which is very costly and provides no direct environmental benefit. Further, if this requirement is maintained, there should be a size exemption threshold for smaller engines which may not have enough fuel flow to be fitted with a fuel meter that will provide accurate and reliable data. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1045-1048, 1052-1054, 1056)

Response: The requirement to install fuel flow meters has been removed from the conditions in the final general permit.

Comment 251: The commentator recommends removing the non-resettable hour meter requirement, as it does not appear in the current GP-5 and it incurs additional cost and difficulty while not providing benefits. The commentator points out that 40 CFR Part 63 Subpart ZZZZ stipulates the use of non-resettable hour meters in only three scenarios; for new or reconstructed emergency 4SLB stationary RICE with site rating greater than or equal to 250 hp and less than or equal to 500 hp located at a major source of HAP emissions (40 CFR § 63.6625(d)), for existing emergency stationary RICE with a site rating of less than or equal to 500 hp located at a major source of HAP emissions (40 CFR § 63.6625(f)), and for existing emergency stationary RICE located at an area source of HAP emissions (40 CFR § 63.6625(f)). (1045)

Response: Adding the time interval to the current showing hours of a non-resettable meter informs the operator when the elapsed time interval has been met (i.e. if the meter shows 2,500 hours when it reads 5,000 hours, it triggers the next periodic monitoring). The recordkeeping can be accomplished with minimal effort.

Comment 252: One commentator states that Section E Condition 1(d)(i) and (ii) of GP-5 and Section G Condition 1(d)(i) and (iii) of GP-5A replicate existing requirements found in state and federal regulations and should be incorporated by reference. (919)

Response: Federal requirements have been incorporated by reference.

Comment 253: One commentator states that Section E Condition 1(d)(iii) through (vi) of GP-5 and Section G Condition 1(d)(iv) through (vii) of GP-5A repeat requirements of 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 63 Subpart ZZZZ. As written, the requirements would apply to all engines regardless of manufacture date, and this is beyond the federal requirements. The Department has provided no justification in the TSD for this expansion of applicability. (919)

Response: In 25 Pa. Code § 121.1, the definition of an air contamination “source” is “any place, facility, or equipment, stationary or mobile, at, from, or by reason of which there is emitted into the outdoor atmosphere any air contaminant.” An existing engine at a facility required to obtain a proposed general permit would meet the BAT requirements for its date of installation, and which are memorialized in the general permit. This includes any requirements based on 40 CFR Part 60 Subpart JJJJ or 40 CFR Part 63 Subpart ZZZZ which may, or may not, be based upon manufacture date. However, if that engine is relocated to a new facility, by 25 Pa. Code § 127.1, “New sources shall control the emission of air pollutants to the maximum extent, consistent with the best available technology as determined by the Department as of the date of issuance of the plan approval for the new source.” (emphasis added) A new source, as defined in 25 Pa. Code § 121.1, is “a stationary air contamination source which was constructed and commenced operation on or after July 1, 1972...”

Comment 254: Several commentators state that Section E Condition 1(d) of GP-5 replicates portions of the federal regulations codified in 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 63 Subpart ZZZZ. These comments should be incorporated by reference only. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The federal regulations, including 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 63 Subpart ZZZZ applicability, are incorporated by reference in the final general permits.

Comment 255: Several commentators state that Section G Condition 1(d)(ii) is not listed in GP-5A. (919, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: This was an error that has been corrected in the final GP-5A.

Comment 256: Several commentators state that an oil analysis option consistent with 40 CFR § 63.6625(i) and (j) should be added as an alternative to the defined oil change interval. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1045)

Response: The federal regulations, including applicability of oil analysis under 40 CFR Part 63 Subpart ZZZZ, is incorporated by reference in the final general permits.

Comment 257: Several commentators suggest that Section E Condition 1(d)(i) of GP-5 be reworded to say, “Comply with the following requirements for engines constructed (as defined in 40 CFR Part 63 Subpart ZZZZ) prior to June 12, 2006.” (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Federal requirements have been incorporated by reference in the final general permits.

Comment 258: Several commentators suggest that Section E Condition 1(d)(v) of GP-5 and Section G Condition 1(d)(vi) of GP-5A not impose an idling limitation of 30 minutes, instead maintaining the language in the current GP-5. There may be times during periods of extreme cold where startups may

require engines to idle more than 30 minutes before it can accept a load. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Section C Condition 1(d)(iv) of GPs is identical to 40 CFR § 63.6625(h) which states “...minimize the engine’s time spent at idle during startup and minimize the engine’s startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the emission standards applicable to all times other than startup in Tables 1a, 2a, 2c, and 2d to this subpart apply.” There are no startup provisions in 40 CFR Part 60 Subpart JJJJ.

Comment 259: Several commentators state that additional testing beyond that required in the current GP-5 should not be required. In addition, for engines rated greater than 500 hp any test completed within 180 days of reauthorization, whether before or after, should satisfy the requirement. This avoids forcing an operator to test significantly earlier than the 8,760-operating hour requirement. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The frequency of performance testing is consistent with the previous version of GP-5. Section C Condition 4(b) requires that engines rated greater than 500 hp must test within 180 days of initial start-up or re-authorization of the general permit; however, all engines are subject to 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 63 Subpart ZZZZ as applicable. 40 CFR 60.4243(a)(2)(ii) requires engines rated between 100 hp and 500 hp to test within 1 year of initial startup. 40 CFR 60.4243(a)(2)(iii) requires engines rated greater than 500 hp to test within 1 year of initial startup and every 8,760 hours of operations or every three years, whichever comes first. These testing frequencies for engines are shown in the table in Section C Condition 1(d)(v) of the final general permit. However, final GP-5 and GP-5A allow the Department to alter the frequency of the performance test requirement for reauthorization unless required by federal regulations.

Comment 260: Several commentators state that this requirement should include a provision allowing a full performance test to be used in lieu of periodic monitoring using a portable analyzer, as in the current GP-5. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: It is the Department’s intent that testing and monitoring be used to determine compliance with engine emission requirements. Testing, which is federally required on a specific schedule, is the primary method of compliance. To this end, any performance test resets the periodic monitoring clock to zero hours. The 2,500-hour periodic monitoring interval is to supplement and fill in the periods between the performance tests. With a performance test interval of 8,760 hours, the operator should conduct three monitoring events; the “fourth” monitoring would occur 2,500 hours after the performance test.

Comment 261: Several commentators state that the Department has not justified inclusion of requirements for performance testing and periodic monitoring for engines rated less than or equal to 500 hp. The Department has cited 40 CFR § 60.4243(a)(2)(ii) and § 60.4243(b)(2)(i) for these requirements; however, the referenced requirements are only for engines not operated according to the manufacturer’s instructions or for non-certified engines, respectively. Including this language in the permit, especially for engines that may not be subject to the specific regulation cited by the Department, underscores the commentators’ position that federal regulations should be referenced rather than restated. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: In accordance with the final general permits, performance testing requirements are waived for engines less than or equal to 500 hp, if the engine is certified by the manufacturer in accordance with

40 CFR Part 60, Subpart JJJJ and the owner or operator operates and maintains the engine in accordance with the manufacturer's instructions. Periodic monitoring requirements are determined by the Department to be necessary for the demonstration of compliance. The Department may alter the frequency of periodic monitoring based on the test results.

Comment 262: Several commentators state that the last two rows of the table in Section E Condition 1(d)(vi) of GP-5 both reference engines rated greater than 500 hp. The commentators believe the third row should reference engines rated greater than 500 hp and not subject to Condition 1(d)(i). (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department agrees. The Department has clarified that the second row is for engines which are not subject to Subpart ZZZZ and Section C, Condition 1(d)(i) in final GP-5 and GP-5A.

Comment 263: Several commentators state that Section G Condition 1(d)(vii) of GP-5A, as written, would require all engines greater than 500 hp to conduct annual performance testing even if it does not require controls. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Engines greater than 500 hp that are subject to Condition 1(d)(i) are required by 40 CFR Part 63 Subpart ZZZZ Table 2d to install controls. The only exceptions are for emergency engines, black start engines, remote engines, or engines that operate 24 hours or less per year.

Comment 264: The commentator suggests adding Section G Condition 1(e) of GP-5A which states "This section shall apply to permanent production facilities and shall not apply to temporary stationary natural gas-fired spark ignition internal combustion engines used during construction, drilling, hydraulic fracturing, or completion activities." (972, 981)

Response: The addition of this language is unnecessary as temporary sources have their own requirements under Sections B, C, and D and, as temporary activities, are being removed from GP-5A.

Lean Burn Engines

Comment 265: Several commentators state that they are not aware of any permits issued in Pennsylvania for engines where SCR was required as a result of a BAT evaluation. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: There are currently 23 permitted projects with over 75 engines equipped with oxidation catalysts and SCR, four of which, with 16 engines, are in commercial operation.

Comment 266: The commentator states that there is no indication that the Department has determined SCR is required as a result of a BAT evaluation. In fact, the Department's Southwest Region has issued a plan approval and associated review memo stating that the installation of SCR on the project's proposed engines does not represent a BAT determination. (916)

Response: The Department has provided adequate economical and technical justification in the TSD to require SCR technology as BAT on engines rated greater than or equal to 2,370 hp.

Comment 267: The commentator states that in the February 2013 GP-5 the Department based BAT on vendor guarantees and worst-case data. For example, post-combustion controls for lean-burn engines

under the SCR section in the February 2013 GP-5 TSD establishes a NO_x limit of 0.5 g/bhp-h based on a vendor guaranteed rate. Stack testing data available to the Department showed that this limit was achievable by all sources. However, in the current TSD, the Department chooses to set a limit based on a fraction (upper third) of actual test results without reliance on vendor quotations. As with the Department's 2013 rulemaking, emission limits cannot be tighter than vendor designs will allow. In the commentator's experience, stack test results for smaller engines that are well run can achieve 0.375 g/bhp-h NO_x, which is well below the regulatory limit of 1.0 g/bhp-h NO_x. The Department's proposed 0.35 g/bhp-h NO_x limit would subject some engines to additional control when they all fall within a reasonable range of very well controlled sources. The Department should not establish limits on arbitrary fractions of test data. Limits should be based on design rates that have been validated by test data. (919)

Response: The Department has revised the final general permits based on comments received. The 0.35 g NO_x/bhp-h requirements based on stack test data were removed, the horsepower category was revised upward to 2,370 hp and greater, and the vendor guaranteed emission rate of 0.30 g NO_x/bhp-h is required for uncontrolled sources.

Comment 268: The commentator points out that in Appendix B of the TSD under Table 13, the Department states "Because the quotes furnished to the Department by the vendors were determined based on the assumption of 8,760 hours of operation, the Department proposes to determine cost effectiveness of the control of NO_x with an SCR system without regard to variability of hours of operation." The engine load and the hours of operation are directly related to the uncontrolled emission rate of the engine. Therefore, they are very relevant to the cost/ton pollutant reduced calculation. Assuming a compressor operates at 75% load for a full 8,760 hours/year is still a conservative assumption but reduces the cost effectiveness because some of the costs are fixed and not proportional to engine load. (919)

Response: Using a general permit is not mandatory. If the commentator wishes to use lower loads or operation hours in the BAT determination, they may do so in a case-by-case plan approval. The restricted loads and hours of operation would then be memorialized into the operating permit as an enforceable limit.

The general permits do not have limiting conditions on load or hours of operation, and therefore require the BAT determination to be performed at the Department assumed 100% load at 8,760 hours/year. The rationale in the TSD is valid; the quotes included the operational costs and assumed full operation. Some of the costs are variable based on load and hours of operation; however, the quotes did not take those variables into consideration. Also, because a general permit cannot be modified to incorporate load and hours limits, the cost effectiveness must be determined at maximum load and operating hours.

Comment 269: Several commentators state that the TSD does not demonstrate that the proposed NO_x emission limit of 0.05 g/bhp-h is currently in practice for any source which would be subject to the proposed GP-5 permit. The Department also failed to demonstrate that the ammonia slip limit of 5 ppmvd corrected to 15% O₂ has been achieved for these types of facilities. The commentators believe that such demonstrations must include a significant sample of facilities that achieve these levels of compliance in order to determine they can be reasonably achieved in practice for the term of the permit. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Based on conversation with equipment vendors, SCR technology can achieve a minimum of 90% control with 5 ppmvd ammonia slip corrected to 15% O₂. Engine vendors guarantee NO_x emissions at 0.5 g/bhp-h; therefore, 0.05 g NO_x/bhp-h is achievable in practice. Based on the comments received, the Department has revised the ammonia slip limit to 10 ppmvd corrected to 15% O₂ in the final general permits.

Comment 270: Several commentators state that the proposed BAT for reciprocating compressor engines greater than 1,875 bhp [0.35 g/bhp-h NO_x or apply selective catalytic reduction (SCR)] is, at best, establishing emission rates that can only be achieved by one manufacturer and represent rates that are more aligned with the lowest achievable emission rate (LAER) than BAT. The commentators are concerned that requiring a 0.35 g/bhp-h NO_x limit potentially limits the competitiveness of manufacturers and asks the Department to confirm that there are an adequate number of manufacturers available to avoid the establishment of BAT values that could lead to directing permittees to have to go with one of a limited number of vendors. In addition, the commentators state that even if it is achievable, the use of SCR trades 15 to 25 ppmv of NO_x emissions for 5 ppmv (or more) of ammonia. Ammonia is a PM_{2.5} precursor and can participate in atmospheric reactions with NO_x or SO_x to form ammonium nitrate or ammonium sulfate. If the environmental implications of these emissions, plus the environmental implications associated with ammonia or urea production and shipping and catalyst production, maintenance, and replacement are taken into account, the environmental benefit is very questionable for a nominal incremental NO_x reduction. (928, 930, 936, 952, 987, 1047, 1048, 1052-1054, 1056)

Response: Based on conversations with equipment vendors, SCR technology can achieve a minimum of 90% control with 5 ppmvd ammonia slip corrected to 15% O₂. Based on the comments received, the Department has revised the ammonia slip limit to 10 ppmvd corrected to 15% O₂ in the final general permits. The Department is aware that ammonia is a PM_{2.5} precursor, and can participate in atmospheric reactions with NO_x or SO_x to form ammonium nitrate or ammonium sulfate. Therefore, in the proposed general permits, ammonia slip limitations were limited to 5 ppmvd corrected to 15% O₂ as supported by the vendors that provided the quotes to the Department. However, based on the comments received, a 5 ppmvd limit may not be achievable at all times; therefore, the Department has revised the ammonia slip limit to 10 ppmvd corrected to 15% O₂ in the final general permits.

Comment 271: The Department fails to discuss the technical feasibility of the application of SCR technology or the ability to achieve the proposed emissions levels from reciprocating engines in the type of compression service covered by the general permits. The commentators are not aware of any permits issued in Pennsylvania for engines where SCR was required as a result of a BAT evaluation nor are they aware of units demonstrating compliance with permit limits of 0.05 g/bhp-h NO_x. (930, 936, 1052)

Response: There are at least 10 projects which permitted multiple turbines where SCR was determined to be BAT. Based on conversation with equipment vendors, SCR technology can achieve a minimum of 90% control with 5 ppmvd ammonia slip corrected to 15% O₂. Engine vendors guarantee NO_x emissions at 0.5 g/bhp-h; therefore, 0.05 g NO_x/bhp-h is achievable in practice.

Comment 272: The commentators request that the Department confirm and document that 5 ppmvd ammonia slip corrected to 15% O₂ have been achieved for these sources at similar types of regulated facilities. (928, 930, 936, 952, 987, 1047, 1048, 1052-1054, 1056)

Response: In the proposed general permits, ammonia slip limitations were limited to 5 ppm_{dv} corrected to 15% O₂ as supported by the vendors that provided the quotes to the Department. However, based on the comments received, a 5 ppm_{dv} limit may not be achievable at all times; therefore, the Department has revised the ammonia slip limit to 10 ppm_{dv} corrected to 15% O₂ in the final general permits.

Comment 273: Several commentators state that the TSD indicates that the lowest costs for SCR are about \$9,000 per ton for large lean burn engines, which, when paired with the Department's conclusion that \$10,000 per ton is the appropriate threshold, raise questions about the basis for decision to increase the cost effectiveness threshold for GP-5. (930, 936, 1052)

Response: Nearby states such as New Jersey routinely require controls with cost-effectiveness values around \$10,000/ton. More importantly, U.S. EPA determined that \$10,000/ton was cost effective for BACT for the control of NO_x emissions from petroleum refineries. See Memorandum of John S. Seitz to Air Division Directors, re: BACT and LAER for Emissions of Nitrogen Oxides and Volatile Organic Compounds at Tier 2/Gasoline Sulfur Refinery Projects (January 19, 2001). The Department does not have a bright line benchmark number for a case-by-case RACT II determination. The RACT threshold applied to existing sources is generally lower than the BAT threshold applied to new sources. The Department does not see any need to limit the cost-effectiveness range as suggested by the commentators for the determination of BAT for new sources addressed in the general permits.

Comment 274: Several commentators state that even when SCR is technologically achievable and environmentally beneficial, the cost effectiveness of SCR exceeds \$10,000 per ton based on a more thorough cost analysis. The analysis in the TSD under estimates costs – as an example, the commentators provide alternative cost estimates using recommendations from the EPA Cost Control Manual and using initial direct and indirect installation costs based on a recent SCR installation at a Pennsylvania compressor station. The Department included costs inherent to system design, procurement, installation, commissioning, and operation from the EPA's Cost Control Manual. However, the Department failed to include direct installation costs associated with on-site support and preparation; indirect costs other than installation associated with site support, engineering, and startup; and minimal indirect annual costs associated with operator activity to support SCR operation and ensure performance. In summary, assuming a potential to emit based on 8,760 annual operating hours and an SCR inlet NO_x concentration of 0.35 g/bhp-h for a 4,735 hp engine, the NO_x cost effectiveness is: \$17,310/ton using a capital recovery factor (CRF) based on 10% cost of capital and a 10-year life; \$15,665/ton using a CRF based on 10% cost of capital and a 20-year life; or \$14,825/ton using a CRF based on 7% cost of capital and a 20-year life. These costs are only increased considering that compressors in the transmission and storage segment operate based on pipeline demand, of which a conservatively high capacity factor of 75% operation increases costs between \$18,865/ton to \$22,810/ton for the three CRF cases above.

Commentators also state that when comparing the Department's analysis based on estimates from SCR vendors to actual operator experience, there are significant discrepancies – primarily associated with direct and indirect installation costs such as engineering, foundations and supports, electrical, piping, etc. Appendix C, Attachment B-2 indicates where the commentators provided actual company costs were used. This shows a significantly higher cost than the TSD analysis which, assuming a potential to emit based on 8,760 annual operating hours and an SCR inlet NO_x concentration of 0.35 g/bhp-h for a 4,735 hp engine, the NO_x cost effectiveness is: \$26,861/ton using a CRF based on 10% cost of capital and a 10-year life; \$21,155/ton using a CRF based on 7% cost of capital and a 20-year life. (930, 936, 1052)

Response: The Department used some of the information provided by the commentator in the revised cost analysis. However, some of the analyses provided were discarded based on the use of 10% interest and 10-year life, which is inconsistent with recent EPA guidance. There were also additional costs provided by the commentator with no basis, such as installation of a continuous emissions monitoring system, inclusion of sales tax, and company costs for engineering, foundations and supports, electrical, and annual performance testing.

Comment 275: Several commentators state that higher cost effectiveness values result for engines in the 1,875 to 3,000 hp size category due to cost scaling with unit size and other factors. The revised analysis shows cost effectiveness well above the Department's \$10,000/ton threshold. Based on actual costs for equipment and installation from a Pennsylvania site, the NO_x cost effectiveness exceeds \$20,000/ton. The commentators contend that costs would be even higher based on the contingency costs for applying SCR to an equipment category with very limited applications to date. (930, 936, 1052)

Response: Site-specific costs inherently vary across the state. The Department's analysis in the TSD is based on generic factors. Using a single expensive installation to document that SCR is not cost effective for statewide application is counter to the intent of the BAT process and the general permit program. The Department's revised analysis shows SCR is still cost effective, however at a higher horsepower threshold than previously proposed.

Comment 276: Several commentators state that for lean burn engines less than 100 hp, the table in Condition 1(c)(i) of GP-5 proposes an emission standard of 0.70 g/bhp-h for NMNEHC. However, the TSD presents a lower value and includes an analysis of oxidation catalyst control, which is not warranted for such small engines. The limit proposed in the GP-5 should be retained and the inconsistencies with the TSD should be acknowledged or corrected. Additionally, the Department's Air Quality Permit Exemptions list indicates that engines less than 100 hp are conditionally exempt from permitting, but the proposed GP-5 includes such engines. The commentators recommend exempting these engines, or the Department should justify the inconsistency. (930, 936, 1052)

Response: The proposed general permit contained an error in transcribing the emissions limits for lean-burn engines from the TSD. However, based on comments the Department determined that there was insufficient vendor data for lean-burn engines less than 100 bhp to conduct an effective BAT analysis. The Department therefore determines that BAT for rich-burn engines less than 100 bhp is 1.00 g/bhp-h NO_x, 2.00 g/bhp-h CO, and 0.70 g/bhp-h NMNEHC as found in 40 CFR Part 60 Subpart JJJJ.

The Air Quality Permit Exemptions list exempts engines rated less than 100 hp from plan approval. The GP-5 may be used as an operating permit for these engines.

Comment 277: Several commentators state that the TSD provides no discussion of technical feasibility relative to the 0.05 g/bhp-h NO_x limit, particularly as it applies to the varying operation dynamics and to site resources relative to gathering, midstream, and transmission facilities. Also, the TSD indicates that the application of SCR to engines rated at or greater than 1,875 hp is economically feasible, inaccurately stating that SCR can be applied under the threshold of \$10,000 per ton of NO_x removed. The BAT analysis in the TSD is not comprehensive, significantly underestimating the costs to install an SCR system to meet proposed emissions limits. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The TSD justifies the limit of 0.05 g NO_x/bhp-h. The cost effectiveness was re-evaluated based on additional information received. The Department modified the horsepower threshold at which SCR is cost effective, and has also removed the requirement for engines that emit 0.30 g NO_x/bhp-h to install SCR. Additional materials were provided to the commentators at their request, including a scope of supply. The scope of supply was compared to information submitted by others and was found to be comparable. Not all costs, such as site preparation and construction for other components, are to be included in a comprehensive analysis, only those that relate to the control in question. When other costs are included, such as quotes that include both oxidation catalyst and SCR, all pollutants must be considered when determining the dollar-per-ton reduced figure.

Comment 278: Several commentators state that the Department's internal guidance on how to establish BAT requires that SCR would have to be determined to be both technically and economically feasible. The commentators do not agree that either of these conditions are met for SCR and therefore the Department cannot establish SCR as BAT.

The commentator recommends that the current 0.5 g/bhp-h NO_x emission limit be maintained as BAT for lean burn engines greater than or equal to 1,875 hp. This is the emission limit in the current GP-5, which was last revised in 2013. The recommendation is based on a detailed analysis and critique of the information provided in the Department's TSD and "scope of supply document."

The TSD does not explain or consider the site-specific considerations that impact SCR technical and economic feasibility at well sites or gathering, mid-stream, and transmission facilities. A compulsory SCR requirement imposes significant engineering, construction, and component costs which are not adequately addressed in the BAT analysis. The commentator contends that the installation of SCR on lean burn gas compression engines is neither technically or economically feasible, and the commentator's analysis will show that achieving a 0.05 g/bhp-h NO_x emission limit will require the installation of a supplemental SCR system and exceed the stated BAT threshold of \$10,000/ton of NO_x removed.

There are no facilities with an SCR system capable of achieving 0.05 g/bhp-h NO_x with an ammonia slip less 5 ppm in Pennsylvania. For an engine rated at 4,735 hp with a manufacturer's guarantee of 0.5 g/bph, the commentator estimates the cost to be \$10,902/ton of NO_x reduces; for an engine with a manufacturer's guarantee of 0.3 g/bhp-h, the commentator estimates the cost to be \$19,702/ton of NO_x reduced. These estimates are conservative, as they assume access to grid power; the costs and site emissions would increase significantly if a generator would be required. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1045-1048, 1053, 1054)

Response: The Department provided the detailed information on the technical and economic feasibility of requiring SCR as BAT for lean-burn engines greater than or equal to 2,370 hp. The procedure for determining BAT was followed. The ammonia slip requirement has been revised in the final general permits to 10 ppm_{dv} corrected to 15% O₂.

Comment 279: The commentator states that the scope of supply document lacks the basic information as to what components are included and what components will need to be supplied by the facility operator or third parties. Specifically, the Department analysis failed to account for all needed components to construct an actual functioning SCR system that would meet the required 0.05 g/bhp-h NO_x emission limit without exceeding the 5 ppm ammonia slip limit. Therefore, the significant discrepancies between the commentator's and the Department's analyses are due to significant errors

and omissions in the Department's calculations. In addition, the Department did not complete a comprehensive cost analysis with the information that was provided by Vendors A and B in the scope of supply document.

Industry standard official quotes typically provide detailed system descriptions of vendor supplied SCR components and additional third-party or customer supplied components required for a functional installation. This includes a line-item quote estimate in order to develop an accurate bill of materials. The Department did not engage in reasonable due diligence such as requesting actual vendor quotes. Instead, the Department asked for and received generic estimates, which are misleading because they do not include all required components for an SCR system. The commentator also states that to extend SCR catalyst lifespan and provide a margin of safety to avoid exceeding the 5 ppm ammonia slip requirement, an ammonia slip catalyst may be required. This possibility and its associated costs are not included in the Department's BAT analysis. Other examples of missing components are a power supply, air compressor, catalyst differential pressure sensors, catalyst inlet and outlet temperature sensors, insulation, reactant level indicator, tank heaters, and climate controlled enclosures for controllers. (1045)

Response: The Department used all information available, including the scope of supply information from Vendors A and B, and standard EPA estimation methods in calculating the cost-effectiveness of SCR.

The Department did request actual quotes from Vendors A and B; detailed line-item quotes are not available for general price quotes; however, general permit BAT cannot consider site-specific costs. A plan approval is required for a case-by-case determination that considers site-specific costs.

Comment 280: The commentator states that in a meeting with Vendor B, Vendor B revealed that the quotes provided to the Department were intended as ballpark estimates for the components they would supply, and did not include all necessary components to install an SCR system. The email communications between Vendor A and the Department exhibit a similar lack of transparency as to which components are included in the quote and whether additional components are necessary for a functioning system.

While meeting with Vendor B, the commentator submitted a request for quote for an SCR system for a 4,735 hp Caterpillar G3616-A3 engine with a 0.5 g/bhp-h NO_x rating that would achieve the proposed GP-5/GP-5A emission limit for engines rated greater than or equal to 3,000 bhp while limiting ammonia slip to 5 ppm. The commentator requested that Vendor B include all necessary components, or to identify components that would be supplied by the operator or a third party. The equipment cost provided to the commentator totaled \$517,942, exceeding the quote provided by Vendor B to the Department by approximately \$243,000. (1045)

Response: The information submitted by the commentator was included in the re-analysis of cost effectiveness in the TSD and resulted in revisions to the BAT determination in the final general permits.

Comment 281: The commentator states that after consulting with several operators that install SCR systems in electric power and gas compressor facilities they learned that none of the facilities were designed to achieve NO_x limits as low as 0.05 g/bhp-h with less than 5 ppm of ammonia slip. Based on this consultation and conversation NO_x s with Vendor B, the commentator learned that the Department significantly underestimated the engineering and site construction costs. The commentator received

estimates for engineering and construction costs totaling \$360,000, exceeding the Department's estimate by approximately \$305,000. (1045)

Response: The Department is unable to estimate the engineering and site construction costs to the level of detail noted by the commentator. Therefore, the Department used the EPA Control Cost Manual to estimate these costs. The BAT analysis for the general permit must apply to all sites and therefore cannot be based on a quote at a single specific site. The Department's re-analysis included several additional quotes provided by the commentators.

Comment 282: The commentator states that SCR installations are more common in electric power applications incorporating turbines and some large-scale transmission facilities. SCR is rarely installed on gas compressor engines at gathering and mid-stream facilities because they rarely operate on pipeline quality fuel, frequently exhibit inconsistent loading, and often do not have access to grid power. These drivers can impair the ability of the SCR system to achieve the required activation temperature to operate effectively while minimizing ammonia slip. These conditions can also reduce the life of the catalyst element and therefore require more frequent replacement. Facilities without grid power would be required to install grid power, which is cost-prohibitive, has environmental impacts, and right-of-way concerns, or install back-up generators which would offset estimated NO_x reductions achieved by installing the SCR system. The Department provides an exemption from the requirement to install electrically powered controllers and pumps for facilities without access to grid power; the Department should provide a similar exception regarding the installation of an SCR system.

Several commentators state that engines rated greater than or equal to 3,000 hp at gathering and boosting compressor stations rarely have SCR installed. SCR is common in electric power applications, which are typically larger facilities with more site resources than oil and gas facilities. Electric power stations have access to pipeline quality gas, a consistent engine load, and available electricity to run the SCR system. Gathering and boosting stations have inconsistent fuel quality and variable engine loading which can degrade the effectiveness of the SCR system, increase operating costs due to frequent catalyst replacements, and impair the ability to limit ammonia slip to less than or equal to 5 ppm_{dv}.

The commentators are not aware of any gas compression application of SCR in the Commonwealth that achieves the proposed 0.05 g NO_x /bhp-h emission rate. There is one transmission facility in Pennsylvania that has SCR installed with a permitted emission rate of 0.15 g NO_x /bhp-h. The commentators believe that the proposed emission rate is not technically feasible and the BAT cannot be established on one theoretical case.

Additionally, the commentators point out that there is one gathering station in the Commonwealth that has a Plan Approval to install SCR; the controls are not yet installed, and are thus not proven. SCR is also not being installed at all engines at the facility, and the operator will be able to adjust load on the engines with SCR should varied load become an issue at the station. The commentators disagree that SCR can be installed on every engine and should be limited to case-by-case determinations. The Plan Approval also allows twice the ammonia slip rate of the proposed BAT limit.

The commentators consulted several SCR vendors and were told that achieving a 90% NO_x reduction from a 0.5 g/bhp-h in a compressor application may not be able to consistently comply with the 5 ppm_{dv} ammonia slip limit without the installation of an ammonia slip catalyst. The TSD did not discuss this, nor was the cost of an ammonia slip catalyst included in the Department's BAT analysis. The

Department must justify the 5 ppm_{dv} ammonia slip limit before including it as a permit condition. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1045-1048, 1053, 1054)

Response: The Department used the EPA Control Cost Manual to estimate cost-effectiveness for SCR. General permit BAT evaluation cannot consider site-specific costs. A plan approval is required for a case-by-case determination that considers site-specific costs. SCR systems have been installed on several engines that operate at variable loading.

Comment 283: The commentator states that the use of “never-to-exceed” (NTE) rates, which is the current practice, versus stack test data overestimates the tons of NO_x Reduction. As stated in the TSD, many of the 0.5 g/bhp-h NO_x engines are capable of superior performance which represents a significant percentage of the engine population below the NTE estimates. BAT calculations should be based on operator’s demonstrated field stack performance test data to more accurately estimate potential emission reductions associated with installing SCR technology. (1045)

Response: The demonstrated field stack performance test data would be after the fact and vary significantly. The BAT requirement for the installation of new or modified sources requires the use of the vendor’s guarantee to establish the baseline emissions.

Comment 284: Several commentators state that Table 12 of Appendix B in the TSD shows quotes from two vendors. Vendor B offers estimates that are twice the estimate of Vendor A in all categories. The Department should gather additional quotations for a statistically sound evaluation. In addition, the Indirect Annual Costs do not appear to be accurate. They do not reflect a discount rate of 7% for an equipment life of 10 years. At this rate, the Indirect Annual Costs would be \$57,419. A higher discount rate, such as 10% or 12%, or a shorter life, such as 5 to 7 years, would result in an even higher Indirect Annual Cost. The commentator asks what discount rate and expected lifetime the Department used. (919, 1045)

Response: The Department used additional quotes that were provided by operators to conduct a re-analysis. Therefore, the determination as detailed in Appendix B of the TSD is statistically sound.

The Department used a 7% discount rate with an equipment life of 20 years. This is consistent with recent guidance from EPA.

Comment 285: The commentator states that total Indirect Installation Costs are likely to reach 100% of the purchased equipment cost. A vendor’s estimate of installation costs reflects their assumptions and understanding, but the operator’s requirements dictate the actual costs. (919)

Response: The commentator may opt for a case-by-case determination through a plan approval application if they believe the site-specific costs would be too high for the installation of SCR.

Comment 286: Several commentators state that the BAT limit of 0.35 g NO_x/bhp-h for lean-burn engines rate greater than or equal to 1,875 hp but less than 3,000 hp is not supported in the TSD. The Department states these engines “can achieve 0.35 g/bhp-h or less for uncontrolled NO_x emissions in approximately 33% of cases,” however, no documentation is provided to support the claim. The commentators do not believe that the standard should be established because 33% of existing engines can meet that level; even a new engine of the most recent model year rated at 0.5 g/bhp-h may not test at the proposed BAT level based on unique operating conditions at the facility. Also, the commentators

disagree that BAT limits should be established based on test data rather than vendor guarantees. The BAT limit should be 0.5 g/bhp-h based on the vendor guarantees as such engines consistently test in compliance with this rate. Establishing a BAT limit of 0.35 g/bhp-h would therefore require operators to install SCR on all engines in this category, which is not economically or technically feasible. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The 0.35 g NO_x/bhp-h emission limit was achievable based on stack-test results for engines rated greater than or equal to 1,875 hp but less than 3,000 hp. This provided operators relief from installing SCR on engines of this horsepower range based on the increased cost per ton reduction due to lower baseline emissions. However, the limit has been removed from the final general permits; in the revised SCR analysis, the uncontrolled limit for engines rated greater than or equal to 2,370 hp is 0.30 g NO_x/bhp-h uncontrolled, based on vendor's guarantees, or 0.05 g NO_x/bhp-h based on installation of SCR.

Comment 287: Several commentators believe the data provided to the Department by SCR vendors was neither intended to be a detailed quote nor intended to be used to establish BAT based on their independent research. In the "scope of supply" document provided by the Department, Vendor B clearly states that the information was provided as a "ballpark" estimate. It is customary for SCR vendors to provide detailed quotes that not only include a description of components included, but also which components are not included and need to be supplied by third party vendors or the facility operator during construction and installation.

The "scope of supply" document received by the Department did not include a bill of materials required to install a fully-functional SCR system, nor was there an attempt to normalize the component list of included equipment across vendors. Therefore, the commentators believe that the Department did not include numerous items in the cost analysis that would be required to engineer, design, and install a fully operational SCR unit. Potential items missing from the quote that represent significant additional costs include an ammonia catalyst; reactant tank level indicator; reactant filter; natural gas sample probe; reactant storage tank heater; air compressor; thermal insulation for the exhaust system; inlet and outlet temperature sensors for the oxidation catalyst; inlet and outlet temperature sensors for the SCR catalyst; differential pressure sensor for oxidation catalyst; differential pressure sensor for SCR catalyst; nut, bolt, and gasket set for SCR housing; silencer; and a power source. This list of missing components may not be comprehensive. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department used all information available, including the scope of supply information from Vendors A and B, and standard EPA estimation methods in calculating the cost-effectiveness of SCR.

The Department did request actual quotes from Vendors A and B. Detailed line-item quotes are not available for general price quotes; however, general permit BAT cannot consider site-specific costs. A plan approval is required for a case-by-case determination that considers site-specific costs.

Comment 288: Several commentators state that the Department estimated annual electricity costs for the SCR, but did not comment on the power source in the TSD. Many gathering and midstream boosting facilities do not have access to grid power. As the Department noted in the TSD on page 31 for controllers and page 32 for pumps, a lack of grid power limits the ability to install electrically powered supplemental equipment for methane and VOC mitigation. The installation of SCR, and the corresponding 0.05 g NO_x/bhp-h emission limit, should be subject to the availability of grid power. The

BAT estimates in Appendix B do not address the cost implications of adding the power required for a facility without access to grid power. A blanket assumption of \$5,000 annual cost of electricity per SCR unit is clearly unvetted. Facilities that do not have access to commercial grid power would require installation and operation of a non-emergency generator which would offset some, if not all, of the NO_x reduction achieved by installing SCR on a gas compressor engine. Adding the generator would also add significant costs further impacting the economic feasibility of the BAT determination. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department is aware that some facilities may not have access to grid power. However, operators routinely install remote monitoring systems and other electricity-consuming components at these facilities. The Department suggests that the operators account for any increased electricity demand for controls when making provision for the remote monitoring systems.

The \$5,000 annual cost of electricity was used in the original analysis based on vendor quotes. In the reanalysis, electricity costs from the submitted analyses were used. If no cost was submitted, electricity consumption was calculated according to EPA's Control Cost Manual and assumed to cost \$0.07/kwh based on retail rates.

Comment 289: Several commentators state that the Department did not adequately address the ammonia slip limit of 5 ppmvd corrected to 15% O₂ in the TSD. No documentation was provided for the establishment of this limit. The commentators know of a recent vendor quote for SCR which gives an ammonia slip limit of 10 ppmvd corrected to 15% O₂. The Department should provide justification for establishment of this limit and recognize the cost impacts of incorporating an ammonia slip catalyst to consistently comply with the proposed 5 ppmvd limit. An ammonia slip catalyst was not listed in the Department's cost analysis despite the significant increase in capital and annual costs. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: In the proposed general permits, ammonia slip limitations were limited to 5 ppmvd corrected to 15% O₂ as supported by the vendors that provided the quotes to the Department. However, based on the comments received, a 5 ppmvd limit may not be achievable at all times; therefore, the Department has revised the ammonia slip limit to 10 ppmvd corrected to 15% O₂ in the final general permits.

Comment 290: Several commentators state that there are numerous physical configurations for the installation of an SCR device; these systems are not simple "plug and play" units. Therefore, the commentators believe the Department underestimated the engineering, site construction, and installation costs by an order of magnitude. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department is unable to estimate the engineering and site construction costs to the level of detail noted by the commentator. Therefore, the Department used the EPA Control Cost Manual to estimate these costs. The BAT analysis for the general permits must apply to all sites, and therefore cannot be based on a quote for a single site. The Department re-analysis included several additional quotes provided by the commentators.

Comment 291: Several commentators state that the Department's cost analysis is flawed because it only includes calculations for two engine horsepower ratings, neither of which are the horsepower threshold that requires installation of SCR. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department's re-analysis includes four engine horsepower ratings that are commonly used at natural gas facilities. Each engine rating has multiple cost-effectiveness determinations, which were averaged to form a baseline cost per ton NO_x reduced. The baseline costs were used to establish a linear relationship between horsepower and the cost per ton NO_x reduced for all engines similar to the methodology of E C/R Incorporated for oxidation catalysts and NSCR.

Comment 292: Several commentators state that the Department only considers the cost per ton of pollutant reduced and believe that additional cost factors for the SCR requirement should be considered. One such consideration is that operators in the Commonwealth would be at a severe disadvantage compared to neighboring states such as Ohio and West Virginia. The commentators believe this could have a larger economic impact beyond dollars spent by an operator as some operators may choose to not develop new midstream assets within the Commonwealth. This could limit the midstream capacity available within Pennsylvania, prevent producers from bringing new wells online, and impact capital invested in the Commonwealth and revenues realized by leaseholders and governmental units.

Another consideration is that the installation of SCR could lower NO_x emissions at a specific facility; however, there is a smaller net decrease in NO_x in the air shed than the Department discussed in its TSD. NO_x will be generated by the processes required to manufacture urea and transport urea to a facility. Additionally, the power demand of SCR systems will have a greater-than-zero impact on emissions.

A final consideration is that several engine manufacturers have made large financial investments to reduce NO_x emissions from their engines without add-on controls. Should the regulatory landscape shift in a way that add-on NO_x controls would be universally required, the commentators believe that engine manufacturers would not continue to develop products with lower pre-control emission rates as these reductions would be insignificant compared to a 90% control efficiency. The Department should note that these engines are not limited to the oil and gas industry, thereby impacting emissions reductions in other industries. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: New sources are required to control the emission of air pollutants to the maximum extent, consistent with the BAT as determined by the Department. BAT is defined in 25 Pa. Code § 121.1 as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The applicable emission limits of Federal NSPS and NESHAPS will serve as a minimum requirement for determining the BAT.

The resources utilized in the determination of BAT include the BAT included in the plan approvals which are determined on a case-by-case basis, general permits, and other permits issued by other states for similar sources. The Department also evaluated vendors' guaranteed emission limits, available stack test data, and stakeholders' submitted data for the applicable sources.

The emission limitations included in GP-5 must be technically and economically achievable. In addition, these emission limitations must be sustainable during the life of the unit. The Department has determined that the emission limitations in the final GP-5 constitute BAT.

BAT only considers the emissions from a single facility, and does not consider emissions over the entire airshed. Based on the Department evaluation, engines with a manufacturer's guaranteed NO_x emission level of 0.5 g/bhp-h and add-on control such as SCR with 90% NO_x destruction efficiency, NO_x

emission rate of 0.05 g/bhp-h are technically and economically feasible. The detailed feasibility analysis can be found in TSD. Based on the comments received, the ammonia slip requirement has been revised in the final general permits to 10 ppm_{dv} corrected to 15% O₂. In addition, the owner or operator may use site specific information for BAT determination in a source specific plan approval application.

As stated by the commentators, these engines are not limited to the oil and gas industry and are being operated in other industries. The BAT requirements for engines in GP-5 will be used for the BAT determinations for similar engines in other industries.

Comment 293: A commentator states that the proposed emission limits for new natural gas-fired lean-burn SI internal combustion engines rated greater than or equal to 1,875 bhp are too stringent. For these large lean-burn engines to achieve NO_x emission rates of 0.05 g/bhp-h, large-scale SCR systems must be used. However, the Department has not demonstrated that these systems are BAT through an evaluation of previously-issued permits. The proposed BAT analysis is therefore insufficient. The commentator further states that the Department failed to justify the economic feasibility threshold of \$10,000 per ton of NO_x reduced, show that SCR systems are in fact economically feasible, and that SCR systems are technically feasible. The proposed NO_x emission limits also fail to account for the ammonia impacts that will result from the use of large-scale SCR systems. The Department also fails to show that the proposed NO_x emission standards with the 5 ppm_{dv} corrected to 15% O₂ ammonia slip limit are achievable in practice. This requirement would increase equipment costs significantly as maintaining such a low ammonia slip rate would require the addition of an oxidation catalyst. The commentator states that the temperature changes associated with variable engine-loading requirements would be problematic for the catalyst substrate and could damage or destroy the equipment. Therefore, the commentator urges the Department to conduct a supplemental cost-effectiveness analysis and verify the proposed NO_x and ammonia slip limits are technically and economically feasible. The commentator recommends that the Department retain the current NO_x emission standard of 0.5 g/bhp-h. (1046)

Response: Nearby states such as New Jersey routinely require controls with cost-effectiveness values around \$10,000/ton. More importantly, in 2001, EPA determined that \$10,000/ton was cost effective for BACT for the control of NO_x emissions from petroleum refineries. See Memorandum of John S. Seitz to Air Division Directors, re: BACT and LAER for emissions of nitrogen oxides and volatile organic compounds at Tier 2/Gasoline Sulfur Refinery Projects (Jan. 19, 2001). The Department does not have a bright line benchmark number for a case-by-case RACT II determination. The RACT threshold applied to existing sources is generally lower than the BAT threshold applied to new sources. The Department does not see any need to limit the cost-effectiveness range as suggested by the commentators for the determination of BAT for new sources addressed in the general permits.

The Department used all information available, including the scope of supply information from Vendors A and B, and standard EPA estimation methods in calculating the cost-effectiveness of SCR. The Department's revised analysis shows SCR is cost-effective; however, in the final general permits, SCR is required at a higher horsepower threshold than proposed.

In the proposed general permits, ammonia slip limitations were limited to 5 ppm_{dv} corrected to 15% O₂ as supported by the vendors that provided the quotes to the Department. However, based on the comments received, a 5 ppm_{dv} limit may not be achievable at all times; therefore, the Department revised the ammonia slip limit to 10 ppm_{dv} corrected to 15% O₂ in the final general permits.

Comment 294: A commentator states that the proposed 0.25 g /bhp-h NMNEHC (excluding HCHO) emission limit for new natural gas-fired lean-burn SI internal combustion engines rated greater than or equal to 500 bhp requires the use of high-quality natural gas. The NMNEHC emissions from lean-burn engines depend on the natural gas composition and the proposal does not demonstrate or specify that the natural gas that would power the engines is of consumer pipeline quality. Likely it is not, as natural gas available from unconventional facilities typically contains high levels of impurities.

The presence of unknown quantities of methane, propane, and high molecular weight hydrocarbons in the available gas could make it difficult, if not impossible, to meet the proposed emissions standards. Without disclosing and studying the quality of natural gas used at the facilities in question, the proposal fails to show the standards are achievable in practice. It is well known that the oxidation rate for shorter-chain alkanes (i.e., methane, ethane, and propane) is low. Thus, even assuming the use of oxidation catalysts, it is questionable whether the proposed NMNEHC limit could be achieved. Therefore, the commentator recommends that the Department assess the expected quality of the natural gas in the region to ensure that the proposed standards are feasible given the natural gas composition available. The assumptions set forth in the TSD regarding the NMNEHC reduction rate oxidation catalysts can achieve are not sufficient grounds to set an emission standard in this case. (1046)

Response: The 0.25 g NMNEHC/bhp-h emission limit is BAT for lean-burn engines rated greater than or equal to 500 hp established February 2, 2013, in the previous version of GP-5. The limit was established based on engineering calculations and corroborated by stack test results.

Comment 295: The commentator notes that the revised GP-5 requires SCR for NO_x on natural gas-fired engines rated at 1,875 horsepower if they cannot demonstrate pre-control NO_x emissions levels of 0.35 g/bhp-h; SCR would be required for engines rated at 3,000 horsepower regardless of the pre-control NO_x emissions. SCR would be required for turbines rated between 5,000 and 15,900 horsepower if they cannot demonstrate pre-control NO_x emissions of 15 ppm_{dv}, corrected to 15% O₂, and also for turbines rated at greater than or equal to 15,900 bhp if they cannot demonstrate pre-control NO_x emissions of 9 ppm_{dv}, corrected to 15% O₂. However, there is no indication that DEP has determined SCR is required on engines and turbines as a result of a BAT evaluation. In fact, the Department's Southwest Region has issued a Plan Approval, with an associated review memo, stating that installation of SCR on the project's proposed engines does not represent a BAT determination. The commentator believes that while DEP notes in the TSD that SCR is justified and accordingly constitutes BAT if the cost per ton of NO_x removed is equal to or less than \$ 10,000 per ton, there is no discussion of technical feasibility nor a justification for establishing the economic threshold at \$10,000 per ton of NO_x removed. The commentator believes that when comparing DEP's analysis based on estimates from SCR vendors to actual operator experience, there are significant discrepancies — primarily associated with direct installation costs such as engineering, foundations and supports, electrical, piping, insulation and heat tracing for ductwork and reagent feed lines, etc. Based on actual experience as depicted in the 930, 936, 1052 comments, SCR can involve significantly higher costs than the TSD analysis. Based on actual costs, DEP's \$10,000 BAT for lean burn engines is not realistic; the amount likely exceeds \$20,000 per ton. The commentator mentions that its experience with SCR suggests that implementing widespread SCR as DEP proposes could result in practical issues. First, the commentator has experienced technical issues that were addressed during the shake down period that resulted in removal of the optimization controls. Second, the commentator has experienced problems with both vendor support and availability of replacement catalysts. It is important to note that these practical issues occurred where the SCR reduction percentage (as required by permit) was LESS than the 90% proposed by DEP in the proposed revisions to GP-5. (936)

Response: The Department used all information available, including the scope of supply information from two vendors, and standard EPA estimation methods in calculating the cost-effectiveness of SCR. The Department's revised analysis shows SCR is cost-effective. Based on comments submitted, the Department has determined that SCR for engines is required at a higher horsepower threshold in the final general permits, than previously proposed. The Department has determined the SCR to be a technically and economically feasible option. The detailed technical and economic analysis is stated in the TSD.

Comment 296: The commentator recommends that the Department provide additional justification for selection of \$10,000 per ton as a cost effectiveness threshold for NO_x controls. (944)

Response: Nearby states such as New Jersey routinely require controls with cost-effectiveness values around \$10,000/ton. More importantly, in 2001, EPA determined that \$10,000/ton was cost effective for BACT for the control of NO_x emissions from petroleum refineries. See Memorandum of John S. Seitz to Air Division Directors, re: BACT and LAER for emissions of nitrogen oxides and volatile organic compounds at Tier 2/Gasoline Sulfur Refinery Projects (Jan. 19, 2001). The Department does not have a bright line benchmark number for a case-by-case RACT II determination. The RACT threshold applied to existing sources is generally lower than the BAT threshold applied to new sources. The Department does not see any need to limit the cost-effectiveness range as suggested by the commentators for the determination of BAT for new sources addressed in the general permits.

The Department used all information available, including the scope of supply information from Vendors A and B, and standard EPA estimation methods in calculating the cost-effectiveness of SCR.

Comment 297: The commentator recommends the NO_x emissions limit for lean burn engines greater than 500 hp of no less than 0.5 g/bhp-h as this limit has been demonstrated to be achievable in practice in a cost-effective manner. (944)

Response: New sources are required to control the emission of air pollutants to the maximum extent, consistent with the BAT as determined by the Department. BAT is defined in 25 Pa. Code § 121.1 as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The resources utilized in the determination of BAT include BAT included in the plan approvals which are determined on a case-by-case basis, general permits, and other permits issued by other states, for similar sources. The Department also evaluated vendors' guaranteed emission limits, available stack test data, and stakeholders' submitted data for the applicable sources. The emission limitations included in the GP-5 must be technically and economically achievable. In addition, these emission limitations must be sustainable during the life of the unit. The Department has determined that the emission limitations in the final GP-5 and GP-5A constitute BAT. Details of the technical and economic feasibility can be found in the TSD.

The Department has established a NO_x emission limit of 0.5 g/bhp-h for lean-burn engines rated greater than 500 and less than 2,370 bhp. The Department has determined that SCR technology is technically and economically feasible for engines rated at or above 2,370 bhp unless the uncontrolled NO_x emission rate is 0.3 g/bhp-h.

Comment 298: The commentator recommends that some makes of turbines used at natural gas compressor stations employ low NO_x technology (e.g., SoLoNO_x on Solar Turbines), which would not be able to achieve NO_x emissions reductions during periods of low ambient temperature, such as below zero degrees Fahrenheit. The commentator recommends that other non-normal modes as discussed above should also be exempt from the emission limits requirements and good combustion practices be required for these operational modes. (944)

Response: While it is not outside the bounds of winter in Pennsylvania, temperatures at or below 0 °F are the exception, not the rule. However, the Department added the following language to the final GP-5: “Operate the turbine and air pollution control equipment consistent with good air pollution control practices during periods of low ambient air temperature (at or below 0 °F), during which time the emissions standards in (a) through (c) do not apply.”

As for the emission limits in Condition 1(a) through (c), they apply at all times, except as allowed in Condition 1(d)(iv) for startup and shutdown and the proposed condition for low temperature operation. Condition 1(d)(iv) is clear that the emission standards do not apply, as long as the startup or shutdown event does not exceed 30 minutes.

Comment 299: Several commentators state that the Department fails to provide the basis for the 5 ppm_{dv} ammonia slip requirement in the TSD. Additionally, to consistently achieve operation below the 5 ppm_{dv} ammonia slip limit, an “ammonia slip” catalyst would need to be installed in series with an oxidation catalyst and SCR catalyst, which adds significant costs not accounted for in the BAT determination. In addition, the ultra-low NO_x limit of 0.05 g/bhp-h should be removed from the gathering and midstream general permits. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1045-1048, 1053, 1054)

Response: Based on conversation with equipment vendors, SCR technology can achieve a minimum of 90% control with 5 ppm_{dv} ammonia slip corrected to 15% O₂. Engine vendors guarantee NO_x emissions at 0.5 g/bhp-h; therefore, 0.05 g NO_x/bhp-h is achievable in practice. Based on the comments received, the Department has revised the ammonia slip limit to 10 ppm_{dv} corrected to 15% O₂ in the final general permits.

Rich Burn Engines

Comment 300: Several commentators state that in Appendix C of the TSD, the Department incorrectly calculates the cost effectiveness of both oxidation catalysts and non-selective catalytic reduction (NSCR) by adding together the total tons of pollutants when a given technology controls more than one pollutant. While the commentator agrees that there are benefits associated with certain control technologies that control for more than one pollutant, it is inconsistent with proper application of BAT and BACT type analyses to sum the pollutants together. Such an approach implies that emissions of each of the pollutants are considered equivalent, when that is clearly not the case. The commentators do not necessarily agree with the Department’s cited numerical values; the Department separately states in the TSD that controls for CO and NMNEHC are cost-effective at \$5,000/ton versus controls for NO_x are cost-effective at \$10,000/ton. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: Nearby states such as New Jersey routinely require controls with cost-effectiveness values around \$10,000/ton. More importantly, U.S. EPA determined that \$10,000/ton was cost effective for BACT for the control of NO_x emissions from petroleum refineries. See Memorandum of John S. Seitz

to Air Division Directors, re: BACT and LAER for Emissions of Nitrogen Oxides and Volatile Organic compounds at Tier 2/Gasoline Sulfur Refinery Projects (January 19, 2001). The Department does not have a bright line, benchmark number for a case-by-case RACT II determination. The RACT threshold applied to existing sources is generally lower than the BAT threshold applied to new sources. The Department does not see any need to limit the cost-effectiveness range as suggested by the commentators for the determination of BAT for new sources addressed in the general permits.

Comment 301: Several commentators state that non-selective catalytic reduction (NSCR) is the appropriate control technology for rich burn reciprocating engines. The proposed GP-5 would retain the same emission standards for units larger than 100 hp, reduce the NO_x and CO standards for smaller rich burn engines from 2.0 to 0.6 g/bhp-h, and add a non-methane, non-ethane hydrocarbon (NMNEHC) standard. The emissions standards for larger rich burn engines would be lower than for engines 100 hp and smaller.

NSCR performance requires very tight control of the air to fuel ratio (AFR) so that the catalyst has the appropriate mixture of NO, CO, hydrocarbons, and oxidation species (i.e., trace oxygen and OH radicals) to ensure the reduction of all pollutants. The commentators understand that these emission limits are being accepted in permits, but information is available that shows that continuous, long term performance at these very low levels may be challenging. More sophisticated AFR controllers and improved exhaust feedback sensors may be needed to ensure performance.

Various sources of information demonstrate NSCR performance limitations, including documentation from the EPA's engine NSPS docket, which contained information on South Coast Air Quality Management District in Los Angeles, CA that shows similar NO_x limits to the GP-5 but allows marginally higher VOC and CO limits, and a Department of Energy sponsored study that included semi-continuous measurement of NSCR-equipped engines, which showed significant pollutant reduction in all cases, but perturbations in continuous and long-term performance.

The commentators recommend retaining the current GP-5 limits for engines at or below 100 hp rather than adopting the proposed standards. Also, to account for the perturbations documented in the above studies, the commentators recommend increasing the emissions limitations for rich burn engines greater than 100 hp. Performance targets and NSCR design could still be based on ultra-low limits, but the potential for emissions perturbations should be accounted for in the compliance requirements. (930, 936, 1052)

Response: Based on the comments, the Department re-evaluated the BAT emission limits for rich burn engines. The available data suggests that the proposed emission limits for rich burn engines less than 100 hp are difficult to meet in some instances. The other factors considered include that the emissions are not large from these engines and these types of engines are generally exempted from permitting requirements in other states. In addition, the compliance testing by performance is too large for the emissions involved. However, these engines are still subject to EPA's NSPS standards. The final permit does not include any specific emission standards for these engines.

Reciprocating Compressors

Comment 302: Several commentators state that compressors must be periodically taken off-line for maintenance, operational stand-by, or emergency shutdown testing releasing methane in the process.

When compressor units are shut down, the high-pressure gas remaining within the compressors and associated piping between isolation valves is typically vented to the atmosphere or to a flare.

There are no blowdown standards established in the general permits for compressors. While there are some notice, reporting, and recordkeeping requirements for such events, there are no direct standards that require operators to reduce or control emissions of methane or VOCs. The commentators point out that blowdown vents reached 35,041 tons of methane in 2015, which is over one-quarter of the total reported methane emissions from all sources in Pennsylvania's natural gas sector that year.

The commentators point out that there are multiple cost-effective, technologically feasible means by which operators can responsibly control emissions from blowdowns. EPA's Natural Gas STAR program and participating program partners have found that simple changes in operating practices and in the design of blowdown systems can save money and significantly reduce methane emissions. The commentators also point out that the Ohio Environmental Protection Agency recent finalized a series of general permits for natural gas compressor stations that requires reciprocating compressors to be designed with a capture and control system to control emissions from compressor isolation valves and compressor blowdown vents. The control requirements must either capture 100% of gasses and route them to a flare designed for a 95% destruction efficiency or route the high-pressure gasses to a low-pressure line prior to venting so that at least 90% of the gasses are recovered. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039, 1040-1042)

Response: Blowdowns are required to be reported in the Annual Emissions Inventory. In addition, blowdowns must be reported as specified in the GP-5 Malfunction Reporting Instructions.

As per the final GPs, if emissions from blow down operations exceeds 200 tpy of Methane, 2.7 tpy of total VOC, 0.5 tpy of single HAP, 1.0 tpy of a total HAP, the owner or operator is required to reduce emissions by 95% or more.

Comment 303: The commentator supports the Department's decision to establish requirements for reciprocating compressors located at well sites. With data suggesting emissions from such sources are significant, it is critical for these sources to be subject to control and monitoring requirements. By adopting these requirements, Pennsylvania will be on par with other leading states that require operators to meet the same standards. (1041)

Response: The Department appreciates the comment.

Comment 304: Several commentators state that Section G does not clearly indicate the emission source addressed for reciprocating compressors. For clarity and consistency, this section should address reciprocating compressor rod packings. (930, 936, 1052)

Response: This requirement has been incorporated by reference in the final GP-5 and the language was updated in the final GP-5A.

Comment 305: Section H. (General Comments) – The requirements of the general permit should match and not exceed the requirements of OOOO or OOOOa (40 CFR 60 § 60.5385 and 40 CFR 60 § 60.5385a) as applicable per date of construction. Additional requirements, such as requiring a professional engineering certification of a closed vent system, where it is the chosen method of compliance, or reporting of permitted venting should be eliminated. No justification for additional

requirements is offered in the TSD. The commentator also suggest that this section should clarify that it does not apply to reciprocating compressors without packing. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The final GP-5 and GP-5A incorporate the applicable federal requirements by reference.

Comment 306: The commentator suggest that the definition of construction requires clarification, as it should be consistent with definitions in 40 CFR § 60.5360 and § 60.5360a. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The definition of construction in 25 Pa Code 121.1 is applicable to comply with state regulatory requirements, and the definition of construction in federal regulation is applicable to demonstrate compliance with applicable federal requirements.

Comment 307: Testing or metering requirements for VRUs should be consistent for affected sources under NSPS Subparts OOOO or OOOOa. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Performance testing for Vapor Recovery Units is subject to engine testing requirements contained in Section C, which is consistent with NSPS Subparts OOOO or OOOOa.

Storage Vessels

Comment 308: The commentator states that requiring VOC emission controls on tanks prospectively is a good start; however, ALL tanks associated with unconventional wells including all existing placements should be required to install VOC controls. Exempting tanks in 2013 was a mistake. VOCs are harmful to public health and, too many well sites, compressor stations and other facilities have been placed within 1,000 feet of homes due to the lack of public health-based regulations. (1020)

Response: The Department required 95% control on a storage vessel that emits more than 2.7 tpy to be eligible for the conditional exemption 38 in 2013. Existing storage vessels will also be subject to the new RACT rules that the Department is currently developing to be consistent with EPA's Control Technique Guidelines (CTG) for the Oil and Natural Gas Industry issued on October 27, 2016.

Comment 309: Several commentators suggest that the Department consider storage vessels that are manifolded together as a single source when determining applicability of control to prevent operators from installing multiple smaller tanks to avoid having a single tank that exceeds the emissions control threshold. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039, 1040-1042)

Response: Each new or modified source is subject to the BAT requirements that are source specific. The common control for multiple sources is feasible when a common stack is shared by all sources.

Comment 310: The commentator recommends that the Department retain the 6 tpy VOC threshold currently used in Exemption 38 and in EPA's Subpart OOOO and OOOOa for imposing vapor controls to tanks and truck loading, rather than imposing emission controls on all emissions above 2.7 tpy VOC.

Operators can provide an estimation of potential VOC emissions to validate exclusion from tank and truck loading controls at the request of the Department. Most water tanks, particularly in dry gas areas, are expected to produce negligible VOC emissions. (928)

Response: In addition to compliance requirements for applicable federal requirements, 25 Pa. Code Chapter 127 requires that all new sources control the emissions to the maximum extent, consistent with the BAT as determined by the Department at the time of issuance of the Plan Approval. The Department has provided the rationale in the TSD for BAT requiring VOC control for specific sources that emit more than 2.7 tpy of VOC.

Conditional exemption 38, issued in 2013 requires 95% control for storage tanks and other equipment unless the uncontrolled emissions, in combination with all other uncontrolled sources, are under 2.7 tpy VOC on a facility-wide basis.

Comment 311: One commentator states that methane emissions from storage vessels can and should be reduced by 98%. Another commentator suggests. (1026)

Response: Based on the comments received, the 98% control requirement for methane, VOC, and HAP was revised to a 95% control requirement in the final general permits. While manufacturer-tested models typically achieve significantly greater than 95% control in practice, the control requirement was revised to allow operators to continue to benefit from the manufacturer-tested models in accordance with the federal regulations. This revision avoids additional source testing to demonstrate 98% efficiency, instead relying on the manufacturer's certification list maintained by U.S. EPA to demonstrate and maintain compliance under the federal regulations.

Comment 312: The commentator suggests that storage tanks should be treated as sources and controlled using devices with 95% control efficiency and without venting hydrocarbons during operation. (568)

Response: Storage vessels are treated as a source and control is required if the emissions control threshold for methane, VOC, or HAP is exceeded. Based on the comments received, the 98% control requirement for methane, VOC, and HAP was revised to a 95% control requirement in the final general permits. While manufacturer-tested models typically achieve significantly greater than 95% control in practice, the control requirement was revised to allow operators to continue to benefit from the manufacturer-tested models in accordance with the federal regulations. This revision avoids additional source testing to demonstrate 98% efficiency, instead relying on the manufacturer's certification list maintained by U.S. EPA to demonstrate and maintain compliance under the federal regulations.

Comment 313: Several commentators are concerned that the control requirements in the GP-5A (and the related proposed revisions to GP-5) are based, at least partially, upon this flawed calculation of CO_{2e} reduction. With the correct assumptions and calculations in hand, the commentator recommends that the control requirements on the tanks match the NSPS Subpart OOOOa. The commentators also believe that the TSD does not include a source-specific BAT analysis and no other form of control for storage vessels is examined for cost effectiveness. The commentators believe the Department should show an analysis for all types of emission controls for storage vessels. The commentators suggest that the proposed GP-5 requirements do not justify reducing the requirement for controlling emissions from 5 tpy to the de minimis level of 2.7 tpy of VOC. The TSD justification is based on an extremely low assumed capital cost of controls without sufficient supporting documentation. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Conditional Exemption 38, finalized in 2013 required 95% control of any emission unit exceeding emission thresholds of 2.7 tpy VOC, 0.5 tpy single HAP, and 1.0 tpy total HAP. Despite these emission thresholds and control requirement, no individual plan approval has been submitted for an unconventional natural gas well site since 2013. This means either the installation of controls is cost effective, or that the sources in question emit less than 2.7 tpy VOC, 0.5 tpy single HAP, and 1.0 tpy total HAP. Additional explanation is included in the Department's TSD.

Comment 314: The commentator believes that DEP does not have legal authority to establish through a permit a fixed uncontrolled limit of 200 tpy for methane. The commentator also believes DEP does not have legal authority to establish through a permit a control limit of 98% which exceeds the federal regulatory control limit of 95%. (991)

Response: The Department has legal authority to regulate methane emissions, see response to the previous comment. 25 Pa. Code Chapter 127 requires that all new sources control the emissions to the maximum extent, consistent with the BAT as determined by the Department at the time of issuance of a plan approval. Based on the comments received, the 98% control requirement for methane, VOC, and HAP was revised to a 95% control requirement in the final general permits. See response to Comment 308 for further explanation.

Comment 315: Several commentators believe that Professional Engineer certification of closed vent systems for existing Storage Vessels is not of NSPS OOOO but of OOOOa. This is unnecessary retroactive application of new requirements, or possibly errors in copying regulatory language instead of properly incorporating by reference. The conditions of this section are based on NSPS Subpart OOOO which does not require a PE certification. The commentators recommend that this requirement should be deleted and Professional Engineer certification of closed vent systems default to the Subpart OOOOa requirements by reference. (916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The final GP-5 and GP-5A have been revised to incorporate applicable federal requirements by reference.

Comment 316: The commentator believes that PA DEP provides no justification for requiring stringent controls at PTE levels between 2.7 tpy and 6.0 tpy of VOC. Per the PA DEP's current Exemption categories, a source with a PTE less than 2.7 tpy VOC is considered exempt from permitting without requiring controls; furthermore, the federal requirements listed under NSPS Subpart OOOO do not require controls unless the PTE is over 6.0 tpy of VOC. The commentator recommends keeping the applicable language of the current GP-5, thereby requiring the NSPS Subpart OOOO requirement of 95% control. The commentator believes that the TSD does not provide significant justification for requiring a more stringent control of 98%, as compared to the 95% control that is required by NSPS Subpart OOOO and does not provide a specific BAT analysis for storage vessels. The commentator recommends keeping the applicable language of the current GP-5, therefore requiring the NSPS Subpart OOOO requirement of 95% control. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Based on the comments received, the 98% control requirement for methane, VOC, and HAP was revised to a 95% control requirement in the final general permits. See response to Comment 308 for

further explanation. See the explanation in Comment 309 that justifies the permit conditions for the emission control threshold of 2.7 tpy of VOC.

Comment 317: The commentator asks whether the Department has a cost analysis for requiring a cover over a centralized impoundment or an above-ground tank that is not built to hold a cover? This requirement places an impractical and unobtainable requirement on an operator. (1055)

Response: GP-5A is not applicable to a centralized impoundment unless it meets the definition of a storage vessel. See the explanation in Comment 309 that justifies the permit conditions for the emission control threshold of 2.7 tpy of VOC.

Comment 318: Section I(b)(ii) states: [a] total uncontrolled VOC emission rate of less than 2.7 tpy, an uncontrolled single HAP emission rate of less than 0.5 tpy, and a total uncontrolled HAP emission rate of less than 1.0 tpy, the owner or operator shall demonstrate compliance by submitting the required notifications and reports and maintaining the required records. The commentator believes that the cost of testing flowback and produced water for these parameters can cost anywhere from \$1,000 to \$2,000 per test. An operator should be allowed to use an approved sampling method to establish general knowledge in an operating area to make a determination for all wells in that area rather than having to do excessive testing. (1055)

Response: According to the final revised Exemption Category No. 38, an owner or operator of well site will not be required to seek an authorization to use GP-5A for temporary activities such as site preparation, well drilling, hydraulic fracturing, completion, and work-over activities for conventional and unconventional well sites. However, the owner or operator must include the actual emissions from these sources in annual emission reporting.

Comment 319: The commentator believes that inconsistencies with Subpart OOOOa create additional problems. The VOC threshold that triggers the control requirements of proposed GP-5A (i.e., the 2.7 tpy) is less than 50% of the Subpart OOOOa threshold and would bring in many more tanks under these requirements. There is no definition of “storage vessel” in the proposed GP-5A similar to the Subpart OOOOa definition that limits it to tanks containing “crude oil, condensate, intermediate hydrocarbon liquids, or produced water.” This could be read as subjecting any tank, regardless of content, to the GP-5A recordkeeping and reporting requirements. As previously indicated, the definitions used in Subpart OOOOa should be incorporated by reference unless the DEP intends for different sources to be regulated. (1055)

Response: Words and terms that are not otherwise defined in GP-5A shall have the meanings set forth in Section 3 of the APCA (35 P.S. § 4003) and Title 25, Article III including 25 Pa. Code § 121.1 unless the context indicates otherwise. The meanings set forth in applicable definitions codified in the Code of Federal Regulations (CFR) including 40 CFR Part 60, Subparts JJJJ, OOOO, and OOOOa or 40 CFR Part 63, Subparts HH and ZZZZ shall also apply to this General Permit.

The Storage Vessel is defined in 40 CFR Subpart OOOO and OOOOa. Therefore, no separate definition of storage vessel is needed in GP-5A.

Comment 320: The Department has not justified the incremental benefit of requiring 98% control when the OOOOa rules require 95% control, and long-established Department permits and exemptions allow 95%. The commentator suggests that the maximum control required should be 95%. (919)

Response: The Department has revised in the final general permits, the control efficiency from 98% to 95%. See the response to Comment 307 for further explanation.

Comment 321: Several commentators recommend modifying the limit for requiring controls to match the NSPS Subpart OOOO standard of 6.0 tpy and the required control to 95%. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The rationale for requiring control for a source with greater than 2.7 tpy VOC is stated in the TSD. See the response to Comment 309 for further explanation for the use of this lower control threshold.

Comment 322: The commentator believes that the concept of triggering permitting or permit limitations solely based on methane (GHG) emissions is inconsistent with the application of the PSD permitting program at the federal level. The commentator recommends removal of 200 tpy of methane emissions as a trigger for applying add-on controls. While the threshold is not expected to affect many, if any, storage vessels, the control of tanks based solely on methane emissions levels has not been justified by DEP and should be removed. In most, if not all cases, controls will be triggered due to VOC emissions and the same controls that limit VOC will limit methane as a co-benefit. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department has legal authority to regulate methane emissions, see response to Comment 9. 25 Pa. Code Chapter 127 requires that all new sources control the emissions to the maximum extent, consistent with the BAT as determined by the Department at the time of issuance of a plan approval. U.S. EPA used Social Cost for Methane of \$1,000 (in 2012 \$ per metric ton) at discount rate of 3% in the rulemaking of NSPS Subpart OOOOa for oil and gas industries. EPA's social cost for methane ranging from \$1,000 to \$2,800 for various discount rates. The estimate of \$2,800 is the 95th percentile of the social cost for methane. The Department used \$1,000/ton methane reduced as cost effectiveness threshold for feasibility of methane reduction measures. Emissions greater than or equal to 200 tpy of methane require to control. The Department's BAT is applicable to each source, not to an entire facility, which is why the 200 tpy threshold is a source specific and not facility-wide control threshold. The Department has provided in the TSD a rationale for requiring control on a source emitting more than 200 tpy as BAT.

Comment 323: The commentator believes that the incremental benefit of requiring 98% control when the OOOOa rules require 95% control, and long-established DEP permits and exemptions allow 95%, has not been justified. While many control devices will achieve far greater than 95% destruction, the Technical Support Document states that 1,600 F in a combustion control device is required to ensure 98% methane destruction, yet no technical or cost analysis is provided regarding what is required to achieve and sustain a 1,600 F combustion zone temperature. The maximum control required should be 95%. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department has revised in the final general permits, the control efficiency from 98% to 95%. See the response to Comment 307 for further explanation.

Tanker Truck Loadout Operations

Comment 324: Several commentators state that the Department should consider the chemistry and characteristics of the natural gas, which varies over the state. The gas in the northcentral and northeast parts of the state is dry; therefore, the produced fluids do not contain condensate. Most trucking companies haul residual waste water, produced water, or flowback water, otherwise called brine. Brine water is not hazardous, nor does it contain high levels of methane or VOC. Many people think that brine water is bad and needs to be heavily regulated; in fact, it already is and the regulations have forced a shift to recycling brine for reuse in fracturing new wells. This is good as it reduces the need for fresh water.

To haul brine, the truck must have a residual waste sticker and ID number, and the driver must attend safety classes and briefings. In these classes, the driver is taught to take environmental precautions such as double-checking hose connections, using secondary containment under hose connections, ensuring that hoses are secured before leaving the site, and that all hatches and valves are closed once loadout is complete. Drivers must also fill out a manifest to report type and volume of liquids loaded, where the liquids were picked up, and where they were taken; this is reported monthly to the Department.

In the southwest region, the gas is often wet and therefore the produced fluids, especially at compressor stations, may contain condensate. It is the condensate that requires special management. The commentators recommend that the Department only require vapor recovery units and leak testing for trucks if the storage vessels from which the liquids are being unloaded do not require controls. (901, 902, 907, 909, 913, 914, 917, 918, 922, 923, 925, 932, 933, 938, 941, 948, 951, 953-956, 959, 965, 966, 969, 975, 979, 980, 982-984, 986, 989, 993, 996, 997, 998, 1001)

Response: The Department has changed the requirements in the final general permits to reflect that tanker truck load-out operations only have requirements if taking liquids from storage vessels that emit methane, VOC, or HAP in excess of the control thresholds.

Comment 325: Several commentators state that the requirements for tanker truck loading is needlessly complex. The tanker truck pressure testing requirements resemble those cited in major source regulations for VOC control. These requirements apply to the carrier companies, not the oil and gas operators.

The process should be simplified to allow estimating total truck loading emissions for the reporting period, not for each loadout operation. There could easily be hundreds of loadout events per well pad per year, even before accounting for water delivery to and from fracturing operations.

The commentators state that the truck loadout requirements are unreasonable in a dry gas area such as most of Pennsylvania. The general permits should be clear that the requirements only apply to trucks hauling hydrocarbons and does not apply to water truck loading. The commentator recommends that truck loadout operations should have a de minimis level below which the requirement to use a vapor recovery loadout system is not required.

The commentators state that the Department's requirement that a "vapor recovery loadout system" which meets the closed vent system requirements should be removed. There is no "loadout system" defined in Subpart OOOOa, and should certainly not be equated to a closed vent system which requires a professional engineer's certification. The Department's requirement for closed vent systems is also

problematic because they are not always feasible and may not be safe under certain conditions. This section should be deleted.

The proposed permit should also not include existing sources which would have been subject to BAT at the time of installation (lack of “grandfathering” clause).

The TSD provides no justification for closed vent systems, routing emissions to controls, or why such controls would be considered as BAT. (901-903, 907-909, 913, 914, 916-919, 922, 923, 925, 928, 930, 932, 933, 936, 938, 939, 941, 948-956, 959, 961, 964-966, 969, 972, 975, 978-984, 986, 987, 989, 991, 993, 996-999, 1001-1003, 1044, 1046-1048, 1050, 1052-1056)

Response: Though tanker truck testing requirements apply to truck carrier companies, it is the responsibility of the permittee to ensure that all trucks that perform loadout operations at their facility have passed one of the appropriate leak tests prior to allowing them to unload liquids from a storage vessel. While the leak test requirements are part of PennDOT and US DOT regulations, the Department maintains that verifying that a tanker is properly leak tested is necessary to reduce emissions from storage tanks that emit above the control thresholds.

The emissions records for each loadout operation will assist the inspector in verifying the compliance with emissions control thresholds for VOC, HAP, and methane.

The final GP-5A and GP-5 require control of VOC emissions from tanker truck loadout operations which service storage vessels which emit more than 2.7 tpy VOC (uncontrolled), 0.5 tpy of a single HAP, 1 tpy total HAP, or 200 tpy methane.

The final general permits allow the owner or operator to use a vapor balancing system for tanker truck loadout operations instead of a vapor recovery unit. The Department has replaced “vapor recovery loadout system” with “use a vapor balancing system when removing liquids from the storage vessel.” There is no requirement for control, as the storage vessel will be controlled and the vapor balancing system will route the emissions back to the storage vessel.

The requirements in the general permits are prospective and do not apply to existing sources unless a source is modified.

The TSD provides justification for requiring a vapor balancing system as BAT.

Comment 326: The commentator suggests that requirements for a “vapor recovery loadout system” used for truck loadout operations should be removed. Under Subpart OOOOa, the “loadout system” itself is not the equipment covered by the PE certification, when applicable for storage vessel affected facility, but rather it is the closed vent system (the control device, piping and components on the tank farm). The “vapor recovery loadout system” would simply be the vapor-return hose which runs from the truck to the tanks, and which allows the flow of displaced vapors back into the tanks. (1050)

Response: The final general permits require a vapor balancing system instead of a “vapor recovery loadout system” when removing liquids from the storage vessel that emits methane, VOC, or HAP in excess of the control thresholds.

Comment 327: The commentator wants to know how to estimate methane or ethane emissions when loading trucks. (964)

Response: The owner or operator may estimate methane and ethane emissions from truck loading operations based on the gas analysis and emission factors.

Comment 328: Section J includes recordkeeping and reporting requirements that obligate the operator to keep records of the entire fleet of trucks that may be used to collect liquids from a facility, including the data and rating of each leak test. The shale gas operator does not own the fleet of trucks and is not qualified to determine if each leak test was performed adequately and meets DOT standards. An operating company may use several trucking companies, each of which may have hundreds or thousands of trucks. With new trucks entering the system and the retesting of existing trucks, the operating company would be required to dedicate a full-time employee for tracking this requirement without any environmental benefit. Additionally, Section J requires operators to perform emission calculations for each tanker truck load-out. These emissions are reported in the annual emissions inventory, but calculating emissions on a per-truck basis would be overly burdensome and time consuming and would not accomplish the goal of demonstrating compliance with the annual emission threshold. Section J also requires that records of each truck load-out be included with the annual report. The commentator believes that reporting these records would involve an overwhelming amount of paperwork (as high as 26,000 pages per year) and would place additional burden on PADEP to review while providing no environmental benefit. (939)

Response: The Department has removed the recordkeeping and reporting requirements that obligate the operator to keep records of the entire fleet of trucks that may be used to collect liquids from a facility, including the data and rating of each leak test.

Comment 329: The commentator believes that the explanations for this source are vague. It is addressed by Section J of both draft general permits and in the TSD. It is not clear what type of control if any is being mandated. It appears it may be some form of vapor balancing where the vapors displaced from the tank-truck are routed back into the supplying storage tank. Is that the intent? The permit condition merely requires compliance with Section N.1(f) which addresses the closed vent system routed back to control or process. If this is vapor balancing, then the tank would be considered the process. In many cases an atmospheric tank is allowed, thereby the recovered vapors would freely vent from the tank, rendering this requirement useless despite being mechanically, economically, and administratively burdensome. (919)

Response: The final general permits allow the owner or operator to use a vapor balancing system for tanker truck loadout operations instead of a vapor recovery unit.

Comment 330: Section N.1(f) includes a requirement to have a PE certify the adequacy of the closed vent system. This is yet another unnecessary application of an OOOOa compliance requirement being applied to a separate source category within the general permit. This would add significant cost and burden for limited environmental benefit. In addition, the DEP is attempting to require that a “vapor recovery loadout system” which meets the requirements of Section N, Condition (1)(f) be used for truck loadout operations. This requirement must be removed.

DEP does not present a technical or economic assessment of the control of tanker truck loadout emissions in the Technical Support Document, but rather simply states that “...tanker truck loadout

operations are required to use a vapor recovery loadout system that meets the closed vent system requirements in the section on enclosed flares and other control devices.” The commentator recommends that Section J Tanker Truck Loadout Operations should be removed from the proposed GP-5/GP-5A until satisfactory justification is provided.

The commentator recommends that the language of the current GP-5 be maintained, but continue to allow appropriate VOC emission controls to remain a synthetic minor for VOC. PA DEP fails to provide a BAT analysis for Tanker Truck Loadout Operations in either the proposed GP-5 TSD or the TSD for the 2013 GP-5. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053-1056)

Response: The final GP-5 and GP-5A have been revised and incorporate all the applicable federal requirements by reference. The final GPs allow the owner/operator to use a vapor balancing system for tanker truck loadout operations instead of a vapor recovery unit. The final GPs do not include the requirement to have a PE certify the adequacy of the closed vent system.

According to the final general permits, for all tanker truck loadout operations that service storage vessels that exceed an uncontrolled emission rate of 200 tpy methane, 2.7 tpy of total VOC, 0.5 tpy of an uncontrolled single HAP, and 1.0 tpy of a total uncontrolled HAP, the owner or operator is required to reduce methane, VOC, and HAP emissions by 95% or more.

Conditional Exemption 38, finalized in 2013 required 95% control of any emission unit, including tanker-truck loadout operations exceeding emission thresholds of 2.7 tpy VOC, 0.5 tpy single HAP, and 1.0 tpy total HAP. Despite the requirement to install 95% VOC control on storage vessels and other equipment, no individual plan approval was submitted for an unconventional natural gas well site. This means either the installation of control is cost effective, or that the sources in question emit less than 2.7 tpy VOC, 0.5 tpy single HAP, and 1.0 tpy total HAP.

Quantification of Fugitive Emissions

Comment 331: The commentators recommend removing the requirement to quantify leaks with a highflow sampler as it does nothing to reduce emissions and delays the repair of the leak. Operator experience with high-flow samplers has shown low repeatability and the availability of equipment and qualified personnel is limited. (916, 919, 928, 930, 936, 949, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1052-1056)

Response: Due to non-availability of reliable high flow samplers, the final GP-5A does not contain any instrument-based quantification requirements.

Fugitive Emission Repair, Delay of Repair, and Resurvey

Comment 332: The commentators state that repairs should be conducted as soon as possible, with an immediate cessation of operations until repairs are conducted and re-tested to validate the effectiveness of the repair. The operators must report and document these activities in a timely manner with substantial penalties for failing to comply. (675)

Response: The final general permits require that any leak detected from a fugitive emission component shall be repaired by the owner or operator of the facility as expeditiously as practicable. A first attempt at repair must be attempted within 5 calendar days of detection, and repair must be completed no later

than 15 calendar days after the leak is detected unless: (i) the owner or operator must purchase parts, in which case the repair must be completed no later than 10 calendar days after the receipt of the purchased parts; or (ii) the repair or replacement is technically infeasible, would require a vent blowdown, a well shutdown or well shut-in, or would be unsafe to repair during operation of the unit, in which case the repair or replacement must be completed during the next scheduled well shutdown, well shut-in, after a planned vent blowdown or within 2 years, whichever is earlier. This is consistent with 40 CFR § 60.5397(h)(2).

Comment 333: The commentators state that repairs should be conducted as soon as possible. While some repairs may not be feasible without causing a blowdown or shutdown that generates emission, in no case should a leak be delayed for up to two years. This is a long time for leaks to remain unaddressed and continue their impact on air quality and public health. (1021, 1037, 1038)

Response: In the final general permits, Section G Condition 1(f)(ii) states that if “The repair or replacement is technically infeasible, would require a vent blowdown, a [facility] shutdown, or would be unsafe to repair during operation of the unit, the repair or replacement must be completed during the next scheduled [facility] shutdown, after a planned vent blowdown or within 2 years, **whichever is earlier** [emphasis added]. This is consistent with 40 CFR § 60.5397(h)(2).

Comment 334: The commentator recommends referencing 40 CFR Part 60 Subparts OOOO and OOOOa rather than including the text in the general permits. This would simplify the general permits and ensure that they remain consistent with any changes in federal requirements. It would also ease compliance demonstration because there would be certainty that federal and state compliance are achieved, especially as it concerns delay of repair. (916, 928, 930, 936, 944, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054, 1056)

Response: In the final GPs, monitoring requirements have been incorporated by reference. However, the terms and conditions in Section G of the final general permits are determined by the Department to be BAT. Therefore, the terms and conditions were written into the final general permits.

Regarding the concerns for delay of repairs, the final general permits require that any leak detected from a fugitive emission component shall be repaired by the owner or operator of the facility as expeditiously as practicable. A first attempt at repair must be attempted within 5 calendar days of detection, and repair must be completed no later than 15 calendar days after the leak is detected unless: (i) The owner or operator must purchase parts, in which case the repair must be completed no later than 10 calendar days after the receipt of the purchased parts; or (ii) the repair or replacement is technically infeasible, would require a vent blowdown, a well shutdown or well shut-in, or would be unsafe to repair during operation of the unit, in which case the repair or replacement must be completed during the next scheduled well shutdown, well shut-in, after a planned vent blowdown or within 2 years, whichever is earlier. This is consistent with 40 CFR § 60.5397(h)(2).

Comment 335: The commentator states that prudent operating practice requires that leaks that pose a safety hazard must be immediately isolated and repaired regardless of the LDAR requirements. Smaller leaks should be considered for repair when equipment is removed from service for maintenance since the volume of gas vented to accommodate the repair may be greater than the volume leaked over the time until the next scheduled shutdown. Section K Condition 1(g)(2) of the proposed general permits impede an operator’s ability to complete a repair immediately or under the schedule prescribed by the general permits. By not incorporating the federal requirements, the LDAR provisions in the proposed

general permits put operators in the untenable position of either meeting contractual requirements to deliver gas or complying with the general permit and keeping the unit offline until the leak can be repaired. (916, 936)

Response: The language in Section G Condition 1(f)(2) of the final general permits was revised based on the comments received. The final general permits require that any leak detected from a fugitive emission component shall be repaired by the owner or operator of the facility as expeditiously as practicable. A first attempt at repair must be attempted within 5 calendar days of detection, and repair must be completed no later than 15 calendar days after the leak is detected unless: (i) The owner or operator must purchase parts, in which case the repair must be completed no later than 10 calendar days after the receipt of the purchased parts; or (ii) the repair or replacement is technically infeasible, would require a vent blowdown, a well shutdown or well shut-in, or would be unsafe to repair during operation of the unit, in which case the repair or replacement must be completed during the next scheduled well shutdown, well shut-in, after a planned vent blowdown or within 2 years, whichever is earlier. This is consistent with 40 CFR § 60.5397(h)(2).

Comment 336: The commentator recommends that the required resurvey of repairs can be performed during the same LDAR survey if a minor leak is capable of immediate repair. If the Department does not accept resurvey during the same LDAR survey, the Department must explain why a resurvey at a separate date is required and beneficial. (991)

Response: Section G Condition 1(g) requires that “Once a fugitive emission component has been repaired or replaced, the owner or operator must resurvey the component as soon as practicable. This includes during a first attempt at repair that occurs during the LDAR survey.

The final permit does not require re-survey after repair to be conducted on a separate day. The owner or operator can do the resurvey on the same day as the LDAR survey.

Comment 337: The commentators recommend that Section K Condition 1(h)(i) not be listed as a sub requirement of Condition 1(h) as it requires documenting a component that is not able to be repaired during the scheduled LDAR survey. The commentator recommends making it a standalone requirement. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Section G Condition 1(g)(i) of the final permit is consistent with 40 CFR § 60.5397a(h)(3)(ii).

Fugitive Emission Recordkeeping and Reporting Requirements

Comment 338: The commentator states that the proposed recordkeeping requirements are largely copied from 40 CFR Part 60 Subpart OOOOa without proper independent justification by the Department. It is unnecessary and unreasonable to list the fugitive emission equipment, manufacturer, model number, and serial number for all equipment as required by Section K Condition 3(a)(ii). The commentator recommends reverting to the recordkeeping requirement found in the previous GP-5. (919)

Response: Section G of the final permit incorporates 40 CFR § 60.5397a(c)(3) by reference. The condition in the proposed general permit inadvertently dropped the word detection in “A list of fugitive emissions [detection] equipment...” as in the federal regulation.

Comment 339: The commentators state that the proposed recordkeeping and reporting requirements are fundamental to compliance monitoring and provide vital information on the efficacy of the LDAR program. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039-1042)

Response: The Department agrees. Each monitoring survey must be recorded and maintained in accordance with Section A, Condition 12 and those that occurred during the reporting period must be submitted with the annual report in accordance with Section G, Condition 3 and Section A, Condition 13(c).

Alternative LDAR Requirements

Comment 340: The commentator recommends referencing 40 CFR Part 60 Subparts OOOO and OOOOa rather than including the text in the general permits. This would simplify the general permits and ensure that they remain consistent with any changes in federal requirements. It would also ease compliance demonstration because there would be certainty that federal and state compliance is achieved. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: In the final general permits, monitoring requirements have been incorporated by reference. The terms and conditions requiring compliance demonstration are included in the final permit. The requirement in Section G Condition 1(b) was revised to state “No later than 60 days after initial startup of a source...” This is consistent with language in the previous GP-5 Section H Condition 2 (Within 180 calendar days after the initial startup of a source...) and with 40 CFR § 60.5397a(f)(2) (You must conduct an initial monitoring survey within 60 days of the startup of a new compressor station...).

Comment 341: The commentators recommend increasing the LDAR inspection frequency to monthly as leaks would be found quickly and repaired as soon as possible. The recommendation is made based on studies that suggest that methane leak rates are higher than previously estimated, with one based on aerial infra-red detection of GHG estimating emission rates 100 times greater than U.S. EPA’s estimates. Another study suggests that leaks are not the result of aging components as emissions were more likely to be detected at newer well sites. (1-8, 11-14, 16-18, 20-22, 24, 25, 28-36, 38-40, 42-57, 59-61, 63-67, 69-72, 74-79, 82-86, 89-104, 106-109, 111-114, 116-145, 147-153, 155-170, 172-176, 178-200, 202-205, 207-219, 221-225, 228-230, 234-245, 247-251, 253-258, 261-281, 283, 285-289, 291-301, 303-305, 307-312, 314-322, 324-339, 342-344, 346-349, 351, 352, 354-358, 360-363, 365-367, 369-378, 380, 384-387, 389-391, 393-406, 408-415, 417-421, 423-425, 427-436, 439-442, 444-470, 474, 475, 477-482, 484-502, 504-534, 536-550, 552-569, 571-595, 598-604, 606-624, 627-631, 633-649, 651-665, 667-677, 679-683, 685-689, 691-706, 708-714, 717-728, 730-732, 735-745, 747-750, 752-757, 759-763, 765-771, 773-776, 779-783, 786-799, 802, 806-809, 811, 813, 815-817, 819-825, 827-839, 842, 844-852, 872, 874, 1011, 1014, 1015, 1020, 1022, 1026, 1028, 1038, 1057-1062, 8754-9357)

Response: The monthly frequency proposed by the commentators for larger facilities is based on Colorado’s requirement for major facilities to perform LDAR monthly. The DEP’s final general permits are not applicable to sources located at major facilities. The requirements including frequency of LDAR are determined for major facilities through case-by-case plan approval reviews.

The final GPs require quarterly LDAR which is determined to be cost effective as BAT. In addition, GPs require monthly AVO inspections.

Comment 342: The commentators recommend removing the stepdown provision that allows operators to reduce the frequency of LDAR inspections if less than 2% of components are found leaking. Equipment and component failure are unpredictable and U.S. EPA recommends that more frequent monitoring should be performed to ensure leaks are being identified in a timely manner. There is also evidence that compares site-level emissions to the percentage of leaking components which shows that sites with less than 2% leaking components constituted 90% of total emissions and 80% of all sites. In addition, the stepdown provision may have the unintended consequence of encouraging companies to not find and repair leaks to reduce costs based on less frequent inspections. (1-8, 11-14, 16-18, 20-22, 24-26, 28-36, 38-40, 42-55, 57, 59-61, 63-67, 69-72, 74-79, 82-86, 89-114, 116-145, 147-153, 155-170, 172-176, 178-200, 202-205, 207-219, 221-225, 228-231, 234-245, 247-251, 253-258, 261-283, 285-289, 291-300, 303-305, 307-312, 314-322, 324-327, 329-334, 336-339, 342-344, 347-349, 351-358, 360-363, 365-378, 380, 384-387, 389-391, 393-406, 408-415, 417-421, 423, 425, 427-436, 439-442, 444-470, 474, 475, 477-481, 484-502, 504-534, 536-544, 546-550, 552-559, 561-567, 569, 571-591, 593-595, 599-604, 606-624, 627-631, 633-649, 651-665, 667-677, 679-683, 685-689, 691-706, 708-714, 717-728, 730-733, 735-745, 747-750, 752-757, 759-763, 765-768, 770, 771, 773-776, 779-783, 786-799, 802, 806-809, 811, 813, 815-817, 819-825, 827-839, 842, 844-852, 854, 855, 857-861, 863, 865, 868-870, 872, 874-876, 878-899, 1004, 1007-1009, 1014, 1017, 1018, 1020, 1021, 1023, 1026, 1027, 1030, 1031, 1033, 1034, 1037-1042, 1057-3332, 4602, 4629-5105, 8754-9357)

Response: The stepdown provision provides some relief to smaller operators by allowing them to track the percentage of leaking components and, by maintaining less than 2% leaking components, reduce frequency. This allows smaller operators to reduce the number of times per year they must hire a contractor to perform this service and therefore save money. If at any time the percentage of leaking components exceeds 2%, the facility must resume quarterly LDAR inspections. Larger operators typically have in-house personnel to perform LDAR inspections and would rather maintain a consistent frequency than be burdened by the additional recordkeeping to receive a stepdown frequency.

Comment 343: The commentator will concede a stepdown provision for facilities that perform LDAR inspections monthly provided that the facility consistently passes with a comfortable margin, the operator continues to self-report monthly even when on a quarterly inspection schedule, and immediately resumes monthly LDAR inspections if any portion of a quarterly inspection is failed. (1011, 1015, 1022, 1028)

Response: Facilities will be inspected monthly, using AVO, and quarterly for instrument-based LDAR. Monthly instrument-based LDAR inspections are only required in Colorado for facilities that are major sources. All facilities authorized under a general permit are minor facilities, and do not warrant the same level inspection as a major facility.

Comment 344: The commentators recommend that the largest facilities should be subject to a monthly LDAR inspection frequency. This is already implemented in Colorado, which requires well sites with storage tanks and compressor stations that emit more than 50 tpy VOC and well sites without storage tanks that emit more than 20 tpy VOC to perform monthly LDAR. (854, 855, 857-861, 863, 865, 868-870, 1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039-1042)

Response: The monthly frequency proposed by the commentators for larger facilities is based on Colorado's requirement for major facilities to perform LDAR monthly. The final general permits cannot be used at major facilities; major facilities would be required to determine LDAR frequency on a case-by-case basis.

Comment 345: The commentators recommend adopting similar LDAR requirements for existing facilities. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039-1042)

Response: The Department is required to develop regulations to implement CTG for existing sources. The rulemaking for existing sources will be proposed for public comment prior to its promulgation.

Comment 346: The commentator states that there are occasions when Department staff are inspecting wellheads and discover a methane leak. It is unknown whether these are routine inspections or if they are related to a water supply complaint; regardless, negligent operators allow methane to escape either through failure to inspect or by refusing to act. Operators have staff on the well site daily; however, these employees are task-oriented, and if their duties don't involve monitoring for leaks, they don't. (1020)

Response: Based on discussions with industry, the Department was informed that most well sites are unmanned. Therefore, the Department has determined that monthly AVO is appropriate BAT and our inspectors can inspect these facilities without prior notice.

Comment 347: The commentators recommend referencing 40 CFR Part 60 Subparts OOOO and OOOOa for GP-5 covered facilities that may be applicable. Other facilities not yet subject to Subparts OOOO or OOOOa should be subject to the previous GP-5 LDAR program upon reauthorization under the final GP-5. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Because the LDAR requirements are laid out in Section G of the final GP-5, an existing facility authorized under the previous GP-5 that seeks reauthorization under the final GP-5 would be required to comply with the terms and conditions therein. However, the operator of a facility authorized under a previous GP-5 can maintain the current LDAR program by rolling the facility into a state-only operating permit.

Comment 348: The commentators state that quarterly LDAR is excessive for well pads and the frequency should be changed to annual as supported by operator data or to the federally required semi-annual. Section K Condition 1(b)(iii) does not provide adequate relief because it unnecessarily requires two consecutive quarterly inspections with percentage of leaking components below 2% before insufficiently reducing the frequency to semi-annual. (916, 919, 928, 930, 949, 952, 961, 972, 981, 987, 991, 999, 1046-1049, 1053-1056)

Response: All new or modified facilities would be required to comply with the federal semi-annual inspection requirement at a minimum; this is the case for facilities that meet the conditions of Exemption 38. As part of BAT, the Department found that quarterly LDAR requirements are technically and economically feasible at well sites. Section G Condition 1(b)(iv) of the final general permit does provide relief, and based on information provided by operators in their comments, would result in only one additional survey over the federal semi-annual requirement.

Comment 349: The commentators support the Department's proposed standards for LDAR from sources not covered in other states, such as pigging operations and liquids unloading. However, the commentators recommend that all sources of unintentional venting, including continuous and intermittent bleed pneumatic controllers, should be surveyed. The same methods that detect leaks from

other components can also be used to detect operational issues with pneumatic controllers. The commentators also recommend that the Department require operators perform an annual direct measurement of all continuous bleed pneumatic devices and repair or replace any with a measured emission rate above 6 scf/h within 14 days of the date of the measurement, as is required in California. Performing direct measurement of emissions from continuous bleed controllers during LDAR inspections has an incremental cost per controller of approximately \$36. (854, 855, 857-861, 863, 865, 868-870, 1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039-1042)

Response: The definition of “fugitive emissions component” includes the language “Any component that has the potential to emit fugitive emissions of methane, VOC, or HAP...” This means that any component with a potential to emit fugitive emissions, such as pneumatic controllers, are part of the LDAR program. However, controllers that emit from their operational vent is not considered a leak. Any unintentional venting over the established limit is required to be reported in accordance with the GP-5 Malfunction Reporting Instructions.

Due to non-availability of reliable high flow samplers, the final GP-5A does not contain any instrument-based quantification requirements.

Comment 350: The commentator states that the Department has reduced the effectiveness of LDAR compared to the current GP-5 by limiting the scope to “fugitive emissions components” as opposed to the facility. This is compounded by excluding all vents and exhausts unless the leak occurs from a place other than the designed emission point. Excluding vents and exhausts neglects the possibility that a vent designed to emit steam or water vapor could emit hydrocarbons or other substances; this exclusion removes glycol dehydration units from the LDAR program. (27, 805, 1029, 1032)

Response: The previous version of GP-5 was not as clearly defined as the final GP-5. The LDAR program described in the final general permit is consistent with the Department’s intent as indicated through responses to FAQs.

Comment 351: The commentators state that the proposed LDAR program in the general permits applies to significantly more components than the federal requirements. Because of this, operators would be required to keep a record of all components that meet the definition under the proposed LDAR program; this mismatch will cause significant compliance confusion and potentially report two values from the same source. The commentators recommend aligning the LDAR requirements with the federal requirements so operators can estimate the component counts under 40 CFR Part 98 Subpart W. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1044, 1046-1049, 1053, 1054)

Response: The Department disagrees. The Department’s definition is based on the definition in 40 CFR § 60.5430a and has been determined to satisfy other federal definitions in scope and intent. The definition includes open-ended lines. Devices that vent as part of their normal operation, such as pneumatic controllers and pneumatic pumps, are not fugitive emissions components unless there is a discharge from a place other than the vent.

The Department included covers, closed vent systems, and thief hatches as fugitive emissions components because the potential for fugitive emissions also exists from these sources. Closed vent systems are required to perform a no-detectable-emissions inspection according to 40 CFR § 60.5416a which is a Method 21 test covered by the LDAR requirements in the final general permits. Thief hatches

are required to be inspected under the federal definition unless the storage tank emits less than the control threshold (i.e., not subject to 40 CFR § 60.5395a).

The Department was clear in the definition of “leak” what constitutes a leak from a fugitive emissions component. All components or equipment authorized by the final general permits must conduct LDAR in accordance with Section G, which also satisfies the federal requirements.

Comment 352: The commentators request that the Department clarify that leaks discovered and repaired during an AVO survey are considered repaired if they no longer exhibit the audible, visual, or olfactory indicators that made them discoverable. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053-1055)

Response: Section G Condition 1(g)(ii) specifies what methods are eligible to verify repair; Condition 1(g)(ii)(D) is likely the most appropriate verification method for leaks found and repaired during an AVO inspection, although any of the others could be used at the operator’s discretion.

Comment 353: The commentator states that sealing device manufacturers have had a significant role in helping their customers quantify and reduce emissions. Documentation of leakage levels is essential to maintenance programs to determine their effectiveness. LDAR programs have been in use for some time and have been proven to be effective at reducing emissions.

While a leak has been defined as a concentration of 2.5% methane or a concentration of 500 ppm VOC, many low emission packing and valve technologies can achieve emission levels less than 100 ppmv in practice. Flanges can achieve even lower emission levels, with less than 50 ppmv generally recognized and not to exceed 100 ppm absent special circumstances.

The commentator recommends that LDAR programs use these sealing solutions to reduce fugitive emissions to their lowest levels and reduce the occurrence of massive leaks. Large emitters of fugitive emissions are not necessarily due to the equipment design, technology, or end of life but rather in the improper installation or misapplication of sealing products. (FSA)

Response: The Department’s definition of a leak is 500 ppm (see Section A Condition 3); this definition is consistent with EPA in that it describes the level at which emissions are considered a leak and must be repaired.

The Department cannot establish a specific standard without knowing the associated costs because as per the BAT requirement, a technology must be technically and economically feasible.

Comment 354: The commentators ask what cost-benefit methodology was used to justify the frequency and stringency of the LDAR requirements in the proposed general permits. (853, 867, 871, 921)

Response: The Department’s cost analysis in Appendix E of the TSD also includes well sites, compressor stations, and processing plants. The quantification requirement has been removed from the final general permits.

Comment 355: The commentators recommend that the Department justify the monthly AVO inspection requirement in the TSD. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Monthly AVO inspections included in the final general permits are consistent with requirements of 40 CFR Part 60 Subpart OOOOa. In addition, since 2013, GP-5 requires monthly AVO inspections for sources at natural gas compression and processing facilities.

Comment 356: The commentators state that the proposed LDAR requirements in the general permits require quarterly LDAR surveys and monthly AVO inspections. This causes duplicative inspections four times per year, and is an example of the inefficient use of resources required by the proposed general permits with no additional environmental benefit. The commentators recommend not requiring an AVO inspection in the month that an LDAR survey is conducted. The commentators also recommend that both LDAR and AVO only apply to new or modified equipment. (928, 930, 944, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: Monthly AVO inspections included in the final general permits are consistent with requirements of 40 CFR Part 60 Subpart OOOOa. Since 2013, the previous version of GP-5 required quarterly LDAR requirements using OGI and monthly AVO for midstream natural gas operations. The LDAR program using OGI includes AVO and therefore does not constitute duplicative inspections.

Comment 357: The commentators state that quarterly LDAR requirement and monthly AVO requirement are cost-effective methods to reduce fugitive emissions. The commentators submitted a cost analysis for LDAR assuming quarterly inspections reduce fugitive emissions by 80% and monthly inspections reduce fugitive emissions by 90%. For quarterly LDAR, the dollar per metric ton of methane reduced ranged from \$420 to \$960 at well pads and from \$214 to \$891 at compressor stations. For monthly LDAR, the dollar per metric ton of methane reduced ranged from \$844 to \$1,903 at well pads and from \$396 to \$1,583 at compressor stations. The cost-effectiveness improves if the value of the saved gas is accounted for. (1004, 1008, 1009, 1018, 1019, 1021, 1023, 1026, 1027, 1030, 1031, 1033, 1034, 1037, 1039, 1040, 1042)

Response: Based on the Department's criteria, monthly LDAR inspections are not cost-effective, even when considering the value of saved gas. The Department assumed 80% reduction based on monthly inspections and 60% reduction based on quarterly inspections consistent with EPA and Colorado's reduction estimates.

Comment 358: The commentator recommends the first LDAR inspection at a well pad be conducted using OGI within 15 days of a well commencing operation and monthly thereafter with weekly AVO inspections. Leaks should be required to be repaired within 5 calendar days of detection or, if parts must be ordered to conduct the repair, within 15 days of receiving the parts. (568)

Response: The Department has determined that monthly AVO conducted within 30 days of an emission source commencing operation and a quarterly LDAR program conducted within 60 days after initial startup of a source are BAT for fugitive emissions. The repair requirement starts within 5 days of detection for the first attempt of repair, with the repair being completed no later than 15 days after the leak is detected unless (i) the repair requires the purchase of parts in which case the repair must be completed within 10 days of the receipt of parts or (ii) the repair or replacement is technically infeasible, would require a vent blowdown, a shutdown, or would be unsafe to repair during operation of the unit, in this case the repair must be completed at the earliest of the next scheduled shutdown, after a planned blowdown, or within 2 years.

Comment 359: The commentator states that LDAR, OGI, and AVO apply to sources that emit less than 50 tpy VOC. The commentator asks if sources that emit 50 tpy VOC or more will be treated as major sources under the CAA. (568)

Response: The Department agrees that, absent a malfunction, a facility that emits 50 tpy VOC or more will be a major facility requiring plan approval and a Title V operating permit.

Comment 360: The commentator states that leaks should be defined as a concentration of 2.5% methane or a concentration of VOC of 500 ppm or greater. (568)

Response: The leak concentration is 500 ppm or greater detected by an instrument reading. The leak definition is consistent between Section A, Condition 3 and Section G, Condition 1(d) of the final general permits and the federal definition.

Comment 361: The commentator states that definition of leak should be consistent between Section A, Condition 3, Section K, Condition 1(d), and the federal definition. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The leak definition is consistent between Section A, Condition 3 and Section G, Condition 1(d) of the final general permits and the federal definition.

Comment 362: The commentators state that data from operator experience shows the percentage of leaking components is well below 2%; the data does not support the Department's assertion that the LDAR frequency needs to be increased from the federally required semi-annually to quarterly. The commentator recommends maintaining the federal LDAR requirement. (919, 949, 991, 1044)

Response: BAT requires quarterly inspections as shown in the TSD. If the operator's experience is that the percentage of leaking components is well below 2%, they may use the stepdown provision in Section G Condition 1(b)(iv) after two consecutive quarterly LDAR inspections.

Comment 363: The commentator states that data from operator experience shows the percentage of leaking components is well below 2% (0.175% using optical gas imaging (OGI) cameras and 1.07% using Method 21) and the volume of leaks is small and generally decreases over time. This skewed distribution of fugitive emissions emphasizes that a regulatory LDAR requirement with fixed frequency and limited detection methods is not an efficient allocation of capital and resources causing undue burden on the operators. The commentator recommends the Department allow Directed Inspection and Maintenance (DI&M) programs with an initial LDAR survey and annual follow-on inspections coupled with monthly AVO inspections. If necessary, the LDAR survey frequency can be increased to semi-annual if the percentage of leaking components are over 2% of the estimated component counts using 40 CFR Part 98 Subpart W for major equipment types. (919, 1049)

Response: The LDAR requirement in 40 CFR Part 60 Subpart OOOOa requires a semi-annual inspection with no provision for reduction. Barring that, the Department determined BAT to be quarterly inspections, with the potential to step down to the federal semi-annual schedule based on the percentage of leaking components at unconventional natural gas well sites, coupled with monthly AVO inspections.

Comment 364: The commentator states that LDAR technology is evolving quickly because of the national focus on reducing emissions. These new or improved technologies may make less costly, more

efficient LDAR programs that achieve equivalent or greater fugitive emissions reductions. The Department should retain flexibility in any regulations promulgated to accommodate these new or emerging technologies. In fact, the changes have been rapid enough that the Interstate Technology & Regulatory Council (ITRC), of which the Commonwealth is a participant, recognizes the need for better understanding and flexibility on methane detection.

One example of an existing technology that can be incorporated into the LDAR program involves the Heath Remote Methane Leak Detector (RMLD) which has been used by operators to identify smaller leaks than are detected using OGI. The number of leaking components detected increases with lower detection thresholds; one operator that used the RMLD found just under 50 components at 10,000 ppm methane, just over 50 components at 5,000 ppm methane, under 100 components at 2,000 ppm methane, and just over 200 components at 500 ppm methane.

Another example of an existing technology is an aerial infra-red detection program. A recent study found that over a 10-year period, aerial infra-red detection programs have the most positive Net Present Value (NPV) over the four programs examined. The study advocates that “low-cost leak detection programs can rely on high-cost technology, as long as it is applied in a way that allows for rapid detection of large leaks.” The commentator is aware of several commercial and scientific vendors of these technologies, and recommends that the Department work with operators to use these potential advanced programs to provide the blueprint for LDAR and DI&M that can be the model for other states and countries. (1049)

Response: The final GPs do not discourage the use of any potentially advance LDAR and DI&M program. Section G Condition 1(b) of the final general permits states that “...the owner or operator shall conduct an LDAR program using... leak detection methods approved by the Division of Source Testing and Monitoring.” At minimum, the alternative LDAR method would have to be at equivalent or better than OGI and Method 21.

Comment 365: The commentators state that the cost-effectiveness portion of the Department’s BAT analysis for LDAR only considers well pads. While the commentators recognize that the previous GP-5 and 40 CFR Part 60 Subpart OOOOa require quarterly monitoring, the Department should not reference a BAT analysis for well pads when establishing or continuing to justify BAT for compressor stations, processing plants, or transmission stations. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The BAT analysis in Appendix E of the TSD considers dry gas well pads separately from wet gas well pads, compressor stations, processing plants, or transmission stations because dry gas well pads have significantly less components than the other facilities. The cost-effectiveness is clearly demonstrated for all applicable facilities.

Comment 366: The commentator commends the Department for considering ICF-1049’s economic analysis in the development of the proposed air permitting requirements

The commentator states that emission reductions are a function of several variables including viewing distance, wind speed, temperature, and frequency. The commentator believes that while not linear, semi-annual monitoring is expected to be significantly more expensive than annual monitoring. (1049)

Response: The Department determined that quarterly LDAR requirements are technically and economically feasible. Since 2013, the previous version of GP-5 required quarterly LDAR requirements for midstream natural gas operations.

Comment 367: The commentators state that the Department’s methodology for determining the emissions reduction from fugitive emissions components is flawed. The commentators point out that basing the leak rate on the maximum amount of gas that a high-flow sampler can measure has no logical basis. The commentators also dispute the logic of using certain studies to justify the frequency of “super-emitters.” In addition, the Department uses component counts provided by LDAR contractors rather than operator data or actual program implementation. The Department’s decision to calculate emissions based on these assumptions results in emissions estimates twenty times higher than those used by U.S. EPA in their rulemaking. In addition, the Department’s approach in using both methane and VOC in the analysis is inconsistent with U.S. EPA, especially since the Department has not yet issued a regulation for methane emissions. The commentators contend that the extremely high emissions estimate and neglecting to account for repair costs is what drives the cost-effectiveness presented in the TSD. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1049, 1052-1054, 1056)

Response: The Department disagrees. The LDAR requirements in the final general permits were not determined based on any data from “super-emitters.” The BAT analysis for LDAR requirements is found in Appendix E of the TSD. The Department found that quarterly LDAR requirements are technically and economically feasible.

Comment 368: The commentators recommend the Department allow DI&M or other performance-based standards to be implemented in place of the proposed LDAR program. The performance-based standard should set limits on fugitive methane emissions, such as limiting emissions to a percentage of gross production, and allow operators to develop an alternative compliance program with equivalent or greater emission reductions as the technology-based program. This gives operators the flexibility to, based on operator experience, focus on sites and sources that pose a higher risk of fugitive emissions, determine the frequency of LDAR and AVO inspections, adopt new technically effective and cost-efficient methane monitoring technologies, and implement a reasonable notification, reporting, and recordkeeping requirement. The commentators state that this more flexible, performance-based approach will accomplish targeted, effective emissions reductions at a lower cost. Because methane is the primary product of the regulated community, allowing them to set a goal of limiting fugitive emissions and develop the most efficient and cost-effective method of achieving that goal will have greater impact than the Department’s regulatory LDAR approach. (930, 936, 987, 1049, 1052)

Response: The Department cannot adopt performance-based standards set by one operator. GPs have standard terms and conditions that must be met by an applicant. If an applicant wishes to propose performance-based standards it must do so through an individual plan approval. The type of program described by the commentator is not appropriate for a general permit. However, the LDAR program established under the GP-5 and 5A is based on science, technology, and the collective knowledge of industry and the Department.

Controllers

Comment 369: Several commentators state that the Department provides neither a technical assessment nor an economic evaluation of the requirement to implement “electric controllers” at sites where electricity is available; including the environmental impact of right-of-way clearing for utility power

corridors and access roads and the associated increase in emissions due to increased electricity demand. Under 40 CFR Part 60 Subpart OOOOa, the EPA established limits on natural gas driven controllers at well sites and compressor stations by limiting the use of high bleed controllers. EPA also determined that controllers at natural gas processing plants should have no natural gas emissions; it should be noted that this requirement does not require that the controllers must be electric – i.e., they could be driven by instrument air.

While transmission compression stations and most storage facilities are likely to have access to grid power, the controllers are often associated with equipment or components that are critical to facility operation and safety such as closing a valve during an emergency shutdown. This critical infrastructure must always be available, and using electric controllers could affect reliability or compromise safety. Events where power is lost are also events where facility safety procedures are likely to be triggered.

Also, various references indicate that natural gas pneumatic emissions are not significant for transmission and storage operations. One example is a white paper submitted as part of a comment on Subpart OOOOa that clearly demonstrated that emissions from pneumatic devices are extremely low. Another is the GHG Reporting Program.

Therefore, the Department should remove requirements of electric controllers and require that pneumatic controllers meet the applicable requirements of 40 CFR Part 60 Subpart OOOOa. (916, 928, 930, 936, 949, 952, 961, 972, 981, 987, 991, 999, 1003, 1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039, 1040, 1042, 1046-1048, 1052-1056)

Response: The Department removed the requirement to install electric controllers at facilities if grid power is available based on safety and reliability issues. The Department requires pneumatic controllers to meet the applicable requirements of 40 CFR Part 60 Subpart OOOOa.

Comment 370: Several commentators state that emissions from continuous-bleed pneumatic controllers, even those designed to be low-bleed, can be substantial. Although superior to high-bleed controllers, a significant number of low-bleed controllers have been shown to emit above the 6 scf/h threshold required by the NSPS.

The commentators recommend the use of zero-bleed controllers as BAT. The commentators reference an August 2016 study by Carbon Limits that shows that zero-bleed controllers are cost-effective and technically feasible even when grid power is not available at the site. Specifically, in most of the scenarios analyzed by Carbon Limits the costs associated with zero-bleed controllers were less than the social cost of methane. The cost-effectiveness is greatly affected by the number of controllers and other zero-bleed equipment that would share certain common equipment, which is a large portion of the total system cost. Zero-bleed controllers have been proven to work at upstream oil and gas operations.

The commentators state electronic controllers, both grid powered and solar powered, are in wide use today. Facilities should have a requirement to install zero-bleed controllers if electricity is available, whether it is generated or from the grid, as many facilities generate electricity for lighting, systems control, and other purposes and may not have a grid connection.

The commentators also performed their own analysis based on data reported by Pennsylvania's operators to EPA's GHGRP. They estimate that the typical new unconventional well pad consists of six wells with one continuous-bleed pneumatic controller and five intermittent-bleed controllers. Using

these controller counts a new dry-gas site with no power available would have a cost of \$2,076 per ton VOC and \$557 per metric ton methane abatement. Cost-effectiveness calculations would be even less if a multipollutant approach is used. The commentators state that for wet-gas sites net costs are lower because wet-gas can cause maintenance problems when used to operate pneumatic controllers and therefore the increased maintenance costs are eliminated by switching to electric controllers or air-driven controllers.

The commentators state that even if the zero-bleed requirements are not implemented as BAT, the Department should require both continuous-bleed and intermittent-bleed controllers to have an emission standard of 6 scf/h. Wyoming has had this requirement since 2010, and also requires operators to route emissions from the controllers to a process if it cannot meet the 6 scf/h standard. (568, 1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039, 1040, 1042)

Response: The Department appreciates the comment; however, the requirement to install electric controllers at facilities if grid power is available has been removed based on safety and reliability issues. The Department requires pneumatic controllers to meet the applicable requirements of 40 CFR Part 60 Subpart OOOOa.

Comment 371: The commentators request clarification on the applicability of controller requirements to low-bleed and intermittent controllers. In the draft GP-5, the tagging and other requirements appear to apply to all pneumatic controllers, including low-bleed and intermittent controllers. However, consistent with 40 CFR 60 Subpart OOOO and OOOOa definitions and applicability, continuous low-bleed and intermittent controllers should be exempt from Section L. requirements. The Department has not justified the incremental benefit of requiring 98% control when the OOOOa rules require 95% control, and long-established Department permits and exemptions allow 95%. The maximum control required should be 95%. The Notification requirements for pneumatic controllers are unnecessary and provide no environmental benefit. Unless the Department can clearly justify their need for and their intended response to such notifications, L.2 should be deleted. (919, 930)

Response: In the final general permits, the Department requires pneumatic controllers to meet the applicable requirements of 40 CFR Part 60 Subpart OOOOa.

Comment 372: For the annual report, Section L(4)(a) should be revised to read, “The identification, location, and date of construction for each controller constructed during the reporting period,” Otherwise, this may be interpreted to require information for all controllers at the station regardless of when installation occurred. (930, 936, 1052)

Response: The final general permits have been revised to require the emissions from each pneumatic controller in operation during the reporting period to be included in the Annual Emissions Inventory report.

Pumps

Comment 373: Several commentators state that the Department provides neither a technical assessment nor an economic evaluation of the requirement to implement “electric pumps” at sites where electricity is available. Under 40 CFR Part 60 Subpart OOOOa, the EPA established limits on natural gas-driven diaphragm pumps at well sites. EPA also determined that diaphragm pumps at natural gas processing

plants should have no natural gas emissions; it should be noted that this requirement does not require that the pumps must be electric – i.e., they could be driven by instrument air.

In addition, the commentators contend that the Department did not provide a cost evaluation in conjunction with the apparent requirement in the draft general permits to install a control device solely for controlling a diaphragm pump. It should be noted that EPA established that operators did not need to install a control device solely for controlling an effected pump.

The commentators recommend that this section not attempt to repeat or replicate OOOOa language; instead, incorporate the requirements by reference. Examples of this concern are found in Section M, Conditions 1(a), 3, and 4. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The Department requires pneumatic pumps to meet the applicable requirements of 40 CFR Part 60 Subpart OOOOa. The Department removed the requirement to install electric pumps at facilities if grid power is available based on safety and reliability issues. However, the Department requires that pumps must control emissions by 95% if they exceed the emission control thresholds, even if it is the only source at the facility that requires control.

Comment 374: Several commentators state that BAT for pumps should be zero-bleed pumps. These zero-bleed pumps include instrument air systems, electric pumps, and capturing gas and routing it to a sales line, fuel gas system, or control. The commentators also state that for natural gas processing plants, controlled through GP-5, pneumatic pumps are required by U.S. EPA's NSPS to be zero emissions. DEP proposes only 98% reduction. DEP must require that emissions be reduced to zero. (568, 928, 930, 952, 987, 1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039, 1040, 1042, 1047, 1048, 1053, 1054, 1056)

Response: The Department removed the requirement to install electric pumps at facilities if grid power is available based on safety and reliability issues. 25 Pa. Code requires that all new sources control the emissions to the maximum extent, consistent with the BAT as determined by the Department at the time of issuance of a plan approval. The Department's investigation shows that the manufacturer-tested models typically achieve greater than 95% control in practice. However, after considering comments received, the Department revised the 98% control requirement for methane, VOC, and HAP to a 95% control requirement in the final general permits if the source exceeds the emission control thresholds.

In the final general permits, the Department requires pneumatic pumps to meet the applicable requirements of 40 CFR Part 60 Subpart OOOOa.

Comment 375: The commentators ask if Section M in the general permits requires utilizing controls for methane even if methane emissions are at or under 200 tpy.

The commentators also question DEP's authority to establish via permit a control limit of 98% which exceeds the federal regulatory control limit of 95%. The current 95% represents a significant reduction, and the improvement to 98% comes at a potentially significant cost with limited environmental benefit. Also, in some instances "condensers" are listed as an option, but it is frequently difficult to obtain condensers rated at a 98%, especially for methane. (919, 991)

Response: The final GPs require controls only when methane emission rate from a pump exceeds 200 tpy of methane, 2.7 tpy VOC, 0.5 tpy of a single HAP, or 1.0 tpy total HAP by 95%.

Comment 376: In Section M, PA DEP proposed amendments to GP-5 that would require control of pneumatic pumps. Subpart OOOOa requirements for pneumatic pumps do not apply to transmission and storage facilities, and PA DEP has not justified this requirement. Transmission and storage facilities may occasionally use portable pneumatic pumps to transfer liquids – e.g., from one tank to another. Pneumatic pump requirements should not apply to transmission and storage facilities. At a minimum, portable, occasional use pumps should be exempt from any requirements that PA DEP adopts in the final general permit. (930, 936, 1052)

Response: 25 Pa. Code requires that all new sources control the emissions to the maximum extent, consistent with the BAT as determined by the Department at the time of issuance of a plan approval. Therefore, new or modified pneumatic pumps at transmission and storage facilities are also subject to BAT requirements. The final general permits include a control requirement for any pump, regardless of type of facility, that exceeds the control thresholds.

Comment 377: The commentators recommend that the Department should clarify that non-diaphragm pumps such as Kimray pumps and other chemical injection pumps are not applicable to these requirements. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056,)

Response: The Department agrees. The final general permits address only natural gas-driven pneumatic diaphragm pumps unless the pump exceeds the control thresholds.

Comment 378: The commentator recommends that pneumatic pump requirements be made consistent with federal regulations and incorporated by reference. This section should reference NSPS Subparts OOOO and OOOOa, rather than restating the language of such regulations. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: In the final general permits, the Department requires pneumatic pumps to meet the applicable requirements of 40 CFR Part 60 Subparts OOOO and OOOOa, unless the pump exceeds the control thresholds.

Comment 379: PA DEP proposes, “...that the (OOOO and OOOOa) requirements for pumps at well sites are also BAT for pumps located at remote pigging stations, natural gas compressor stations and transmission stations.” However, the Department notes that “Subpart OOOOa does not have a requirement for pumps located at natural gas compressor stations.” Finally, “The Department requires that electric pumps be used at any facility that has access to electricity on site.” PA DEP has not justified or demonstrated that these requirements represent BAT, and therefore, the commentator recommends that they be removed from the proposed permit. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department requires pneumatic pumps to meet the applicable requirements of 40 CFR Part 60 Subpart OOOOa. The final general permits do not include the requirement to install electric pumps at facilities if grid power is available based on safety and reliability issues. However, the Department requires that pumps must control emissions by 95% if they exceed the emission control thresholds.

Comment 380: The DEP has not justified application of controls in excess of Subpart OOOOa. The Department provides neither a technical assessment nor an economic evaluation of the requirement to implement “electric controllers” or electric pumps at sites where electricity is available. Under Subpart OOOOa, the EPA established that affected controllers and affected diaphragm pumps at gas processing plants should have no natural gas emissions. It is noted that this requirement is limited to gas processing plants and is different than requiring that controllers and pumps must be electric. Under Subpart OOOOa, controllers at gas processing plants could still be pneumatic, but air-driven versus natural gas driven. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: In the final general permits, the Department requires pneumatic pumps to meet the applicable requirements of 40 CFR Part 60 Subparts OOOO and OOOOa.

Comment 381: The commentators note the Department has not provided a cost evaluation in conjunction with the apparent requirement in the draft general permits to install a control device solely for controlling a diaphragm pump. Notably, under Subpart OOOOa, U.S. EPA established that operators did not need to install a control device solely for the purpose of complying with the regulation for an affected pump. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: In the final general permits, the Department requires pneumatic pumps to meet the applicable requirements of 40 CFR Part 60 Subpart OOOOa. The Department removed the requirement to install electric pumps at facilities if grid power is available based on safety and reliability issues. However, the Department requires that pumps must control emissions by 95% if they exceed the emission control thresholds.

Enclosed Flares and Other Emission Control Devices

Comment 382: Several commentators state that when combustion control devices are required the Department requires a control efficiency of 98% versus the federally required 95% control efficiency. The commentators state that even though the Department calculated a 1,600 °F combustion zone temperature to ensure 98% methane destruction, that the Department did not conduct a technical or cost analysis to determine what is required to achieve and sustain this combustion zone temperature. The commentators acknowledge that many control devices will achieve far greater than 95% destruction.

Several commentators state that the Department’s BAT analysis assumes an extremely low capital cost for controls. Specifically, the Department estimates combustor costs of \$34,000; typically, combustor installation is greater than \$100,000 when including installation costs, engineering cost, etc. Even though the Department attempted to scale capital costs to show variation, if the original cost estimate was flawed, the scaling of annual costs and capital costs will also be flawed. For example, the additional cost for natural gas usage to ensure the higher combustion zone temperature was not included. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The Department does not prohibit the use of a control device if it meets the control requirements. Condensers or carbon adsorption units would see limited use for sources constructed after the effective date of the final general permits based on their ineffectiveness to control methane; however, these techniques could be used, and therefore were incorporated into the final general permits for sources that predate the effective date.

In the final general permits, the Department requires combustion control devices to meet the applicable federal requirements established in 40 CFR Part 60 Subpart OOOOa, including 95% destruction efficiency.

Comment 383: One commentator states that the requirement to achieve 98% control efficiency for methane, VOC, and HAP emissions from pigging operations, glycol dehydration units, and storage vessels is on par with requirements in Wyoming and Colorado. (1041)

Response: The Department's investigation shows that the manufacturer-tested models typically achieve greater than 95% control in practice. However, after considering comments received, the Department revised the 98% control requirement for methane, VOC, and HAP to a 95% control requirement in the final general permits if the source exceeds the emission control thresholds.

Comment 384: Several commentators commend the Department for the emissions control thresholds for control for dehydrators, tanks, and pigging operations. The commentators especially support the methane control thresholds as some oil and gas facilities, such as those in the dry gas regions of the state, emit predominantly methane and may not be required to control if only VOC or HAP emissions are considered. The commentators are also supportive of the low control thresholds of 2.7 tpy VOC, 0.5 tpy for single HAP, and 1.0 tpy for total HAP. The commentators, however, believe that the 200 tpy of methane control threshold is too high. Based on the commentator's analysis of 2015 Air Emissions Inventory data, less than 0.1% of facilities could be affected by the 200 tpy methane control threshold; since the number of tanks present at each facility are not known, it is possible that no storage vessel will trip the 200 tpy methane control threshold.

The commentators suggest adopting a control threshold of 10 metric tons per year implemented in California. The California Air Resources Board (CARB) determined that control at this level is cost effective; their calculation was \$562 per metric ton of methane, which is less than the social cost of methane of \$1,100 of damage per metric ton of methane. This is based on the annualized cost of VRUs from U.S. EPA's Natural Gas STAR Industry partners capable of handling 25 Mcf/d.

The commentators state that the Colorado Department of Public Health and Environment (CDPHE) used an annualized cost of a VRU that is higher than CARB's. Even with the higher annualized cost, the abatement cost of 22 tpy of methane is \$960 per ton. Therefore, the abatement cost at 10% of the Department's proposed threshold is still below the social cost of methane. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039-1042)

Response: CARB's control threshold of 10 metric tons per year is limited to separator and tank systems; the CDPHE methane control cost effectiveness deals only with VRUs. Pennsylvania's methane control threshold is a generally applicable threshold, meaning it is not technologically limited to VRUs or limited to only a few sources such as separators and tanks. The Department determined that installing a control for a source emitting less than 200 tpy of methane is not cost-effective, and considering the scientific uncertainty of the calculation of a state average gas composition detailed in Appendix A of the TSD and the site-specific costs associated with the installation of control devices, the Department conservatively maintains the 200 tpy methane control threshold. The commentators' suggestion to lower the methane control threshold is not cost-effective.

Comment 385: Several commentators believe the proposed control thresholds should not apply for individual sources, but rather for the entire facility. This is because equipment to capture or control

emissions from sources at unconventional natural gas facilities can be used to control emissions from multiple sources. Enclosed flares and other emission control devices can be used to control emissions from essentially any vented source provided they are adequately sized. Vapor recovery units (VRUs) are the superior approach because they conserve the natural gas and result in lower overall emissions and can be used for nearly any source except dehydrators. Routing emissions to a process heater can also be used for many emissions sources, including dehydrators. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039-1042)

Response: The Department appreciates the comment. The Department's BAT requirements are source specific and do not apply to the entire facility. However, wherever applicable, the Department has combined emissions from multiple sources of the same category, such as controllers, tanker-truck loadout operations, and pigging operations to apply the control thresholds.

Comment 386: Several commentators state that the standards in the general permits should require operators to capture natural gas whenever feasible. The use of a combustion device to control hydrocarbons from these sources should only be used after capture and reinjection to the production line or capture for beneficial use is demonstrated to be infeasible. Further, reciprocating compressors, centrifugal compressors, and storage vessels have compliance requirements that direct operators to "route all vapor through a closed vent system to a control device that [reduces air pollutants by a certain amount] by meeting the applicable control, cover, and closed vent system requirements of Section N..." and therefore operators may not be aware that VRUs can be used for these equipment types. (568, 1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039-1042)

Response: VRUs are added to the final general permits as one of the available control measures.

Comment 387: Several commentators state that the Department should not allow operators to use control technologies based on condensers or carbon adsorption, referred to as "Vapor Recovery Devices" in Section N Condition 1(b) for any type of equipment as these devices will not control methane emissions by a significant amount. The commentators refer to comments submitted by the Clean Air Task Force to U.S. EPA on December 4, 2015 on the proposed Subpart OOOOa that document the ineffectiveness of these technologies on methane control. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039, 1040, 1042)

Response: The Department does not prohibit the use of a control device if it meets the control requirements. See the response to Comment 378 regarding the use of carbon adsorption. The owner or operator may choose the control techniques to comply with the 95% control requirement.

Comment 388: Several commentators state that CRSD Standard 10 applies during instances where other CRSD Standards permit flaring. CRSD Standard 10 requires that flares achieve at least a 98% destruction efficiency and limits the duration of flaring over the well's life to 14 days for development wells and 30 days for exploratory or extension wells.

The Department's TSD states that "a control requirement of 98% is achievable and reasonable based on the economic feasibility of combustion control devices ... and [a demonstration] that at a combustion zone temperature of 1,600 °F a methane destruction of 98% is achievable." However, Section N of GP-5 does not require that flares meet a minimum level of destruction efficiency. Rather Section N states that a flare must "meet the most stringent percent reduction requirement" for the sources routed to it. By its own terms, Section N does not guarantee that such a "stringent percent reduction requirement"

will achieve at least 98% destruction efficiency. Both the Department's TSD and CRSD Standard 10 state that flares that achieve 98% destruction efficiency are available and therefore Section N should be revised accordingly.

Further Section N does not limit the number of days that a flare may be operated at any particular well. CRSD Standard 10 suggests that limiting the time that a flare may be operated at a particular well is an available method that minimizes the emission of air pollutants. The Department should determine whether CRSD Standard 10 is an available method and, if it is, revise Section N accordingly. (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: The Department did not list a control efficiency in Section N of the proposed general permits, as the control efficiency is determined by the source's BAT. This means that an applicable source in another section dictates the control efficiency, but the requirements to ensure proper operation of the controls, such as performance testing, recordkeeping, and reporting, were detailed in Section N. For controls with multiple sources routed to it, the requirements were to be determined by the most stringent requirement. However, after consideration of comments, the 98% control requirement for methane, VOC, and HAP was revised to a 95% control requirement in the final general permits if the source exceeds the emission control thresholds.

Comment 389: One commentator states that the GP-5A exceeds many of the recently promulgated federal regulations in Subpart OOOOa. A major example of this is the 95% control efficiency in the federal regulations, which were automatically adopted as Department regulations under 25 Pa. Code § 122.3. However, the Department increased this control efficiency to 98% and mandates controls for methane emissions of 200 tpy or more. This expansion of the scope and breadth of federal regulations is not permitted without following the formal rulemaking requirements of the Regulatory Review Act (RRA), 71 P.S. 745.1 et seq. The Department may not circumvent the requirements of the RRA under the guise of a permit.

The commentator argues that the Department may establish a permit process for the implementation of federal regulations that are by operation of law adopted as state regulations; however, the Department must follow the strict procedures established by the General Assembly in the RRA to implement new regulations that exceed federal rules. Although the Department offered advance publication of the proposed permit and request for comments, the Department's activity to date does not comply with the procedures established under the RRA, particularly the lack of analysis of the economic impact of these regulations on operators. The Department has not provided documentation on the estimated costs of implementing these new rules compared to the estimated emission reductions to be realized.

One commentator states that the requirement that controls 98% control efficiency should be changed to require no greater than 95% control efficiency. Existing units that are often relocated due to the transience of well operations, and controls installed to comply with the current GP-5, Exemption 38, 40 CFR Part 60, and 40 CFR Part 63 would not meet the new 98% control requirement. The 95% control requirement represents a significant reduction, and the improvement to 98% comes with potentially significant cost and limited environmental benefit. Units rated at 98% efficiency are available, but given the industry standard of 95%, nothing more stringent should be required. Also, condensers that achieve 98% control would be difficult to obtain, especially for methane. Condensers typically achieve 95% control efficiency for heavier VOC.

Several commentators state that the Department's BAT analysis is inadequate to determine that 98% control efficiency is technically and economically feasible. The capital costs for the combustor in the Department's analysis are low, based on actual purchased equipment in use. Total capital costs for combustion control units, including installation and engineering, can exceed \$100,000. Although the Department attempted to scale capital costs to show variation, the scaling fails based on the original estimate's flaws.

While the Department calculates the costs of reduction for both 95% and 98% reduction, it does not factor any additional costs associated with the difference in control levels. Outside of any additional capital cost, the Department notes on page 40 of the TSD that a higher temperature is required to obtain the necessary reduction; however, it does not factor any additional operating costs, such as increased natural gas usage, into the analysis. (916, 919, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department's investigation shows that the manufacturer-tested models typically achieve greater than 95% control in practice. However, after consideration of comments, the Department revised the 98% control requirement for methane, VOC, and HAP to a 95% control requirement in the final general permits if the source exceeds the emission control thresholds.

Comment 390: One commentator states their investigations using OGI cameras in Pennsylvania and other states have documented long, dense plumes of emissions from flares in many locations. The commentator states that flares are known to release methane, CO₂, NO_x, and VOC. Therefore, the commentator strongly supports the requirement to use enclosed flares at unconventional natural gas well sites, remote pigging stations, natural gas compressor stations, natural gas processing plants, and natural gas transmission stations. (1021, 1037)

Response: The Department requires permanent flaring activities to be enclosed flares unless the control is located at a remote pigging station. Remote pigging stations are authorized to use open flares because they typically employ mobile flares as a control technique.

Comment 391: Several commentators strongly support requiring 98% control of emissions from new sources such as glycol dehydration units and storage vessels. (410, 576)

Response: The Department's investigation shows that the manufacturer-tested models typically achieve greater than 95% control in practice. However, after considering comments received, the Department revised the 98% control requirement for methane, VOC, and HAP to a 95% control requirement in the final general permits if the source exceeds the emission control thresholds. In the final general permits, the Department requires combustion control devices to meet the applicable requirements of 40 CFR Part 60 Subpart OOOOa.

Comment 392: One commentator urges the Department to eliminate the requirement for stack testing for VDU flares, carbon canisters, and other small, intermittently active vent systems if they are operated in accordance with the manufacturers' recommended practices. It is inappropriate to apply the performance demonstration requirements normally applied to large compressor engines. (928)

Response: The Department maintains that performance testing or monitoring is required in accordance with federal regulations, which were incorporated into the final general permits by reference. Performance testing is also required to demonstrate actual emissions are below allowable emissions.

Comment 393: Several commentators state the TSD analysis incorrectly calculates the dollar per ton of pollutant reduce by summing methane, VOC, and HAP which double counts HAP that are also VOC. This multipollutant cost calculation breaks precedent where BAT is conducted on a pollutant-by-pollutant basis. Additionally, this is inconsistent with how best available control technology is determined in 40 CFR Part 52. Pennsylvania's BAT program has traditionally mirrored that process and the Department should provide a justification for this new requirement. Furthermore, the commentators state that the Department completed the cost analysis using combined emissions but sets control thresholds using each pollutant individually, which is inconsistent.

Should the Department determine that a multipollutant approach is warranted, then the evaluation should include all pollutants, not just those that are reduced.

Several commentators state that the Department assumes methane has the same economic feasibility as VOC or HAP in the analysis. However, this assumption is not discussed in the TSD and it is asserted that 200 tpy of methane is equivalent to 2.7 tpy of VOC. Methane cannot be assumed to be equivalent on a ton-per-ton basis as in the cost analysis if 200 tpy of methane is equivalent to 2.7 tpy of VOC. Also, because methane cannot be tied to an ambient air quality standard and has not been regulated by the Department to date, additional justification must be provided or the economic feasibility should be reevaluated using VOC. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department believes that if a control technology controls more than one pollutant, then it is appropriate to conduct a multi-pollutant cost-effectiveness analysis. The Department has used actual quotes from the vendors to perform the cost-effectiveness analysis and determined that it is cost-effective to control a source with combustion control technology when uncontrolled emissions exceed methane, VOC, and HAP control thresholds. The Department did consider multipollutant for a single control system in the past BAT determination. If a single control system is designed to reduce multiple pollutants, it is appropriate to consider the reduction of all pollutants for the investment of a single control system for the evaluation of BAT.

Comment 394: Several commentators support the 98% control requirement to reduce methane emissions at well sites, compressor stations, processing plants, and transmission stations. The commentators believe such regulations should apply to all oil and gas operations, both existing as well as new, including exploration, production, transportation, and distribution. (1, 2, 8, 16, 25, 26, 32-34, 42, 43, 47, 49-51, 54, 59, 64, 66, 75, 76, 78, 84, 91, 94, 97, 98, 100, 102, 107, 112, 114, 116, 120, 127, 132, 149, 153, 155, 166, 170, 178, 190, 191, 202, 219, 225, 239, 240, 243, 248, 255, 256, 270, 272, 273, 281, 286, 288, 301, 303, 307, 309, 325, 332, 336, 346, 348, 351, 353, 357, 361, 365, 368, 376-378, 391, 393, 401, 415, 418, 420, 431, 440, 444, 446, 447, 454, 458-460, 479, 482, 487, 489, 496, 500, 516, 518, 522, 526, 543, 564, 569, 578, 581, 584, 592, 600, 606, 614, 615, 619, 621, 638, 640, 644, 651, 670, 672-676, 689, 706, 711, 720, 723, 730, 731, 733, 742, 745, 748, 757, 760, 763, 775, 780, 796, 806, 822, 823, 828, 832, 844, 845, 851, 852, 1026, 2336-3332, 8754-9357)

Response: The Department's investigation shows that the manufacturer-tested models typically achieve greater than 95% control in practice. However, after considering comments received, the Department revised the 98% control requirement for methane, VOC, and HAP to a 95% control requirement in the final general permits if the source exceeds the emission control thresholds.

Existing operations at well sites, exploration and distribution facilities will be covered under regulations that the Department is currently developing.

Comment 395: Section N does not discriminate between existing and new equipment; therefore, it applies all conditions retroactively, including design criteria, PE certification of closed vent systems, and initial performance testing. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: GP-5A and GP-5 are applicable to new or modified sources. The permits do not apply to existing sources.

Comment 396: The commentators state that there are numerous sources in the GP-5 permit not subject to federal control standards (e.g., tanks less than 6 tpy VOC, dehydrators less than 1 tpy benzene). For sources not subject to federal emission standards, the control device requirements should remain the same as those in the existing general permit.

Similarly, existing equipment authorized under previous versions of GP-5 that will be transferred to this permit reference this section for monitoring, recordkeeping, and reporting. This would require significant retrofits for equipment not subject to federal emission standards. The existing control device requirements for already-authorized equipment should remain the same as currently constituted in the current GP-5.

One commentator asks whether it is the DEP's intent that this section will apply immediately to existing installed devices.

Another commentator also states that the visible emission test requirements are unduly burdensome and should be deleted.

The commentators believe that these requirements are not limited to new activities and, as proposed, would unfairly apply retroactively to existing sources under Exemption 38. Other sections identify separate requirements for pre-2013 and post-2013 Exemption 38 operations, as well as new GP-5A. This section does not. (916, 919, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: New or modified sources are subject to applicable federal requirements as well as the Department's BAT requirements.

The recordkeeping, monitoring and reporting requirements in the final permit conditions are necessary to ensure the compliance of the source as per 25 Pa. Code §§ 127.12b(a) and 127.441(a) and (c). The use of a general permit is not mandatory. The owner or operator can apply for a state only operating permit to incorporate existing general permit requirements for a case by case determination of § 127.441(a) and (c).

The conditions of GP-5 are effective 60 days after publication of GP-5 in the Pennsylvania Bulletin.

The Department has removed the visible emissions test requirement for the enclosed flare from the final general permits.

Comment 397: The commentator states that DEP relies on one vendor quote for total purchased equipment cost. The costs do not include any representative modifications to the equipment which would include additional engineering and field installation work.

The commentator also states that the Department has calculated cost per ton (of pollutants reduced) for the combined three pollutants and for the pollutants excluding methane (presume this means the sum of HAP and VOC). The commentator mentions that U.S. EPA has determined it is not appropriate to conduct “multipollutant cost-effectiveness.”

The commentator also states that in API’s comments to U.S. EPA’s 09/18/2015 *Federal Register*, the U.S. EPA has a precedent for the cost-effective threshold of VOC for ozone non-attainment areas at \$5,700 per ton VOC. The Department has not justified what or why a higher threshold is warranted. (919)

Response: The Department believes that if a control technology controls more than one pollutant, then it is appropriate to conduct a multipollutant cost-effectiveness analysis. The Department has used actual quotes from the vendors to perform the cost-effectiveness analysis and determined that it is cost-effective to control a source with combustion control technology when uncontrolled emissions exceed methane, VOC and HAP emission thresholds. The Department did consider multipollutant for a single control system in the past BAT determination. If a single control system is designed to reduce multiple pollutants, it is appropriate to consider the reduction of all pollutants for the investment of a single control system for the evaluation of BAT.

Comment 398: The commentator recommends that in Section N the requirements for flares and other combustion control devices to meet a minimum temperature of 1,600 °F should be removed as there is no need to replicate these requirements for OOOOa sources. If the Department’s intent is to apply these to non-OOOOa sources, then the Department should independently justify these requirements in the TSD for all affected sources. (919)

Response: The Department has removed the requirements to meet a 1,600 °F minimum temperature from the final general permits. The federal requirements have been incorporated by reference.

Comment 399: The commentators state that Pennsylvania’s flare requirements should comport with Subpart OOOOa and the current GP-5 in order to comply with the Pennsylvania Air Pollution Control Act and the 1996 Executive Order. The TSD does not discuss the basis for or support added stringency, and an analysis of the impact of control efficiency on environmental benefits and costs should be provided if PA DEP wants to adopt flaring requirements that exceed federal standards. For example, unless proven otherwise by TSD analysis that assesses incremental control costs and environmental benefits, the 95% control efficiency in the current GP-5 and in Subpart OOOOa is appropriate rather than the 98% efficiency proposed for sources that control using a flare or combustion device. In addition, *enclosed* flares or combustion devices should not be a default requirement.

The commentator also states that as proposed, these requirements are not limited to new activities and would unfairly apply retroactively to existing sources under Exemption 38. Other sections identify separate requirements for pre-2013 and post-2013 Exemption 38 operations, as well as the new GP-5A. Section N does not distinguish these timeframes for enclosed flares and other emission control devices. As currently written, this requirement appears to apply retroactively to sources constructed prior to the effective date of the proposed general permit.

The BAT analysis is not adequate to justify the increase to 98% control from the 40 CFR § 60.5413a(c)(11)(iii) requirement of 95% control. Enclosed flares also require additional cost to be technically capable of controlling vents from high pressure systems such as compressors; this is also not discussed in the TSD. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054, 1056)

Response: Existing sources authorized to operate under the previous version of GP-5 can continue to operate under applicable requirements in the respective section that has been incorporated in the final GP-5. New or modified sources are subject to applicable federal requirements as well as the Department's BAT requirements.

The federal requirements have been incorporated by reference. The Department's investigation shows that the manufacturer-tested models typically achieve greater than 95% control in practice. However, after considering comments received, the Department revised the 98% control requirement for methane, VOC, and HAP to a 95% control requirement in the final general permits if the source exceeds the emission control thresholds.

Comment 400: The proposed GP-5 requirements eliminate open flares as a control option. Not only is this problematic for existing flares already authorized upon renewal or modification, but limiting the control options to enclosed flares decreases flexibility of control. Open flares are used routinely in the industry for plant-level emission events and allow for more flexibility in design. Open flares should be retained as an option in this permit. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The revised general permits allow the operation of open flare; however, all permanent flaring operations must be enclosed.

Comment 401: Furthermore, given the complicated nature of the compliance requirements specific to control devices within federal regulations, DEP should maintain these requirements within the general permit by incorporating them by reference, as applicable. The replication of specific language that DEP has copied into the Section N fails to distinguish these requirements accurately, which duplicates burden and contradicts existing compliance programs. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The federal requirements have been incorporated by reference in the final general permits.

Comment 402: The TSD does not provide justification for allowing only enclosed flares or for requiring existing flares be replaced with enclosed flares. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Only new or modified permanent flaring operations are required to be enclosed. The Department has required enclosed flares for permanent flaring operations at well sites since August 10, 2013.

Comment 403: Several commentators state that visible emissions surveys and the associated recordkeeping and reporting should not be required for natural gas operations and natural gas-fired combustion units. The commentators recommend that the PA DEP clarify the acceptable methods for satisfying this requirement in Section N, Condition 1(a)(i)(C)(3) and suggests "A Method 22 visible

emissions test must be performed following any maintenance or repair activity required by (C)(2) of this section before returning the device to service.” (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054, 1056)

Response: The Department has revised the condition in the general permits. The revised conditions, require enclosed flares and other emission control devices to meet federal requirements by reference.

Comment 404: The commentators recommend that the monthly AVO inspection incorporated in Section N, Condition 1(a) and Section K, Condition 1 should be removed as it is duplicative of the requirements for control devices and site-wide quarterly LDAR. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department agrees with the comment and has revised the final general permits to delete duplicative requirements for monthly AVO inspections for an enclosed flare and combustion control devices.

Comment 405: The commentators state that as per Section N, Condition 1(a)(ii), performance testing within 180 days of initial startup or reauthorization is required. The commentator recommends that this condition should be revised to state within 180 days of startup or renewal. Transfer of ownership or a modification to other sources at the facility should not trigger performance testing. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1003, 1046-1048, 1053, 1054)

Response: The Department agrees and has revised the GP-5 and GP-5A. Section A Condition 14(b) allows the Department to alter the frequency of the performance test requirement for reauthorization unless required by federal regulations.

Comment 406: The commentator states that Section N Condition 1(a)(ii) should be limited to those sources subject to federal performance testing and those units already required to test under the current GP-5. Expanding testing beyond those sources already covered would require performance testing for emission units with uncontrolled emissions just above de minimis levels. Vendor guarantees, similar source test results, etc. should be sufficient to document compliance with percent reduction requirements in these instances. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department has revised the 98% control efficiency requirement with a 95% control efficiency requirement in the final general permits to allow operators to use manufacturer-tested controls as per 40 CFR Part 60 Subparts OOOO and OOOOa.

Comment 407: The commentator states that a vapor recovery unit is not a device upon which a performance test can be performed. The unit does not destroy gas; it re-compresses gas into a pipeline. There is no stack to test and efficiency is 100% so long as the unit is operational. This requirement should be removed. Section N, Conditions 1(b)(i)(A) and 1(b)(ii) appear to require a performance test for vapor recovery units which seems to contradict what is stated in Section N, Condition 1(b)(i)(B) that allows an operator to forego a performance test in lieu of a control device design analysis. (1003)

Response: Section N Condition 1(b) refers to vapor recovery devices, which includes regenerative and non-regenerative carbon adsorption units and condensers. The performance testing requirements for these devices are consistent with federal requirements.

Comment 408: The commentator states that the PE certification of CVS requirement in Section N, Condition 1(f) appears to duplicate a federal requirement from OOOOa and is being applied to additional sources without proper justification. The commentator recommends that the PE certification requirement should be removed. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: Final GP-5 and GP-5A have been revised to incorporate the federal PE certification requirements by reference.

Pigging Operations

Comment 409: Several commentators state there is no analysis provided in the TSD for cost-effectiveness of control for pigging operations. Such operations are episodic and therefore different in nature than emissions from a process operation. The commentators state that pigging operations are critical to maintaining proper pipeline pressure, preventing corrosion, and inspecting and otherwise maintaining the integrity of the pipelines. The commentators ask what analysis the Department has done to determine whether the 98% control requirement for pigging operations is practical or attainable. (853, 867, 871, 928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department is aware that pigging operations are episodic events. The Department is also aware that the emissions from these episodic events can be substantial based on frequency and other operational factors (i.e., pressure, composition). There are techniques that can be employed that can reduce emissions and the Department requires that operators employ BMPs to reduce these emissions. Because the Department does not specify which techniques to employ, the operators may select the most cost-effective methods for each site.

The Department has revised the proposed 98% control requirement to a 95% control requirement in the final general permits, consistent with federal regulations. In addition, control is only required for pigging operations if the operator selects it as a BMP or the emissions from the pigging operations exceed the control thresholds after consideration of the BMP.

Comment 410: The commentator states that emissions from pigging operations should be monitored. (1026)

Response: The emissions from pigging operations would be difficult to monitor; the Department accepts engineering calculations based on gas pressure and composition, pigging chamber volume, and frequency of operations to estimate emissions.

Comment 411: The commentator believes clarification is required for situations where the pig launcher/receiver is owned and/or operated by a gathering company and not the owner/operator of the well site. For such situations, it is presumed that DEP would expect both entities to obtain general permits for their relevant operations, but that is not fully clear. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The owner and entity responsible for operating the station and complying with air regulations is responsible to obtain the general permit if applicable.

Comment 412: PA DEP should clarify that these requirements do not apply to existing pigging operations/equipment. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Requirements for pigging operations in GP-5A and Exemption 38(c) are applicable to new or modified sources and do not apply to existing pigging operations.

Comment 413: PA DEP should clarify that this section only applies to pigging facilities with a PTE above the 2.7 tpy VOC de minimis threshold. This includes allowing for physical or process changes such as high pressure to low pressure “jumpers” which result in lower emissions. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Pigging operations at well sites or remote locations are exempted from permitting if they meet Exemption 38(c) of the Exemptions List. Pigging operations at natural gas compressor stations, processing plants, or transmission stations are covered under GP-5.

Comment 414: The commentators recommend that the operators should be allowed to choose their own method for reducing liquids escaping from the barrel other than drain lines. The Department should make this condition simply to minimize liquids from the pig receiver without being prescriptive. Furthermore, pig receivers associated with a dry gas line drain or other similar device would not be necessary, as any fluid present would not be volatile natural gas liquids. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The Department has revised the condition to provide flexibility to the owner or operator in choosing BMPs to minimize the liquids present in the pig receiver chamber and to minimize emissions from the pig receiving chamber.

Comment 415: The commentator asks what does the DEP mean by “high pressure” pig launcher and receiver chamber in Section O, Condition 1(a)(ii)? Does this indicate that the DEP is excluding “low pressure” pig launchers and receiver chambers? How is “low pressure line or vessel” defined? (1055)

Response: The Department believes the words are self-explanatory and didn’t intend to define these words in terms of pressure (psi) in the launcher or receiver chambers, nor to exclude low pressure pig launchers and receivers.

Comment 416: The commentator states that Section O, Condition 1(b) as written, implies that all the listed practices should be utilized. Additionally, if there is a de minimis threshold, companies will voluntarily employ best management practices (BMP) to keep the PTE below the threshold without having a requirement. The Department has provided no explanation or justification as to how it determined what pigging practices constitute BMP. Design recommendations for pigging operations should not be included in a general permit. If emissions limits are met, the Department should not dictate what practices individual operators use. As an alternative, the introduction of a de minimis threshold would allow for operators to design facilities to meet the de minimis threshold without being held to a specific design type or requirement. The commentator suggests introducing a de minimis threshold below which design requirements would not be required for pigging operations, particularly for dry gas operations where pigging events are infrequent. This will give incentive to reduce emissions through ingenuity, perhaps with greater results than requiring the use of existing design options. This condition should be deleted from the general permit. (916, 928, 930, 936, 949, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054, 1056)

Response: In the final GP-5A and GP-5, the Department revised the condition to provide flexibility to the owner or operator in choosing BMPs to minimize the liquids present in the pig receiver chamber and to minimize emissions from pigging operations. The Department has provided the emissions thresholds, below which the owner or operator is not required to install a control for methane, VOC and HAP. The Department believes that the owner or operator must use a BMP to minimize the liquids present in the pig receiver chamber and to minimize emissions from pigging operations and therefore disagrees with the commentator's suggestion to remove the condition.

Comment 417: The commentator recommends that notifications should not be required for regularly occurring de minimis activities. Operators should maintain records showing that the equipment is de minimis, which will be available upon inspection. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054)

Response: The final GP-5 and GP-5A do not contain notification requirements for construction and operations of pig launchers and receivers.

Comment 418: The commentator supports the Department's decision to establish requirements for pigging operations. With data suggesting emissions from such sources are significant, it is critical for these sources to be subject to control and monitoring requirements. By adopting these requirements Pennsylvania will be on par with other leading states that require operators to meet the same standards. (1041)

Response: The Department appreciates the comment.

Comment 419: The commentator recommends that recordkeeping and reporting are the only obligations that should apply to pigging and remote pigging operations.

The proposed revisions to GP-5 would add requirements for pigging operations, including equipment, operational practices, and 98% control, if above defined thresholds. Similar requirements proposed in GP-5A would apply to remote pigging along transmission pipelines. DEP has also proposed requiring notification prior to each event. The company's review of their data indicates that vented volumes for transmission operations are not likely to exceed the tonnage thresholds that require controls. The proposed requirements add unwarranted burden and cost with minimal to no environmental benefit. The commentator believes that the proposed requirements for control or use of equipment or management practices are not supported in the record and should not be adopted. Furthermore, advanced notification is not warranted.

The Department should make clear that emissions from blowdowns related to remote pigging operations are NOT included within the emissions contributing to the emissions thresholds included in the definition of "Remote Pigging Station." The Department should make clear that its focus is pigging operations.

The commentator also recommends that methane should not be addressed in a new or revised general permit. (916, 930, 936, 1052)

Response: The final GP-5 and GP-5A do not contain notification requirements for construction and operations of pig launchers and receivers, but do contain recordkeeping and reporting requirements.

The Department's investigation shows that the manufacturer-tested models typically achieve greater than 95% control in practice. However, after considering comments received, the Department has revised the 98% control requirement for methane, VOC, and HAP to a 95% control requirement in the final general permits if the source exceeds the emission control thresholds.

New or modified sources are subject to applicable federal requirements as well as the Department's BAT requirements. The Department has provided details in the TSD for requiring 95% control for pigging operations exceeding methane, VOC and HAP thresholds.

All emissions including emissions from blowdowns related to remote pigging operations are required to be included in the emissions thresholds for methane, VOC and HAP that trigger the 95% control requirement.

The Department disagrees with the commentator that methane should not be addressed in a new or revised general permit. Methane is a regulated pollutant under CAA as well as APCA. The detailed rationale is included in the TSD.

Comment 420: Pigging operations are largely a midstream gathering and pipeline activity. Including pigging operations in a general permit for upstream well site development and productions is problematic. While the commentators support the development of a general permit for stand-alone pigging operations, the permitting of pigging operations should be included as part of the midstream focused GP-5 revisions or in a separate GP-5B. The commentator believes that the DEP has failed to explain why it has included pigging operation requirements in a permit directed at upstream well development. Midstream operations are separate and distinct from well operations and should be managed as such by DEP. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The pigging operation can be located at the wellsite, midstream and at remote locations. GP-5A addresses the pigging operation at wellsite and remote locations. GP-5 addresses the pigging operation at midstream gas compression and gas processing facilities. The requirements for pigging operations are identical in both GPs. Therefore, no separate GP is warranted for a pigging operation.

Comment 421: The commentator recommends that the provisions of any general permit for remote pigging operations incorporate by reference the relevant federal standards for operation. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: As recommended by the commentators, the federal requirements for pigging operation can not be incorporated by reference since there are no federal requirements.

Comment 422: The commentator believes that the proposed GP-5 should not require that existing sources comply with the new BAT requirements set forth in the final GP-5 (lack of "grandfathering" clause). The commentators also believe the use of condensers, thermal oxidizers and vapor recovery units to control pigging emissions above the stated de minimis level is technically infeasible and DEP provides no justification in the TSD for determining that the referenced BMPs constitute BAT for pigging operations. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: Any new source installed or modified after 1972 is considered as a new source and subject to BAT requirements. Add-on controls such as combustion devices are demonstrated to be effective in

controlling VOC and methane emissions. Emissions from pigging operations in Pennsylvania are currently being controlled by flares and BMPs.

Comment 423: If emissions are below these thresholds, the proposed definition indicates such pigging activities are exempt. The commentators agree that a permit should not be required for insignificant sources. However, Section O(1)(d) of proposed GP-5A mirrors the same section in the proposed GP-5 revisions, and indicates that for pigging operations with an uncontrolled methane emission rate of less than 200 tpy, a total uncontrolled VOC emission rate of less than 2.7 tpy, an uncontrolled single HAP emission rate of less than 0.5 tpy, and a total uncontrolled HAP emission rate of less than 1.0 tpy, the owner or operator shall demonstrate compliance by submitting the required notifications and reports and maintaining the required records. The commentator recommends that for pigging along pipelines, a permit should not be required if emissions from pigging operations are less than the thresholds in the definition of “remote pigging operations.” (930, 936, 1052)

Response: The final GP-5A and GP-5 do not contain notification requirements. If the facility meets Category No. 38 Exemption criteria, the facility is exempted from the permitting requirements. However, if the facility is required to have a permit for any other source category, the owner or operator may use GP-5A. If pigging operations are a source at the facility, the permittee must meet the criteria contained in the permit for pigging operations.

Comment 424: The commentators recommend that DEP clarify the definition of “pigging operations” in the final versions of GP-5 and GP-5A. The proposed definition could be interpreted to exclude pigging for integrity evaluation because the definition refers to “The process of removing and collecting condensed liquids... from a pipeline....” DEP should clarify the definition to indicate the type of pigging operations that are intended to be addressed. (930, 936, 1052)

Response: The Department has revised the definition of “pigging operation” in the final GP-5A and GP-5 to include pigging operations for integrity evaluation.

Comment 425: The commentators recommend that DEP revise the definition of “Remote Pigging Station” in GP-5A to clearly indicate that there are emissions thresholds associated with applicable pigging operations. The commentators suggest the following revised definition, “Remote Pigging Station – A facility where pigging operations are conducted that is not located at an unconventional natural gas well site, natural gas compressor station, natural gas processing plant, or natural gas transmission station and where emissions from pigging operations meet or exceed 200 tpy of methane, 2.7 tpy of VOC, 0.5 tpy of a single HAP, or 1.0 tpy of total HAP.” (930, 936, 1052)

Response: All emissions including blowdowns that are associated with pigging operations must be included to calculate emissions thresholds of 200 tpy of methane, 2.7 tpy of total VOC, 0.5 tpy of a single HAP, or 1.0 tpy of total HAP. No additional clarification is needed.

Natural Gas-Fired Combustion Units

Comment 426: The commentators recommend removing natural gas-fired combustion units rated less than 10 MMBtu/h and the associated notification, recordkeeping, and reporting requirements from the proposed general permits as they are exempt under the Air Quality Permit Exemptions list. (916, 919, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The final general permits reflect that natural gas-fired combustion units rated less than 10 MMBtu/h are exempt from permitting requirements.

Comment 427: The commentators state that natural gas-fired combustion units rated greater than or equal to 10 MMBtu/h are typically boilers at transmission stations or process heaters at processing plants. Requirements for these units should be detailed separately and simply incorporate the applicable federal regulations by reference. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The requirements for natural gas-fired combustion units greater than or equal to 10 MMBtu/h are detailed in Section L of the final GP-5 and, where possible, incorporate applicable federal regulations by reference.

Comment 428: The commentators state that the previous GP-5 did not require the installation of fuel meters. The proposed GP-5 should not require fuel meters either, instead calculating fuel use using process information. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054 1056)

Response: The current GP-1, which authorizes natural gas- and No. 2 oil-fired combustion units, requires fuel flow meters in Condition 16(a). However, the Department has removed the requirement to install a fuel meter in the final GP-5.

Comment 429: The commentators state that the tune-up requirements of Section C Condition 1(a)(i)(E) of the proposed GP-5, and its associated recordkeeping and reporting requirements, should be removed. At a minimum the requirement should be incorporated by reference or not be required for combustion units rated less than 10 MMBtu/h.

The commentators also note that visible emissions surveys and the associated recordkeeping and reporting should not be required for natural gas operations and natural gas-fired combustion units. If a gas-fired combustion unit exceeds the opacity requirements, it is typically a result of incomplete combustion which requires immediate adjustment or shutdown. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054)

Response: Based on the comments, the final general permits do not require an annual tune-up for combustion units. However, the final general permits require a tune-up to be performed within 180 days of re-authorization of the GPs.

The visible emission survey requirement has been removed from the final general permits. The Department approves the use of Method 22 for the monthly visible emissions inspections required under Section L Condition 1(b)(iv).

Comment 430: The commentators state that the references to fuel monitoring and testing requirements are taken from 40 CFR Part 63 Subpart JJJJJ, which specifically exempts gas-fired boilers in § 60.11195(e). Therefore, the commentators recommend removing these requirements associated with units greater than 10 MMBtu/h and less than 50 MMBtu/h and aligning them with those in the current GP-1. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The fuel monitoring requirements have been removed from the final GP-5.

Comment 431: The commentators recommend clarification that the emissions from integrated equipment mentioned in Section E Condition 1(b) are not required to be included in the uncontrolled emissions calculations for the associated natural gas-fired combustion unit. In order to avoid double counting emissions, the commentators recommend the language “Integrated equipment, such as controllers (Section L), pumps (Section M), and any fugitive emissions components (Section K) are subject to the requirements of their respective sections, and their emissions are not required to be included in the uncontrolled emissions calculations for the combustion units in this section.” (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The Department agrees and has revised the requirements in the final general permits.

Stationary Natural Gas-Fired Combustion Turbines

Comment 432: The commentators state that the Department fails to discuss the technical feasibility of the application of SCR technology in the TSD. The commentators are not aware of any permits issued in Pennsylvania where SCR was required due to a BAT evaluation, nor are they aware of units demonstrating compliance with the proposed emission limit of 1.50 ppm NO_x. (916, 928, 930, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: There are at least 10 projects with permitted multiple turbines where SCR was determined to be BAT. The turbines in question have a NO_x emission limit of 2 ppm and an ammonia slip limit of 5 ppmdv corrected to 15% O₂.

Comment 433: The commentators cited many points of disagreement with the Department’s BAT evaluation in the TSD. The most common point of disagreement is the costs, from underestimating capital and operational costs to differences in the cost per ton of NO_x reduced. Another point of disagreement is the fact that SCR is an incremental emission reduction over low NO_x combustion, which is the preferred approach. Yet another point of disagreement is the negative environmental and energy impacts from ammonia emissions and from the lifecycle impacts of the reagent and catalyst. The commentators recommend reversing the Department’s BAT determination. (930, 936, 1000, 1052)

Response: Using a general permit is not mandatory. If the commentator wishes to use lower loads or operation hours in the BAT determination, they may do so under a case-by-case plan approval. The restricted loads and hours of operation would then be memorialized into the operating permit as an enforceable limit.

The general permits do not have limiting conditions on load or hours of operation, and therefore require the BAT determination to be performed at the Department-assumed 100% load at 8,760 hours/year. The rationale in the TSD is valid; the quotes included the operational costs and assumed full operation. Some of the costs are variable based on load and hours of operation; however, the quotes did not take those variables into consideration. Also, because a general permit cannot be modified to incorporate load and hours limits, the cost effectiveness must be determined at maximum load and operating hours.

The Department is aware that ammonia is a PM_{2.5} precursor and can participate in atmospheric reactions with NO_x or SO_x to form ammonium nitrate or ammonium sulfate. Therefore, the Department established ammonia slip limits.

Comment 434: The commentators request that the Department confirm and document that 5 ppmvd corrected to 15% O₂ has been achieved for turbines at similar types of regulated facilities. If this level of control is confirmed to be technically feasible, the Department should account for the costs of the types of controls and monitoring required to meet this low emission rate. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: There are at least 10 projects with permitted multiple turbines where SCR was determined to be BAT. The turbines in question have a NO_x emission limit of 2 ppm and an ammonia slip limit of 5 ppmvd corrected to 15% O₂.

Comment 435: The commentators state that CO, NMNEHC, and PM_{2.5} limits for natural gas-fired combustion turbines and a review of the BAT analysis do not support the additional control of an oxidation catalyst. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: New sources are required to control the emission of air pollutants to the maximum extent, consistent with BAT as determined by the Department. BAT is defined in 25 Pa. Code § 121.1 as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The applicable emission limits of Federal NSPS and NESHAPS will serve as a baseline for determining the BAT.

The resources utilized in the determination of BAT include the BAT included in the plan approvals which are determined on a case-by-case basis, general permits, and other permits issued by other states, for similar sources. The Department also evaluated vendors' guaranteed emission limits, available stack test data, and stakeholders' submitted data for the applicable sources.

The emission limitations included in GP-5 must be technically and economically achievable. In addition, these emission limitations must be sustainable during the life of the unit. The Department has determined that the emission limitations in the final GP-5 constitute BAT.

Comment 436: The commentator recommends changing the CO reduction efficiency to 90% to match the common vendor warranty level. (1000)

Response: The existing GP-5 requires the CO reduction efficiency of 93% which is consistent with NESHAP Subpart ZZZZ requirement.

Comment 437: The commentators state the tables for turbines should state in the column headers for NMNEHC that they exclude formaldehyde as they do in the tables for RICE. (930, 936, 1052)

Response: The Department agrees. In the final GP-5, the Department has revised the NMNEHC limit, which excludes formaldehyde.

Comment 438: The commentator recommends denoting that the particulate matter emission standards are based on lb/MMBtu HHV (Higher Heating Value). (1000)

Response: Final GP-5 has been revised to include particulate matter emission standards based on lb/MMBtu HHV.

Comment 439: The commentator recommends that the emission standards of Condition 1(c)(i) be made identical to the emission standards of Condition 1(b)(i). (1000)

Response: Emission standards of Condition 1(b)(i) for turbines are for existing sources and the emission standards of Condition 1(c)(i) are for new sources.

New sources are required to control the emission of air pollutants to the maximum extent, consistent with BAT as determined by the Department at the issuance of the permit. BAT is defined in 25 Pa. Code § 121.1 as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The applicable emission limits of Federal NSPS and NESHAPS will serve as a baseline for determining the BAT.

The resources utilized in the determination of BAT include BAT included in the plan approvals which are determined on a case-by-case basis, general permits, and other permits issued by other states, for similar sources. The Department also evaluated vendors' guaranteed emission limits, available stack test data, and stakeholders' submitted data for the applicable sources.

The Department has determined that the emission limitations in the final GP-5 constitute BAT.

Comment 440: The commentators state that small turbines should not be precluded due to technically infeasible NO_x standards. The standard for 1,000 to 5,000 hp turbines should be reconsidered based on the turbine NSPS and analyses conducted for state RACT rules, both of which concluded that low NO_x combustion technology is not available for smaller turbines. Even without a low- NO_x combustor, the emissions from these units are relatively low (100 ppmv or less). The commentators recommend that the Department adopts a standard consistent with 40 CFR Subpart KKKK, which for natural gas-fired mechanical drive turbines with a firing rate of 50 MMBtu/h or less is 100 ppmv (at 15% O₂). (930, 936, 1052)

Response: The BAT for turbines $1,000 \leq \text{HP} < 5,000$ in the final general permits is 25 ppmv, which is the same as the previous version of GP-5. BAT for the previous version was determined based on the vendors' guarantee.

Comment 441: The commentators are concerned over the Department's dual BAT requirement for turbines greater than or equal to 15,900 hp. It appears the Department is setting an emission rate that is only achievable by one manufacturer and which is more aligned with lowest achievable emission rates (LAER) than BAT. The Department should confirm that there are an adequate number of manufacturers of equipment capable of achieving the proposed standard. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The Department disagrees. There is precedent in establishing BAT limitations specific to a source based on fuel, technology, or other factors. BAT is defined broadly in 25 Pa. Code § 121.1 as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The 9 ppm NO_x limit from an uncontrolled turbine is an option for the operator to avoid the installation of an SCR system and does not negatively impact the competitiveness of manufacturers. The 9 ppm NO_x limit as baseline emissions makes installation of an SCR system cost-ineffective.

Comment 442: The commentator recommends the NO_x emissions limit for turbines greater than 5,000 hp of no less than 15 ppm as this limit has been demonstrated to be achievable in practice in a cost-effective manner. (944)

Response: New sources are required to control the emission of air pollutants to the maximum extent, consistent with BAT as determined by the Department. BAT is defined in 25 Pa. Code § 121.1 as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The resources utilized in the determination of BAT include the BAT included in the plan approvals which are determined on a case-by-case basis, general permits, and other permits issued by other states, for similar sources. The Department also evaluated vendors' guaranteed emission limits, available stack test data, and stakeholders' submitted data for the applicable sources. The emission limitations included in GP-5 must be technically and economically achievable. In addition, these emission limitations must be sustainable during the life of the unit. The Department has determined that the emission limitations in the final GP-5 and GP-5A constitute BAT, and details of technical and economic feasibility can be found in the TSD.

The Department has established a NO_x limit of 15 ppm for turbines rated between 5,000 and 15,900 bhp. The Department has determined that SCR technology is technically and economically feasible for turbines rated above 15,900 bhp unless the uncontrolled NO_x emissions are 9 ppm.

Comment 443: The commentators recommend that the Department clarify that the emission standards do not apply during startup, shutdown, and at temperatures below 0 °F. (928, 930, 936, 952, 987, 1000, 1047, 1048, 1052-1054, 1056)

Response: While it is not outside the bounds of winter in Pennsylvania, temperatures at or below 0 °F are the exception, not the rule. However, the Department added the following language to the final GP-5: "Operate the turbine and air pollution control equipment consistent with good air pollution control practices during periods of low ambient air temperature (at or below 0 °F), during which time the emissions standards in (a) through (c) do not apply."

The language for startup and shutdown was proposed in Condition 1(d)(iv) and states "during which time the emissions standards in (a) through (c) do not apply."

Comment 444: The commentators request that the Department clarify Condition 1(d)(iv). As written, it could be interpreted that during startup or shutdown events, the emission standards apply after 30 minutes. Although it is not typical for most operations, startups or shutdowns may last more than 30 minutes. (930, 936, 1052)

Response: As the commentator mentioned, typically startup or shutdown does not exceed 30 minutes for most turbines; the conditions for emission limits are established for normal operations, not for the exceptional case.

Comment 445: The commentators state that the Department should more closely align the emission standards with the size categories and emission levels found in 40 CFR Part 60, Subpart KKKK. Any requirements beyond those federal requirements must be demonstrated by the Department to be BAT to

be preserved in the general permit. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1000, 1046-1048, 1053, 1054)

Response: New sources are required to control the emission of air pollutants to the maximum extent, consistent with BAT as determined by the Department. BAT is defined in 25 Pa. Code § 121.1 as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The applicable emission limits of Federal NSPS and NESHAPS will serve as a baseline for determining the BAT.

The resources utilized in the determination of BAT include the BAT included in the plan approvals which are determined on a case-by-case basis, general permits, and other permits issued by other states, for similar sources. The Department also evaluated vendors' guaranteed emission limits, available stack test data, and stakeholders' submitted data for the applicable sources.

The emission limitations included in GP-5 must be technically and economically achievable. In addition, these emission limitations must be sustainable during the life of the unit. The Department has determined that the emission limitations in the final GP-5 constitute BAT.

Comment 446: The commentators state that the proposed GP-5 uses the terms "authorized" and "constructed" to define applicable requirements for a turbine. It is possible to have an emission source authorized through receipt of a plan approval or general permit, but its actual construction could differ and result in overlapping authorization and construction dates. State source requirements should be based upon the permitted authorization date with the notable exception of where an NSPS or NESHAP takes precedence. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The Department used the construction date as the applicability requirement for turbines in Section M Condition 1 of the final GP-5.

Comment 447: The commentators state that the Department's Basis Document for Section F Conditions 1(a), 1(b), and 1(d)(iii) inappropriately cross references Section C for Natural Gas-Fired Combustion Units. The commentators believe this is an error, but asks the Department to clarify the following statement *"For each natural gas-fired combustion turbine constructed prior to February 2, 2013, the owner or operator shall abide by the terms and conditions of the applicable plan approval or operating permit under which they were authorized. [Section C Condition 1 Prologue – the rated capacity greater than or equal to 1,000 hp is based on the Air Quality Permit Exemptions list mentioned above. This was intended to cover the operation of turbines installed at a facility before they were an applicable source in GP-5.]"* (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: This is not an error but rather a reference to Section C of the previous version of GP-5. The prologue states *"The owner or operator of a new or reconstructed turbine with a rated capacity of equal to or greater than 1,000 bhp or 10.7 gigajoules per hour (10 MMBtu/h) based on the higher heating value of the fuel that commenced construction, modification, or reconstruction after February 18, 2005, shall comply with applicable requirements specified in 40 CFR Part 60, Subpart KKKK."*

Comment 448: The commentators state that turbines installed under a plan approval, but that will operate under a GP-5, must meet the BAT and emission requirements at the time of the original permitting. The commentators state that the Department is under no obligation to retain all the original

terms and conditions of the permit if others can provide equivalent guarantees of compliance. The commentators believe that the terms and conditions of the existing GP-5 can be considered equivalent and effectively replace those conditions while avoiding the confusion of additional requirements carried over from a previous permit. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: 25 Pa. Code Section 127.1 requires that BAT is determined by the Department at the issuance of a plan approval. BAT may not be relaxed under the general permit. If a short-term emission limit from a plan approval is more stringent than the limit in the general permit, the operator must abide by the limit from the plan approval as per Section A, Condition 10(e) of GPs.

Comment 449: The commentator states that the periodic monitoring requirement every 2,500 hours with a portable analyzer is excessive. As proposed, the GP-5 requires initial testing, testing at renewal (every 5 years), and portable analyzer testing every 2,500 hours. In addition, depending on the compliance demonstration method selected by the operator, Subpart KKKK could require testing annually or every other year. This is a lot of testing in conjunction with the onerous parameter monitoring plans proposed. (1000)

Response: The parameter monitoring plans included in the proposed GP-5 were from the federal subpart. They have been incorporated by reference in the final GP-5. The initial performance testing and portable gas analyzer testing are consistent with the previous version of GP-5.

Comment 450: The commentators state that the requirement to measure visible emissions using an opacity meter, Method 9, or some other Department-approved method is unnecessary for natural gas-fired turbines. The operability of the turbine eliminates the need to determine opacity because turbines do not operate with visible emissions without a high potential for catastrophic failure. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054)

Response: The final GP-5 does not include a specific frequency of visible emissions monitoring requirement for NG-fired turbines. If visible emissions monitoring is performed, it must be determined by the method described in 25 Pa. Code § 123.43.

Comment 451: The commentators state that the previous GP-5 did not require the installation of fuel meters; as written the requirement is retroactive and would result in high costs to the operators for no environmental benefit. The proposed GP-5 should not require fuel meters either, instead calculating fuel use using process information. (916, 928, 930, 936, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1052-1054, 1056)

Response: The requirement to install fuel flow meters has been removed.

Comment 452: The commentators recommend that the proposed GP-5 include an option to maintain the existing performance testing schedule upon reauthorization of the general permit if a performance test has been performed within 180 days of reauthorization. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The final GPs allow the frequency of performance testing for reauthorization to be altered based on available performance data from the source, unless required by federal regulation.

Comment 453: The commentators recommend removing the language “In addition, there is an annual performance test requirement for turbines that control NO_x using methods other than water or steam injection, although it may be waived if the owner or operator installs a continuous monitoring system as detailed in Condition 6(d) below.” The GP-5 reference to meet the requirements of 40 CFR Part 60 Subpart KKKK will ensure compliance, while also eliminating confusing language. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: This language remains in the final GP-5; however, the requirements for the continuous monitoring system that waive the annual performance test requirement are incorporated by reference.

Centrifugal Compressors

Comment 454: The commentators express concern that centrifugal compressors are not addressed in the proposed GP-5A. The concern is that operators that install centrifugal compressors at oil or natural gas well sites may not consider the facilities to be natural gas compressor stations and therefore assume that the provisions of the proposed GP-5 do not apply to them. Commentator (CATF) has shown that there are centrifugal compressors with wet seals located at production facilities in their comments to U.S. EPA on “Oil and Natural Gas Sector: Emission Standards for New and Modified Sources (Proposed NSPS Subpart OOOOa).” The commentators further state that the emissions from wet seal centrifugal compressors should be captured rather than combusted if technically feasible. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039, 1040, 1042)

Response: There are no centrifugal compressors installed at an unconventional natural gas well site in Pennsylvania and therefore centrifugal compressors are not an applicable source for GP-5A. However, if an operator of a well site wanted to install a centrifugal compressor at a well site, the operator may submit a plan approval application on a case-by-case basis.

The requirement in the final GP-5 is to comply with 40 CFR Part 60 Subpart OOOOa, which requires the owner or operator to control methane and VOC emissions by capturing and routing the emissions, using a cover and closed vent system to a control device that achieves an emission reduction of 95% or routing the emissions to a process. The owner or operator may select any control technique to comply with the 95% control requirements for methane, VOC and HAPs.

Comment 455: The commentators state that CRSD Standard 14.3 prohibits the use of wet oil seals on new centrifugal compressors and requires that wet oil seals on centrifugal compressors be replaced with dry seals as they wear out.

In the TSD the Department “maintains that the use of a dry seal system is BAT.” However, Section H of GP-5 allows the use of wet seals in new centrifugal compressors and does not require that such seals on existing centrifugal compressors be replaced with dry seals as they wear out. The TSD states, and CRSD Standard 14.3 suggests, that prohibiting the use of wet seals on new centrifugal compressors and phasing out their use on existing centrifugal compressors are an available means of minimizing the emissions of air pollutants from centrifugal compressors, and the Department should revise Section H of GP-5 accordingly. (15, 37, 58, 73, 80, 81, 87, 88, 105, 154, 313, 341, 364, 381, 382, 416, 437, 438, 597, 632, 690, 716, 734, 758, 784, 785, 826, 840, 843, 1004-1006, 1010, 1012, 1013, 1021, 1024, 1025, 1027, 1033-1037, 1040)

Response: The commentators misunderstood the statement in the TSD that the Department “maintains that the use of a dry seal system is BAT.” The statement does not preclude the use of wet seals, nor does it imply that existing sources must update to dry seals. The statement simply states that dry seals on centrifugal compressors are BAT and therefore no further requirements apply. The use of wet seals is not prohibited; an operator may use this option if they meet the BAT requirements set forth in the TSD and the general permit.

Comment 456: The commentator states that Section H of the proposed GP-5 allows two approaches to reduce emissions: the first requires a wet seal compressor to equip the seal degassing system with a cover and route emissions through a closed vent system to a control device to reduce VOC by 95%; the second is to use a dry seal compressor. Both wet seal and dry seal compressors were required to also demonstrate compliance through the notification, recordkeeping, and reporting requirements.

The commentator recommends offering a third approach – incentivizing the retrofitting of wet seals with dry seals. While the switch is not technically feasible in every circumstance, in many it is technically, environmentally, and economically feasible. In addition, dry gas compressor seals are installed with a control system that monitors the performance, health, and emissions of the shaft seal and integrated with the facilities’ digital monitoring system.

The commentator has a *Life Cycle Cost Calculator* tool for centrifugal compressors to analyze the merits of the options available. It accounts for the annual operating costs including maintenance costs, value of the leaked gas, consumables, the energy consumption costs, and the cost of lost production resulting from seal failure. The tool calculates the payback period, the present value of the annual operating costs over the remaining lifespan, and the total life cycle cost, accounting for one-time costs such as retrofit costs. The *Calculator* can also be tailored to local conditions and for individual cases and thus help confirm the economic and environmental value propositions between re-routing the gas, flaring, or retrofitting with dry seal technology. (1043)

Response: The Department encourages the use of new tools such as the *Life Cycle Cost Calculator* to promote air pollution control technologies. The commentator may contact operators of centrifugal compressors and discuss the benefits of the *Calculator* and the merits of dry seals over wet seals.

Comment 457: The commentators state that a BAT analysis should be conducted for each type of emission source; an analysis for centrifugal compressors is absent. While the TSD does provide a general BAT analysis for an enclosed flare and implies that any centrifugal compressor can be controlled in such a manner, it provides no discussion for the removal of the option to route to a vapor recovery unit or back to the processor. (916, 928, 952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054)

Response: The requirement in the final GP-5 is to comply with 40 CFR Part 60 Subpart OOOOa, which requires the owner or operator to control methane and VOC emissions by capturing and routing the emissions, using a cover and closed vent system to a control device that achieves an emission reduction of 95% or routing the emissions to a process. Since the Department has considered federal requirements for requiring 95% reduction as BAT for centrifugal compressors, no additional BAT evaluation was performed.

Comment 458: The commentators state that Section H of the proposed GP-5 does indicate that the emission source for centrifugal compressors is the wet seal degassing vent emissions. (930, 936, 1052)

Response: The requirements of Section N of the final GP-5 (Section H of the proposed GP-5) were incorporated by reference.

Comment 459: The commentators state that the control requirements for centrifugal compressors in Section H of the proposed GP-5 mirror the requirements of 40 CFR Part 60 Subparts OOOO and OOOOa. The commentator pointed out there is no option in the proposed GP-5 to route the closed vent system from affected sources wet seal system to a process as allowed by 40 CFR § 60.5380(a)(2) and § 60.5380a(a)(2) and the control requirement is for 98% instead of 95% as in 40 CFR § 60.5380(a)(1) and § 60.5380a(a)(1). (916, 928, 930,952, 961, 972, 981, 987, 991, 999, 1046-1048, 1053, 1054, 1056)

Response: The requirements of Section N of the final GP-5 (Section H of the proposed GP-5) were incorporated by reference.

Comment 460: The commentators state that Section H Condition 1(a) of the proposed GP-5 refers to Section N Condition 1(f) which requires a professional engineer certify the adequacy of the closed vent system for compressors that were not previously subject to these requirements under 40 CFR Part 60 Subpart OOOO. The Department has not justified this retroactive requirement which would have significant cost and burden for limited or no environmental benefit. Therefore, the commentators recommend the federal requirements be incorporated by reference. (928, 930, 952, 987, 1047, 1048, 1053, 1054, 1056)

Response: The requirements of Section N of the final GP-5 were incorporated by reference.

Wellbore Liquids Unloading Operations

Comment 461: The commentators support the Department's decision to establish requirements for wellbore liquids unloading operations. With data suggesting emissions from such sources are significant, it is critical for these sources to be subject to control and monitoring requirements. By adopting these requirements Pennsylvania will be on par with other leading states that require operators to meet the same standards. In addition, requiring personnel to remain onsite during any manual venting episode significantly reduces emissions from unloading operations according to regulators in Colorado and Wyoming, who have imposed similar requirements in recent years. (1004, 1008, 1009, 1018, 1021, 1023, 1027, 1030, 1031, 1033, 1034, 1037, 1039-1042)

Response: The Department has removed the requirement in the final general permits that an operator remain onsite during a manual unloading operation based on comments received.

Comment 462: The commentator recommends that emissions from wellbore liquids unloading should be monitored. (1026)

Response: The emissions from wellbore liquids unloading would be difficult to monitor. The Department accepts engineering calculations based on gas pressure and composition, wellbore volume, and frequency of operations to estimate emissions.

Comment 463: The commentator recommends that the requirement to maintain a daily log in Section P Condition 3 of the proposed GP-5A be removed. (991)

Response: The requirement to maintain a daily log has been removed from Section L Condition 2 of the final GP-5A.

Claims of Impacts on Natural Gas Industry from Permits

Comment 464: The commentators state that it is difficult to keep up with state and federal regulatory requirements, and adding the proposed GP-5A and the corresponding regulatory, financial, and administrative burden will severely impact the industry. Even though Pennsylvania has the Marcellus and Utica shale formations which have proven to be very productive, it is difficult for the industry to survive with low commodity prices. The GP-5A will likely significantly impair the competitiveness of the Commonwealth discouraging capital investment and putting jobs at risk. (227, 302, 853, 867, 871, 877, 900, 905, 906, 908, 912, 915, 916, 924, 927-930, 937, 939, 943, 947, 950, 952, 957, 958, 961, 962, 964, 972, 974, 977, 978, 981, 985, 987, 988, 990, 991, 999, 1046-1048, 1051, 1053, 1054, 1056)

Response: The final general permits are based on existing regulatory requirements and state BAT determinations. BAT determinations consider cost effectiveness evaluations, which are documented in the TSD. General permits are a mechanism to assist industry in meeting these regulatory requirements by creating a permit with standardized conditions and BAT determinations. Individual permits are still an option, but require a case-by-case evaluation of technologies and emissions. The Department has completed this step in the general permits to help industry comply with federal and state regulations.

Comment 465: The commentators state that due to many factors, Pennsylvania's Marcellus play is less expensive to develop and more productive than any other shale gas regions in the US. It is not, as the operators claim, the expense of regulation that has impeded shale resource development in the Commonwealth, but rather low gas prices due to a lack of infrastructure to move the gas to market. As the pipeline infrastructure is built out and LNG export facilities come on line, the Marcellus hub gas prices are expected to converge with the Henry Hub price. However, it is Pennsylvania's lack of adequate regulations and permit requirements that have led to other states, including New York and Maryland, to prevent development of their own shale gas resources. (1019)

Response: The Department has invested substantial energy and resources in responding to production of natural gas from the Marcellus Shale to protect human health and the environment to allow the responsible development of the resource. Many other states and the federal government use regulations and guidance developed by the Department to guide them in creating their own rules and regulations.

Comment 466: The commentators state that due to the nature of natural gas production operations, delays associated with the issuance of a single permit can impact an operator's entire operation within the Commonwealth. This can discourage the short-term development in the Marcellus region, cost jobs, and potentially cause some operators to go out of business. (483, 910, 917, 920, 922, 940, 941, 946, 953, 956, 967, 989, 997, 998, 1002, 1003)

Response: Temporary activities at well sites were removed from the final GP-5A and are now covered under Exemption 38. This provides the flexibility to meet the variable nature of the installation of production equipment (well sites) while maintaining conditions that protect human health and the environment.

Comment 467: The commentators ask whether the Department conducted an economic impact analysis for the proposed general permits and whether the Department considered the additional cost of

compliance for operators, contractors, and subcontractors to comply with the terms and conditions of the proposed general permits. (803, 853, 867, 871, 934, 935)

Response: The Department did conduct the cost analysis required in Pennsylvania law and regulations for the issuance of a general plan approval and operating permit. This includes the cost-effectiveness analyses conducted by the Department for state BAT determinations needed to develop the standardized permit conditions. These analyses are included in the TSD. Where the general permits directly reference federal regulatory requirements (e.g. NSPS), the Department relied on federal cost evaluations.

Comment 468: The proposed GP-5A is more stringent, more onerous, or inconsistent with the federal regulations found at 40 C.F.R. Part 60, Subpart OOOOa (“Subpart OOOOa”). The DEP has failed to justify the increased stringency or inconsistencies and has not provided an adequate BAT analysis. The excessive reporting and recordkeeping requirements in the proposed GP-5A are “death by a thousand lashes” – especially if ever required of conventional operations. In many cases, other offices/bureaus within the DEP currently receive the notifications or records that would be required by the proposed GP-5A. DEP is circumventing the Regulatory Review Act and other administrative law principles and regulating the industry through the proposed GP-5A. (1055)

Response: In addition to compliance requirements for applicable federal requirements, 25 Pa. Code Chapter 127 requires that all new sources control the emissions to the maximum extent, consistent with BAT as determined by the Department at the time of issuance of Plan Approval. BAT is an evolving standard and is defined as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The GP-5A and revised GP-5 also establish BAT technology requirements for all new or modified sources at the natural gas well sites. The TSD contains the analyses and documentation of the Department’s BAT determinations, which meets the regulations for establishing general permit terms and conditions.

Conventional wells are exempted from permitting requirements under GP-5 and GP-5A.

Certain recordkeeping and reporting requirements for sources at unconventional natural gas production sites and remote pigging stations have been revised in the final general permits in response to comments received.

The Department has addressed the comments concerning the regulatory process in other responses in this document.

Claims that Permits Are Necessary to Stakeholder Interests

Comment 469: The commentators state that the proposed general permits are a great step forward to significant control of Pennsylvania’s GHG emissions and other pollutants and to protecting the public health and the environment. (2686, 2602, 2942, 3098, 3213, 584, 3695, 3893, 3364, 384, 431, 4108, 4482, 4602, 7881, 10, 9, 56, 93, 232, 233, 282, 328, 345, 350, 361, 443, 482, 490, 555, 1029, 570, 678, 684, 686, 729, 764, 814, 841, 246, 626, 311, 355, 375, 26, 353, 733, 368, 170, 420, 3-5, 8, 13, 14, 17, 18, 21, 22, 25, 29, 30, 32-34, 36, 39, 42, 43, 46, 49, 51, 52, 54, 55, 57, 59, 61, 63, 69, 75, 77, 78, 89, 91, 94-98, 102, 106, 107, 112, 116, 118, 123-125, 127, 130-133, 135, 136, 138, 139, 141, 143-145, 147, 148, 153, 160, 161, 163, 164, 166, 167, 169, 178, 182, 186, 187, 190, 191, 194, 198, 202, 203, 211, 212, 216, 219, 222, 223, 225, 231, 236, 238-241, 243, 244, 250, 254, 255, 257, 262, 264, 265, 270-273, 275,

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Response: The Department appreciates the comment.

Comment 470: The commentators state that managing methane emissions in a cost-effective, technically feasible manner benefit the citizens, industries, and environment of Pennsylvania. Reasonable requirements in permits or regulations serve to protect the environment, improve the public health, and create jobs. (876, 878-899, 875, 950, 675, 945, 1050, 410, 707, 516, 1834, 3068, 3171, 3591, 317, 3415, 4015, 357, 23, 970, 302,4-6, 11, 12, 17, 18, 21, 24, 25, 28, 30, 32-36, 38, 42-47, 51, 55, 60, 61, 65, 67, 69-71, 74, 77-79, 82, 83, 89, 90, 92, 95-99, 101-103, 106-108, 111-113, 117, 118, 121-125, 128-131, 133, 134, 136, 138, 140142, 144, 145, 147, 153, 156-159, 161-164, 167-169, 172, 174-176, 178-183, 185-194, 197-200, 204, 205, 207-209, 213, 215, 218, 219, 221-225, 228, 229, 235-237, 239-244, 247, 251, 254, 256-258, 261, 263, 264, 266, 268-273, 275, 277-280, 285, 287, 288, 291, 292, 295-297, 304, 308, 309, 315-321, 324, 326-331, 333-335, 337, 338, 342-344, 348, 349, 351, 352, 358, 362, 363, 365-367, 370-372, 374, 375, 380, 384, 386, 389, 390, 393-395, 398, 399, 401-404, 406, 409, 411, 413-415, 417-419, 421, 423, 427436, 439-442, 444-446, 449-456, 461-463, 465, 467, 469, 470, 474, 475, 477, 480, 481, 484-487, 492, 494-496, 498, 500-502, 504-508, 510, 512-515, 517, 519-521, 523-533, 536, 537, 540-542, 544, 546, 547, 550, 552, 554, 557-559, 561-563, 565, 567, 569, 571-574, 576, 579, 580, 582, 583, 585, 588-591, 593, 594, 601-603, 606, 607, 609-613, 617, 618, 620, 623, 624, 627-631, 633, 636, 637, 639, 642-648, 652-656, 658, 660, 661, 665, 667, 669-671, 673, 674, 680, 681, 683, 685, 687-689, 693-699, 701, 703, 704, 706, 708, 710-713, 717-722, 724-728, 730-732, 735-737, 740, 741, 743, 744, 749, 752, 754-756, 761, 762, 765, 766, 768-770, 773, 776, 779-783, 786, 788-790, 792-795, 797, 798, 802, 806-809, 815, 822, 824, 825, 827, 829, 831-839, 842, 846-848, 850, 3333-4628)

Response: The Department appreciates the comment.

Comment 471: The commentators state that natural gas is a valuable resource, even at low commodity prices. Any excess emissions are wasteful and represent lost revenue; therefore, reducing emissions is a worthy goal. (876, 878-899, 943, 875, 1021, 1037, 1450, 910, 946, 967, 3333, 3382, 3524, 147, 3568, 3577, 3622, 3626, 3681, 3684, 3709, 3789, 3817, 3835, 3852, 330, 3906, 102, 3476, 3969, 3991, 4133, 517, 4224, 583, 633, 4352, 4385, 4388, 4602, 146, 306, 491, 684, 764, 1028,1019, 905, 963, 929, 957, 4-6, 11, 12, 17, 18, 21, 24, 25, 28, 30, 32-36, 38, 42-47, 51, 55, 60, 61, 65, 67, 69-71, 74, 77-79, 82, 83, 89, 90, 92, 95-99, 101-103, 106-108, 111-113, 117, 118, 121-125, 128-131, 133, 134, 136, 138, 140142, 144, 145, 147, 153, 156-159, 161-164, 167-169, 172, 174-176, 178-183, 185-194, 197-200, 204, 205, 207-209, 213, 215, 218, 219, 221-225, 228, 229, 235-237, 239-244, 247, 251, 254, 256-258, 261, 263, 264, 266, 268-273, 275, 277-280, 285, 287, 288, 291, 292, 295-297, 304, 308, 309, 315-321, 324, 326-331, 333-335, 337, 338, 342-344, 348, 349, 351, 352, 358, 362, 363, 365-367, 370-372, 374, 375, 380, 384, 386, 389, 390, 393-395, 398, 399, 401-404, 406, 409, 411, 413-415, 417-419, 421, 423, 427436, 439-442, 444-446, 449-456, 461-463, 465, 467, 469, 470, 474, 475, 477, 480, 481, 484-487,

492, 494-496, 498, 500-502, 504-508, 510, 512-515, 517, 519-521, 523-533, 536, 537, 540-542, 544, 546, 547, 550, 552, 554, 557-559, 561-563, 565, 567, 569, 571-574, 576, 579, 580, 582, 583, 585, 588-591, 593, 594, 601-603, 606, 607, 609-613, 617, 618, 620, 623, 624, 627-631, 633, 636, 637, 639, 642-648, 652-656, 658, 660, 661, 665, 667, 669-671, 673, 674, 680, 681, 683, 685, 687-689, 693-699, 701, 703, 704, 706, 708, 710-713, 717-722, 724-728, 730-732, 735-737, 740, 741, 743, 744, 749, 752, 754-756, 761, 762, 765, 766, 768-770, 773, 776, 779-783, 786, 788-790, 792-795, 797, 798, 802, 806-809, 815, 822, 824, 825, 827, 829, 831-839, 842, 846-848, 850, 3333-4628, 3-5, 13, 14, 17, 18, 21, 22, 29, 30, 36, 39, 46, 52, 55, 57, 61, 63, 69, 77, 89, 95, 96, 106, 118, 123-125, 130-133, 135, 136, 138, 139, 141, 143-145, 147, 148, 160, 161, 163, 164, 167, 169, 182, 186, 187, 194, 198, 203, 211, 212, 216, 222, 223, 231, 236, 238, 241, 244, 250, 254, 257, 262, 264, 265, 271, 273, 275, 283, 285, 287, 293-295, 297-300, 303, 304, 309, 312, 314, 318, 320, 324, 326, 331, 338, 349, 354, 356, 360, 362, 363, 366, 370, 371, 374, 389, 396, 401, 402, 404, 408, 411-413, 417, 419, 429, 433, 442, 449, 452, 453, 463, 465, 468, 469, 480, 484, 486, 494, 498, 499, 501, 502, 505, 507, 511, 514, 517, 520, 524, 525, 529, 530, 533, 534, 538, 539, 542, 546, 552, 554, 561, 571, 574, 575, 577, 585, 586, 591, 594, 595, 599, 602, 609, 610, 616, 622, 628, 629, 631, 635-637, 639, 641, 643, 645, 653, 654, 660, 662-665, 668, 671, 674, 679, 681-683, 685, 691, 692, 694, 695, 697, 698, 704, 705, 708, 710, 712, 719, 721, 722, 727, 732, 739-742, 744, 745, 747, 752-754, 759, 766, 767, 770, 771, 774, 776, 781, 783, 786, 789-793, 795, 797, 802, 809, 811, 816, 817, 820, 824, 825, 827, 830, 834, 838, 842, 847, 848, 850, 4629-5105)

Response: The Department appreciates the comment. The Governor's methane strategy goal of preventing waste of a valuable resource was a consideration during development of general permit terms and conditions, including LDAR requirements for new and modified facilities.

Claims of Benefits From The Oil and Gas Industry

Comment 472: The commentator is concerned about the effect the proposed Exemption 38 and proposed general permits would have on natural gas production and prices and the subsequent hardship on the overwhelming number of people that use natural gas for cooking, hot water, and heating their homes. (957)

Response: The Department anticipates that the revisions made to the proposed Exemption 38 and proposed general permits will not have an impact in the manner addressed in the comment. The general permit is designed to create standardized terms and conditions for various natural gas production, processing and transmission operations. The use of the general permit streamlines the permitting process, which creates efficiencies for both the Department and industry, resulting in cost savings. The general permits include existing regulatory requirements that the industry has to comply with currently.

Comment 473: The commentator states that Pennsylvania's high-quality hardwoods and low energy costs due to the unconventional oil and gas industry has led to Pennsylvania being considered as a possible location to build a factory which would employ 400 people. The commentator is concerned that the proposed general permits could increase energy prices and threaten the viability of the factory being constructed in Pennsylvania. (945)

Response: See response to Comment 468. General permits are a mechanism to streamline the permitting process which saves time and money. The permits include terms and conditions that are based on existing regulations.

Comment 474: The commentator states that the Penn Central Railroad was given a \$500,000 grant as a partial payment to purchase the spur line from Wellsboro to Gang Mills, NY. This was to be the lifeline for the Corning Glass plant and the Borden's Milk plant in Wellsboro. Unfortunately, both plants have been closed; however, the Wellsboro & Corning Railroad's main customer is now HiCrush's sand facility which supplies sand to the natural gas industry in the northcentral region of Pennsylvania. (921)

Response: The Department appreciates the comment.

Comment 475: The commentators state that unconventional oil and gas development has been positive to the Commonwealth. Municipalities have received impact fees, citizens have become more financially secure through leasing or employment opportunities, the service industries have seen brisk business, and gas companies have donated time and capital to their local communities. (920, 931, 954, 958)

Response: The Department appreciates the comment.

Comments Concerning a Moratorium on the Natural Gas Industry

Comment 476: The commentators state that the proposed GP-5A will result in a "moratorium by permit" on much of the industry because they will not have GP-5A's for their current operations. Those operators in the middle of pad construction, drilling, completion, and production activities when the permit becomes effective will likely suffer millions of dollars in standby fees, firm transportation costs, lost production, and possible lawsuits due to broken contracts. This economic cost will result in no appreciable benefit to the public health or the environment. (934, 920, 943, 939, 950, 994, 908, 978, 942, 992, 958, 935, 1050, 995, 973, 941, 910, 946, 967, 917, 922, 941, 953, 956, 989, 997, 998, 302, 383, 715, 904, 970, 929, 957, 931)

Response: See the response to comments 468 and 469. The general permits are a way to streamline the permitting process, saving time and money. The permits include terms and conditions based on existing regulations that the industry needs to comply with currently. Permits provide a consistent mechanism in understanding how to document and comply with regulatory requirements.

Comment 477: The commentators demand strong environmental standards or a moratorium on the oil and gas industry in order to protect the public health and the environment. (82, 705, 1099, 119, 228, 1316, 245, 1336, 1378, 1390, 1408, 1427, 1450, 1490, 543, 1693, 677, 786, 1780, 1783, 1833, 2954, 2990, 2992, 3201, 3252, 3434, 3509, 321, 367, 450, 4095, 4137, 552, 4218, 4255, 4308, 4416, 769, 93, 109, 171, 173, 177, 201, 206, 226, 232, 233, 259, 260, 282, 284, 290, 340, 388, 392, 426, 359, 252, 503, 116, 443, 471, 476, 482, 491, 493, 535, 545, 560, 570, 592, 605, 666, 746, 751, 772, 777, 800, 801, 391, 137, 1038, 8, 16, 25, 32-34, 42, 43, 47, 49-51, 54, 59, 64, 66, 75, 76, 78, 84, 91, 94, 97, 98, 100, 102, 107, 112, 114, 116, 120, 127, 132, 149, 153, 155, 166, 178, 190, 191, 202, 219, 225, 239, 240, 243, 248, 255, 256, 270, 272, 273, 281, 286, 288, 303, 307, 309, 325, 332, 336, 348, 351, 357, 365, 376, 391, 393, 401, 415, 418, 431, 440, 444, 446, 447, 454, 458-460, 479, 487, 489, 496, 500, 516, 518, 522, 526, 543, 564, 569, 578, 581, 584, 600, 606, 614, 615, 619, 621, 638, 644, 651, 670, 672-674, 676, 689, 706, 711, 720, 723, 730, 731, 742, 745, 748, 757, 760, 763, 775, 780, 796, 806, 822, 823, 828, 832, 844, 845, 851, 852, 2336-3332, 8754-9357, 7, 11, 12, 14, 20, 25, 29, 35, 40, 48, 51, 53, 59, 60, 70-72, 84, 86, 89, 92, 93, 99, 101-104, 107, 108, 111, 117, 119, 121, 126, 127, 134, 135, 139, 140, 142, 152, 155, 156, 166, 168, 175, 176, 179, 180, 184, 185, 187, 189, 193-196, 202, 203, 207, 208, 211, 212, 214, 216, 218, 224, 228, 234, 237, 241, 244, 245, 251, 253, 257, 264, 265, 267, 274-276, 278, 283, 289, 292, 297, 300, 305, 309, 312, 315-317, 319, 321, 322, 325, 329, 339, 343, 344, 347, 348, 351, 357, 358, 369, 372, 373, 376,

380, 385-387, 394, 398, 404, 405, 409, 414, 421, 425, 429, 445, 448, 450, 458, 459, 462, 464, 466, 468, 478, 481, 495, 497, 504, 507, 509, 510, 515, 516, 521, 523, 527, 528, 532, 538, 539, 543, 544, 547, 549, 553, 554, 556-559, 566, 567, 572, 573, 575, 577-580, 583, 586, 588, 590, 599, 604, 608, 616, 619, 627, 634, 635, 638, 643, 646, 647, 653, 657, 659, 671, 677, 679, 689, 691-693, 700, 702, 703, 714, 719, 723, 726, 738, 744, 745, 747, 750, 755, 756, 759, 760, 762, 763, 765, 768, 773, 775, 780, 786-788, 793, 794, 799, 813, 815, 816, 821, 829833, 836, 837, 845, 846, 849, 850, 5106-8683)

Response: The scope of the general permits and conditional permit exemptions is to ensure air emissions from the operations of the oil and gas industry comply with state and federal laws and regulations. Therefore, a moratorium is outside the scope of this permitting action. Both finalized general permits provide requirements for new sources to control the emission of air pollutants to the maximum extent, consistent with federal regulations and BAT as determined by the Department. BAT is equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available.

General Effects of Emissions from the Natural Gas Industry

Comment 478: The commentator states that the restrictive nature of the proposed GP-5A would result in rising natural gas costs, which would make coal more economical, and reverse the current trend of air quality improvement due to the increased use of natural gas in energy generation. (945)

Response: The Department does not believe that the current trend of air quality improvement, due to the use of natural gas in energy generation, will reverse due to the use of general permits. GP-5A includes terms and conditions based on federal and state regulations that currently exist for new or modified sources, and based on standardized BAT determinations. This will streamline the permitting process, saving time and money for industry and the Department.

Comment 479: The commentator states that the implementation of the proposed general permits will have no global environmental, health or safety benefits, since the same production of oil and gas will be replaced by production in other states within the US that do not impose unnecessary limitations such as those proposed in the GP-5 and 5A permits. Worse yet, there is a high likelihood that production will be replaced with foreign sources which means the proposed general permits equate to exporting pollution. The exportation of pollution violates a basic tenant of the PA DEP because it does not result in a net global reduction in emissions. (910, 946, 967, 1051)

Response: The Department disagrees. The requirements in the final general permits are based on existing state and federal regulatory requirements that are very similar and consistently applied throughout the nation.

Comment 480: The commentators state that unconventional natural gas operators are capturing almost 99.9% of methane from a well. In fact, the Department's own data demonstrates that methane emissions have declined despite a nearly ten-fold increase in production since 2009. The proposed general permits will increase the industries' costs with little to no environmental benefit. (994, 903, 945, 935, 910, 946, 967, 900, 906, 912, 915, 927, 947, 962, 977, 985, 988, 302, 950, 227, 974, 483, 905, 963, 970, 976, 990)

Response: Despite the claim that operators are capturing 99.9% of methane from unconventional natural gas wells, the 2015 Air Emissions Inventory Report shows that methane emissions from 2012 through

2015 increased from 107,735 tons to 122,589 tons. In accordance with Governor Wolf's Methane Reduction Strategy, the Department developed GP-5A and revised the GP-5 to incorporate new federal regulations and implement the state BAT requirement.

Comment 481: The commentators state that conventional and unconventional natural gas drilling have significant methane emissions associated with the production, processing, transmission, and distribution of natural gas. These methane emissions, and their associated VOC and HAP emissions, endanger the public health and the environment and contribute to climate disruption. These emissions, both accidental and deliberate, should be stopped as soon as possible. (568, 1020, 1011, 1015, 1022, 1028, 1786, 1388, 3474, 263, 329, 3536, 3453, 406, 4187, 4422, 761, 500, 9209, 9265, 328, 346, 777, 810, 812, 1038, 1019, Postcard Comments on GP-5/5A)

Response: The Department appreciates the comment. The final Exemption 38 and general permits apply prospectively to incorporate new federal standards and updated state BAT determinations. Controls installed through prior versions of the conditional permit exemption and GP-5 still apply to those sources. The Department is required to develop regulations to implement CTG for existing sources. The rulemaking for existing sources will be proposed for public comment prior to its promulgation.

Comment 482: The commentators ask, in light of the Department's reference to climate change as the primary driver behind its methane reduction strategy, what tangible benefits the citizens of Pennsylvania will realize due to the imposition of the permit conditions and what analysis the benefits will be based on. (853, 867, 871)

Response: The applicability of the GP-5A is for new or modified sources. Currently there are no requirements for methane for existing sources. However, methane is reduced through the installation of controls applied to existing sources for other air pollutants (e.g. VOC, NO_x). Sources emitting more than 200 tpy methane will be required to control methane emissions by a minimum of 95%.

Comment 483: The commentators state that methane is a GHG approximately 25 times more powerful than carbon dioxide (CO₂) over a 100-year timeframe and approximately 86 times more powerful than CO₂ over a 20-year timeframe. The commentators caution that even though natural gas is far superior to coal as a fuel, with associated emissions benefits, comprehensive and common-sense rules are needed to address both new and existing methane sources. Scientists estimate that methane is responsible for approximately one quarter of anthropogenic climate change and the commentators state if swift action is not taken Pennsylvania can expect increases in torrential precipitation, higher nighttime temperatures, growing refugee populations, and higher and more volatile food prices. (876, 878-899, 875, 1041, 1007, 1011, 1015, 1022, 1028, 1014, 19, 1026, 675, 128, 3584, 4593, 306, 328, 592, 769)

Response: The Department appreciates the comment. The final permits comprehensively address methane and other air pollutant emissions from oil and gas industry.

Comment 484: The commentators state that it would be unconscionable to not adopt strong standards to help Pennsylvania reduce methane, VOC, HAP, and NO_x emissions; especially considering that methane emissions have increased 28% from 2014 to 2015 which is more than double the 12% increase in production. Much of the emissions come from wasteful leaks, flaring, and venting. The commentators support the cost-effective technologies that can cut emissions from these sources in the proposed general permits and recommend adopting them for existing sources as well. (1041, 1011, 1015, 1022, 1028, 1021, 1037, 1017, 1750, 10, 9, 290, 1019)

Response: The Department appreciates the comment. The final permits comprehensively address methane and other air pollutant emissions from oil and gas industry.

Comment 485: The commentators urge the Department to adopt the strongest general permits possible to reduce leaks of methane and VOC at unconventional natural gas well sites. As the nation's second largest producer of natural gas, Pennsylvania is accountable for approximately 1% of global GHG emissions and has a responsibility to act swiftly to reduce the emission of harmful air pollutants that leak throughout the natural gas supply chain. The general permits use the state's authority to meet its individual methane reduction goals while conserving staff time and resources and allowing operators to obtain authorization in a timely yet properly vetted manner. (1011, 1015, 1022, 1028, 1017, 872, 874, 865, 863, 860, 857, 859, 855, 870, 869, 854, 861, 858, 868, 576, 410, 1, 2, 2370, 2456, 239, 56, 482, 490, 491, 555, 560, 596, 686, 137, 640, 1, 2, 26, 353, 733, 368, 3, 6-8, 11-14, 20, 22, 24, 25, 28, 29, 31, 35, 38-40, 43-45, 48, 49, 51-53, 55, 57, 59, 60, 63, 64, 67, 70-72, 74-76, 78, 79, 82, 84-86, 89-94, 96, 99, 101-104, 107-109, 111, 113, 116, 117, 119, 121, 122, 126129, 133-135, 137, 139, 140, 142, 143, 148, 150-152, 155-159, 162, 165, 166, 168, 173-176, 178-180, 183-185, 187-190, 192-196, 199, 200, 202-204, 207-219, 224, 228-230, 234, 235, 237, 239, 241, 242, 244, 245, 247, 250, 251, 253, 257, 258, 261-270, 274-280, 283, 289, 291-294, 297-300, 305, 308-310, 312, 314-317, 319, 321, 322, 325-327, 329, 332, 336, 337, 339, 343, 344, 347-349, 351, 352, 354, 357, 358, 360, 367, 369, 371-373, 376, 380, 384-387, 390, 391, 393-398, 400, 401, 403, 404-406, 409, 412, 414, 418, 419, 421, 423, 425, 429-431, 434, 436, 439-441, 445, 448, 450, 451, 454-459, 461, 462, 464, 466, 468, 470, 474, 475, 478, 479, 481, 485, 487, 488, 490, 493, 495, 497, 499, 501, 504, 506-512, 515, 516, 519, 521-523, 527, 528, 531, 532, 534, 537-539, 543, 544, 547-549, 552-554, 556-559, 561, 563, 565-567, 572, 573, 575, 577-580, 582, 583, 586-588, 590, 595, 599, 600, 602-604, 607, 608, 611, 612, 616, 617, 619, 620, 622-624, 627, 630, 633-635, 638, 641-643, 645-649, 651, 653, 656-659, 661-664, 667-669, 671-673, 677, 679-683, 687-689, 691-694, 699-705, 709, 712-714, 717-721, 723-726, 728, 730-732, 735, 737-739, 744, 745, 747, 749, 750, 753, 755, 756, 759-763, 765, 767, 768, 773-775, 780, 786-788, 791-794, 796, 798, 799, 808, 813, 815-817, 819-824, 828-837, 845, 846, 849-852, 1057-2228, 4, 5, 30, 31, 38, 39, 51, 53, 65, 70, 75, 83, 85, 96, 101, 103, 104, 129, 143, 148, 151, 160, 165, 172, 179, 181, 193, 197, 205, 210, 212, 214, 221, 223, 238, 239, 242, 243, 245, 255, 270, 273, 276, 280, 287, 296, 297, 300, 308, 310, 316, 330, 333, 334, 342, 347, 352, 356, 363, 367, 369, 393, 394, 397, 399, 400, 408, 418, 419, 425, 427-429, 432, 435, 449, 457, 464, 467, 477, 485, 492, 506, 507, 513, 519, 529, 534, 536, 540, 541, 544, 548-550, 554, 562, 563, 575, 580, 587, 589, 593, 595, 601, 602, 604, 613, 618, 620, 624, 628, 630, 646, 649, 652, 655, 657, 661, 681, 683, 687, 689, 696, 703, 704, 709, 712, 714, 717, 719, 720, 736, 743, 744, 765, 766, 768, 770, 771, 779, 782, 786, 787, 807, 811, 817, 819, 828, 834, 838, 839, 850, 2229-2335, 3-5, 8, 13, 14, 17, 18, 21, 22, 25, 29, 30, 32-34, 36, 39, 42, 43, 46, 49, 51, 52, 54, 55, 57, 59, 61, 63, 69, 75, 77, 78, 89, 91, 94-98, 102, 106, 107, 112, 116, 118, 123-125, 127, 130-133, 135, 136, 138, 139, 141, 143-145, 147, 148, 153, 160, 161, 163, 164, 166, 167, 169, 178, 182, 186, 187, 190, 191, 194, 198, 202, 203, 211, 212, 216, 219, 222, 223, 225, 231, 236, 238-241, 243, 244, 250, 254, 255, 257, 262, 264, 265, 270-273, 275, 283, 285, 287, 288, 293-295, 297-300, 303, 304, 309, 312, 314, 318, 320, 324-326, 331, 332, 336, 338, 348, 349, 351, 354, 356, 357, 360, 362, 363, 365, 366, 370, 371, 374, 376, 389, 391, 393, 396, 401, 402, 404, 408, 411-413, 415, 417-419, 429, 431, 433, 440, 442, 444, 446, 449, 452-454, 459, 463, 465, 468, 469, 479, 480, 484, 486, 487, 494, 496, 498-502, 505, 507, 511, 514, 517, 520, 524-526, 529, 530, 533, 534, 538, 539, 542, 543, 546, 552, 554, 561, 569, 571, 574, 575, 577, 578, 585, 586, 591, 594, 595, 599, 600, 602, 609, 610, 616, 622, 628, 629, 631, 635-639, 641, 643-645, 651, 653, 654, 660, 662-665, 668, 670-674, 679, 681-683, 685, 689, 691, 692, 694, 695, 697, 698, 704, 705, 708, 710-712, 719-722, 727, 730-732, 739-742, 744, 745, 747, 752-754, 757, 759, 760, 763, 766, 767, 770, 771, 774776, 780, 781,

783, 786, 789-793, 795-797, 802, 806, 809, 811, 816, 817, 820, 822-824, 825, 827, 828, 830, 832, 834, 838, 842, 845, 847, 848, 850, 4629-5105, 8754-9357)

Response: The Department has developed the conditional exemption criteria, GP-5A, and GP-5 for the oil and gas sector to manage energy development and protect natural resources, the environment, and public health. The Department is working toward the goals laid out in the Governor's Methane Reduction Strategy, including developing a regulation for existing sources. The final permits comprehensively address methane and other air pollutant emissions from oil and gas industry.

Comment 486: The commentator states that because there are few localized effects with GHG emissions such as methane, the analysis of the regulatory regime must result in a net reduction of emissions on a global basis. If the regulatory regime results in a transfer of production to a region with low regulatory requirements, the displaced production would result in a net increase in emissions. Therefore, the Department must ensure the proposed GP-5A will not cause this transfer of production. (1051)

Response: The Department appreciates the comment and believes the final general permits apply existing federal and state regulations in a predictable and balanced manner to achieve environmental protection goals and the responsible development of the resource.

Comment 487: The commentators state that operators are not adopting voluntary emissions reduction standards consistently across the industry; therefore, effective permit conditions and their enforcement and regulations for existing operations are required to reduce oil and gas emissions. (1011, 1015, 1022, 1028, 1021, 1037, 3803, 4080, 4574, 482, 686, 1019, 3-5, 13, 14, 17, 18, 21, 22, 29, 30, 36, 39, 46, 52, 55, 57, 61, 63, 69, 77, 89, 95, 96, 106, 118, 123-125, 130-133, 135, 136, 138, 139, 141, 143-145, 147, 148, 160, 161, 163, 164, 167, 169, 182, 186, 187, 194, 198, 203, 211, 212, 216, 222, 223, 231, 236, 238, 241, 244, 250, 254, 257, 262, 264, 265, 271, 273, 275, 283, 285, 287, 293-295, 297-300, 303, 304, 309, 312, 314, 318, 320, 324, 326, 331, 338, 349, 354, 356, 360, 362, 363, 366, 370, 371, 374, 389, 396, 401, 402, 404, 408, 411-413, 417, 419, 429, 433, 442, 449, 452, 453, 463, 465, 468, 469, 480, 484, 486, 494, 498, 499, 501, 502, 505, 507, 511, 514, 517, 520, 524, 525, 529, 530, 533, 534, 538, 539, 542, 546, 552, 554, 561, 571, 574, 575, 577, 585, 586, 591, 594, 595, 599, 602, 609, 610, 616, 622, 628, 629, 631, 635-637, 639, 641, 643, 645, 653, 654, 660, 662-665, 668, 671, 674, 679, 681-683, 685, 691, 692, 694, 695, 697, 698, 704, 705, 708, 710, 712, 719, 721, 722, 727, 732, 739-742, 744, 745, 747, 752-754, 759, 766, 767, 770, 771, 774, 776, 781, 783, 786, 789-793, 795, 797, 802, 809, 811, 816, 817, 820, 824, 825, 827, 830, 834, 838, 842, 847, 848, 850, 4629-5105)

Response: The Department appreciates the comment and has developed the final general permits to provide for the consistent implementation of federal and state regulatory requirements through a streamlined and efficient permitting process.

Comment 488: The commentator states that Pennsylvania should establish regulations to reduce methane emissions during operation of natural gas wells and require operators to ensure that leaks will not occur after closedown. (19)

Response: The Department implements regulations in 25 Pa. Code Chapter 78a to insure the appropriate decommissioning of wells after production has ceased.

Comment 489: The commentator is concerned about increasing emissions, including those related to ethane cracking at the proposed cracking plant in Monaca. (1456)

Response: The ethane cracking plant in Monaca is a major facility that went through an individual permitting process. As part of the plan approval application process, Shell Chemical Appalachia was required to conduct a case-by-case BAT analysis reviewed by the Department and subject to public comment.

Emissions Reductions Due to the Natural Gas Industry

Comment 490: The commentators state that the increased use of natural gas instead of coal has led to substantial increases in air quality throughout Pennsylvania and the US. Between 2011 and 2014, NO_x and SO₂ emissions from electric generating units in Pennsylvania have decreased by 27,246 tpy and 54,973 tpy, respectively. Carbon dioxide emissions in the U.S. are down 12% since 2005 primarily due to the shift in the electric power sector toward natural gas. (929, 950, 957, 991, 1051)

Response: The Department appreciates the comment. Based on the actual emissions reported by Pennsylvania's oil and gas industry, unconventional natural gas wells reported VOC emissions of over 795 tpy and methane emissions of 59,000 tpy in 2015. Total oil and gas industry emissions, including the production, midstream, processing, and transmission segments reported VOC emissions of 6,410 tpy in 2015.

Comment 491: The commentator states that natural gas is arguably the cleanest form of energy available; emissions from natural gas are lower than the production of many "green" energy sources. Typically, when green energy operations require the use of alternative power sources it is natural gas that offsets low demand loads. By putting this onerous and non-effective red tape in place to slow development, the Department pushes the Commonwealth to look to other methods of fulfilling the energy demand. This means a resurgence of coal because green energy cannot meet the demand. (976)

Response: See response to Comment 468. General permits are a mechanism to streamline the permitting process which saves time and money. The permits include terms and conditions that are based on existing regulations.

Comment 492: The commentators state that the increased use of natural gas instead of coal has led to substantial increases in air quality throughout Pennsylvania. The commentators recommend protective standards to help maintain the benefits of fuel-switching. (306, 323, 875, 876, 878-899, 1019, 1083, 2312)

Response: The Department appreciates the comment and has developed the final general permits and conditional permit exemption to achieve environmental protection objectives and the responsible development of the resource.

Comment 493: The commentator states that if a general permit increases costs and risks associated with natural gas extraction, whether through direct expenses or permitting delays, the likely result is to transfer production from Pennsylvania to other jurisdictions. If production shifts to foreign jurisdictions, three of the five top natural gas-producing nations are authoritarian or semi-authoritarian where reliable information and the rule of law are suspect. This would likely result in increased emissions. (1051)

Response: See the response to Comment 475. The general permitting process is designed to streamline the implementation of federal and state regulatory requirements, saving applicants time and money.

Comment 494: Several commentators expressed their experiences with the oil and gas industry and the impacts on air and water quality. The commentators urge the Department to control methane, VOC, and HAP by requiring techniques from U.S. EPA's Natural Gas Star Program. Doing so will improve their quality of life. (1142, 1832, 565, 3912, 3769, 208, 3531, 3399, 402, 4345, 8630, 41, 68, 93, 443, 650, 686, 424, 2276)

Response: The Department appreciates the comment. Both finalized general permits implement requirements for new sources to control the emission of air pollutants to the maximum extent, consistent with BAT as determined by the Department. BAT is equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. In addition, all temporary activities, including drilling rigs and fracturing, must comply with conditional Exemption 38 and all applicable state and federal requirements.

Recommendation to Monitor Emissions in the Oil and Gas Region

Comment 495: The commentator states that Wyoming County has always led in school-age asthma rates due to the effects of pollution from a very large manufacturing plant located in the county. Historically, this plant has emitted more pollution than all sources combined within Lackawanna County. Despite this, the Department has not monitored this area so there is no historic air monitoring data specific to this plant or area of the plume within Wyoming County. (1020)

Response: This comment is beyond the scope of the general permit actions being taken by the Department. The Department is concerned about the effect of emissions from the increase in natural gas production, processing and transmission activities and is investing additional resources into additional ambient air monitoring stations throughout the Marcellus Shale play area.

Comment 496: The commentators state that the Department should perform comprehensive health assessments in residential areas within 1/2 mile of unconventional natural gas wells to determine the extent of the residents' exposure to ozone and HAP. This health assessment should include both acute and chronic exposure. (568, 1038)

Response: See the response to Comment 491. The Department will continue to participate in health assessments conducted by the Department of Health as resources allow and monitor other efforts to study health impacts from oil and gas production, processing and transmission activities.

Recommendations to Prohibit Flaring Natural Gas

Comment 497: The commentators recommend that flaring should be the exception to the rule rather than an exempt activity. The commentators have witnessed flaring activities for years and believe it is unacceptable to handle methane waste this way as it is not conducive to public health. (128, 568, 864, 1020, 1378)

Response: Flaring is a common method for controlling emissions as it destroys methane, VOC, and HAP, preventing it from impacting air quality in the area. Exemption 38 requires an enclosed flare for all permanent flaring operations.

Claims that Emissions in the Oil and Gas Region Contribute to Asthma and Other Health Issues

Comment 498: The commentators state that clean air and water is our right under the Pennsylvania Constitution. With pressure to roll back regulations at both the federal and state level, it is imperative that the Department fulfills its mission with robust permit requirements. (769, 1019, 1358, 1378, 3638)

Response: The Department appreciates the comment. The Department has developed the final general permits and conditional permit exemption for new sources to control the emission of air pollutants to the maximum extent, consistent with BAT as determined by the Department. BAT is equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available.

Comment 499: The commentators state that methane, ozone, and benzene levels impact those suffering from asthma and other respiratory ailments; benzene and other HAP can increase the risk of cancer and cause other health effects. The commentators state that proposed general permits will provide costeffective technically feasible controls that will achieve critical emissions reductions and reduce risks of public health problems. (1020, 1011, 1015, 1022, 1028, 1014, 872, 854, 865, 863, 860, 857, 859, 855, 870, 869, 854, 861, 858, 868, 1786, 115, 1390, 352, 1468, 1774, 1836, 3800, 3826, 318, 3441, 60, 769, 10, 9, 217, 220, 224, 290, 137, 1038, 1019, (3-5, 13, 14, 17, 18, 21, 22, 29, 30, 36, 39, 46, 52, 55, 57, 61, 63, 69, 77, 89, 95, 96, 106, 118, 123-125, 130-133, 135, 136, 138, 139, 141, 143-145, 147, 148, 160, 161, 163, 164, 167, 169, 182, 186, 187, 194, 198, 203, 211, 212, 216, 222, 223, 231, 236, 238, 241, 244, 250, 254, 257, 262, 264, 265, 271, 273, 275, 283, 285, 287, 293-295, 297-300, 303, 304, 309, 312, 314, 318, 320, 324, 326, 331, 338, 349, 354, 356, 360, 362, 363, 366, 370, 371, 374, 389, 396, 401, 402, 404, 408, 411-413, 417, 419, 429, 433, 442, 449, 452, 453, 463, 465, 468, 469, 480, 484, 486, 494, 498, 499, 501, 502, 505, 507, 511, 514, 517, 520, 524, 525, 529, 530, 533, 534, 538, 539, 542, 546, 552, 554, 561, 571, 574, 575, 577, 585, 586, 591, 594, 595, 599, 602, 609, 610, 616, 622, 628, 629, 631, 635-637, 639, 641, 643, 645, 653, 654, 660, 662-665, 668, 671, 674, 679, 681-683, 685, 691, 692, 694, 695, 697, 698, 704, 705, 708, 710, 712, 719, 721, 722, 727, 732, 739-742, 744, 745, 747, 752-754, 759, 766, 767, 770, 771, 774, 776, 781, 783, 786, 789-793, 795, 797, 802, 809, 811, 816, 817, 820, 824, 825, 827, 830, 834, 838, 842, 847, 848, 850, 4629-5105)

Response: The Department appreciates the comment.

Comment 500: The commentators state that the increased use of natural gas has led to substantial improvements in air quality, which has led to a reduction in asthma rates. (227, 302, 905, 940, 963, 974)

Response: The Department appreciates the comment. It is also important to reduce methane, NOx, VOC, and HAPs emissions from the oil and gas industry using best available air pollution control technologies wherever they are applicable. Methane, the primary component of natural gas, has been identified by the U.S. Environmental Protection Agency as the second-most prevalent GHG emitted in the United States from human activities. With federal estimates that the natural gas and oil industries account for a quarter of U.S. methane emissions, reducing methane leaks from the oil and gas sector is

one of the essential steps needed to reduce global GHG emissions and reduce the impacts of climate change.

Comment 501: The commentators state that pollution, such as ozone, VOC, and HAP, have disproportionate impact on the unborn, including low birth weight, lower APGAR scores, and increased risk of birth defects. Because of their concern for unborn children the commentators recommend strong regulations to cut pollution from new and existing natural gas infrastructure. (625, 1014, 1019, 1026, 1038)

Response: The Department appreciates the comment and has developed the final general permits and conditional permit exemption to contain clear terms and conditions that reduce emissions from the oil and gas sector. The Department is working towards the goals laid out in the Governor's Methane Reduction Strategy.

Comment 502: The commentators state that they live near a pumping station which is being upgraded for the Atlantic Sunrise pipeline and the proposed pipeline passes less than 600 feet from their house. The commentator also lives downwind of these facilities, and in addition to living within the blast zone of a potential pipeline explosion, is more concerned with the emission of toxic fumes from the pipeline and pumping station. The potential health problems concern the commentator, who will feel safer with protective requirements in the proposed general permits. (22, 1071)

Response: The Department appreciates the comment.

Miscellaneous Comments

Comment 503: What evidence does DEP have that methane emissions from well sites are a significant environmental issue? (903, 935, 994)

Response: The EPA's 2009 endangerment finding states that GHGs in the atmosphere endanger both the public health and the environment for current and future generations. It specifically mentions methane as one of these gases. Based on Pennsylvania's 2015 Air Emissions Inventory for unconventional natural gas operations, methane emissions from 2011 through 2015 increased from 107,375 tpy to 122,589 tpy. Methane is also an air pollutant under Pennsylvania's APCA and, therefore, new sources emitting methane are subject to BAT requirements.

Comment 504: What reduction in methane emissions is anticipated after imposing the GP-5A, beyond that currently being realized under Exemption 38? (935)

Response: The applicability of GP-5A is for new or modified sources to incorporate new federal regulations and update state BAT determinations. Sources emitting more than 200 tpy of methane will be required to control emissions by a minimum of 95%.

Comment 505: The commentator recommends the Department withhold finalization of changes to Exemption 38 and GP-5 and the formation of GP-5A until after EPA finalizes its reconsideration of federal NSPS requirements. The commentator recommends that the proposed revised general permit criteria to be consistent, no more stringent than any reconsidered federal NSPS requirement, and workable for both regulators and the regulated community. (1054)

Response: In addition to compliance requirements for applicable federal requirements, 25 Pa. Code Chapter 127 requires that all new sources control the emissions to the maximum extent, consistent with BAT as determined by the Department. BAT is an evolving standard and is defined as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The Department has directly referenced the federal standards in many areas of the final GP-5A and GP-5.

Comment 506: Section B of proposed GP-5A requires unconventional well site operators to obtain a pre-construction permit for fugitive dust emissions. Fugitive Particulate Matter emissions associated with process that are temporary in nature. The sections in GP-5A cover well site preparation activities including but not limited to clearing, grading and construction activities, non-road engines and well drilling, completion and work-over activities. These activities are not considered stationary emission sources and were specifically exempted from preconstruction air permitting requirements under Exemption 38. (1050)

Response: The fugitive dust emissions section has been removed from the final GP-5A. Temporary activities such as site preparation, well drilling, completion, and work-over activities are exempt from permitting under the final conditional Exemption 38.

Comment 507: The commentator suggests the Department align GP-5A with existing program requirements and established criteria that designate thresholds of significance for incremental emission controls as already exists in the U.S. EPA's Clean Air Act Subparts OOOO and OOOOa and the existing PA exemption 38. (928)

Response: The Department has maintained the exemption thresholds for NO_x, VOC and HAP emissions in the final conditional permit Exemption 38. The Department has also maintained the federal requirements which are in line with the Department's BAT requirements for new or modified sources. However, in addition to compliance requirements for applicable federal requirements, 25 Pa. Code Chapter 127 requires that all new sources control the emissions to the maximum extent, consistent with BAT as determined by the Department. BAT is an evolving standard and is defined as equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available. The Department has provided the rationale for the independent state BAT determinations for the applicable source categories in the TSD.

Comment 508: The commentator believes that by adopting the various federal regulations that largely focus on VOCs, that Pennsylvania, by default, has already been controlling methane under its current Exemption 38 program. Operators already report methane emissions to DEP in their Annual Emissions Statements and Compliance Demonstration Reports. Because VOCs and methane originate from the same hydrocarbon source, and instituting a control for VOCs is also controlling methane, DEP's attempts via the GP-5A to establish new controls directed specifically at methane would appear to be repetitive of the VOC control requirements under the federal rules. (991)

Response: The Department agrees that controlling VOCs will help control methane. However, for dry gas well sites, there is a minimum amount of VOCs in the gas stream, which may allow the owner or operator to install and operate high methane-emitting sources without triggering VOC control. Under

GP-5A, the owner or operator will be required to install and operate control for methane emissions from an individual source if it exceeds 200 tpy.

Comment 509: The commentators believe the draft GP-5 and GP-5A are prescriptive permits that resemble an individual major source Title V permit. They are extremely detailed and burdensome, losing the intentions of a general permit program. One commentator is concerned that it will be difficult for the Department to maintain a 30-day turnaround time for general permit approvals with these new requirements and expanded scope. The commentator recommends that the revised GP-5 level of detail be returned to the existing GP-5 level, and the GP-5A follow the scope of the Exemption 38. (919, 1047)

Response: Most of the added length of the proposed general permits was an attempt by the Department to include and summarize the federal requirements instead of incorporating them by reference. The Department has removed summaries where it is instead referencing federal regulations in the final GP-5 and GP-5A. As a result, the length of the general permits has been extensively reduced.

There will be more of an administrative work load on the Department to implement GP-5A. However, the Department has developed e-permitting for GP-5A and GP-5 which will expedite the review process and enable the Department to authorize the use of general permits in a timely fashion.

Comment 510: The commentator recommends that notification to DEP is sufficient in lieu of full permit application re-submission for scenarios where in-kind changes or like-for-like changes of equipment is done, where there is no increase of the emissions. (991)

Response: In accordance with 25 Pa Code Chapter 127, the Department considers the installation of “in-kind” replacement of sources as new sources subject to BAT requirements. The final general permits allow replacement of equipment at the facility with identical equipment without additional authorization provided that the owner or operator complies with the requirements of 25 Pa. Code § 127.449(a), (b), and (d) through (i), and the equipment being replaced meets the current applicable BAT compliance requirements and other conditions of the permits.

Comment 511: Draft requirements GP-5 Section E(1)(b) and GP-5A Section G(1)(b) refer to sources constructed after February 2, 2013, but before the issuance of a new GP-5A. That would include sources built under Exemption 38, both prior or after August 10, 2013, (date of issuance of new Exemption 38) and would retroactively require conformance with the limits in (1)(b). The Department has not justified such a retroactive requirement. Draft requirements GP-5 Section E(1)(b) and GP-5A Section G(1)(b) should be revised to exclude sources authorized by Exemption 38. (919)

Response: Any existing source previously authorized under the previous version of Exemption 38 will still be under the new, final Exemption 38. Only new sources will either need to meet new requirements under Exemption 38 or get authorized under the new GP-5 or GP-5A.

Comment 512: Proposed GP-5 and GP-5A require for existing (Exemption 38 unconditionally exempt and OOOO-subject) tanks to meet Section N.1(f). Section N.1(f) requires Professional Engineer certification of closed vent systems. This was a requirement not of NSPS OOOO but of OOOOa. This requirement should be deleted. The commentator recommends incorporating federal requirements by reference. (919)

Response: The final GP-5 and GP-5A incorporate the applicable federal requirements by reference.

Comment 513: The commentators believe that it is unclear if control requirements for truck load-out operations would apply to unloading from all tanks, including produced water tanks at locations with no liquids production. Considering the cost and logistics of installing and maintaining VOC emissions controls, these should not be required at sites that have no expected VOC emissions. The commentators recommend that the Department should clarify that VOC controls are not required at locations where past and current emissions calculations demonstrate de minimis VOC emissions.

When controls may be needed, DEP only allows for one control option. In some cases, closed vent systems are not feasible for safety or operational reasons. The commentator recommends that the Department should instead specify that any control is acceptable if it can meet the requirements to allow the facility to remain a minor source. Options for controls at a minimum should include flaring or carbon absorption systems, both of which have been proven to control VOCs at a very high efficiency. (919, 1047, 9999)

Response: The final GP-5A and GP-5 require control of VOC emissions from tanker truck loadout operations which service storage vessels that emit more than 2.7 tpy VOC (uncontrolled) or .5 tpy of a single HAP or 1 tpy total HAPs or 200 tpy methane.

The final general permits allow the owner/operator to use a vapor balancing system instead of vapor recovery unit (as proposed in draft).

Comment 514: The commentator believes that based on their historical data for wells requiring Leak Detection and Repair (LDAR) per Exemption 38, there is no evidence that increasing the frequency to quarterly would be beneficial. The properly performed repairs are long-lasting and do not require quarterly checks to confirm. Performing LDAR quarterly will only lead to increased cost, recordkeeping, and reporting for the operator with no real environmental benefit. The commentator appreciates the option in the proposed permit to prove a semi-annual survey interval, but believes that the effort required to track the number of leaking components in order to support less frequent sampling is as burdensome as actually conducting the more frequent quarterly sampling. (9999)

Response: The Department has provided the documentation for a quarterly LDAR program frequency to reduce methane emissions in its TSD. However, as mentioned in the comment, the owner or operator may track the number of leaking components in the LDAR records and decrease the LDAR inspection interval from quarterly to semi-annually if the percentage of leaking components is less than 2.0% for two consecutive quarterly LDAR inspections.

Comment 515: Enclosed Flares and Other Emission Control Devices would unfairly apply retroactively to existing sources under Exemption 38. Other sections identify separate requirements for pre-2013 and post-2013 Exemption 38 operations, as well as new GP-5A. Section N of proposed GP-5A does not distinguish these timeframes for enclosed flares and other emission control devices. (919, 1056)

Response: The owner or operator of an enclosed flare or other enclosed combustion control device constructed prior to the effective date of GP-5A are required to meet 40 CFR § 60.5412(d)(1) and § 60.5415(e) or 40 CFR § 60.5412a(d)(1) and § 60.5415a(e) as applicable.

Appendix A - List of Commentators

ID	Name	Affiliation
1	Christel Abbadusky	
2	Matt Abbadusky	
3	Katherine Abel	
4	Elise Adibi	
5	Barbara Adkins	
6	Ashley Albrecht	
7	Richard Aldred	
8	Eugene Alexander	
9	Eunice Alexander	
10	Henry Alexander, PE	
11	Melody Alexander	
12	Richard Alloway	
13	Michelle Alvare	
14	Julia Amsler	
15	Catherine Anderson	Environmental Integrity Project
16	Katherine Anderson	Clean Water Action
17	William Anderson	
18	Michael Antosch	
19	Brian Appleby	
20	Ray Applegate	
21	Sally Archibald	
22	Gerald Arcuri	
23	Jon Arnon	
24	Oneida Arosarena	
25	Frank Asturino	
26	Page Atcheson	
27	John Atherton	
28	Greta Aul	
29	Frank Ayers	
30	Andrelene Babbitt	
31	Susan Babbitt	
32	Sidney Baglini	

ID	Name	Affiliation
33	Elizabeth Baker-Smith	
34	Gerritt Baker-Smith	
35	Terrie Balko	
36	Ellen Bardo	
37	James Barnes	Environmental Integrity Project
38	Mary Ann Barrett	
39	Raymond Bartlett	
40	Laura Basso	
41	E. Baub	
42	Cynthia Bauer	
43	Scott Baumann	
44	Fred Baurer	
45	Karen Beall	
46	Shannon Bearman	
47	Priscilla Becroft	
48	Dan Behl	
49	Lawrence Berardi	
50	Matti Beresin	Clean Water Action
51	Henry Berkowitz	
52	Mary Ann Berosh	
53	Karen Berry	
54	Neil Bhaerman	
55	Lee Bible	
56	Kelly Bickel	
57	Kenneth Bickel	
58	Frederick J. Bickerton, Jr.	Environmental Integrity Project
59	Dave Bindewald	
60	Jennifer Binus	
61	Joellen Bitzer	
62	Lois Bjornson	
63	Justin Blevins	

Appendix A - List of Commentators

ID	Name	Affiliation
64	Susan Bloch	
65	Robert Bloom	
66	Barbara Bloomfield	Clean Water Action
67	Linda Blythe	
68	Wayne Boles	
69	Tom Bolich	
70	Donna Bookheimer	
71	Joseph Borst	
72	Dara Bortman	
73	Lois Bower-Bjornson	Environmental Integrity Project
74	Tara Bradley	
75	Barbara Bradshaw	
76	Barbara Breitman	
77	A. Brennan	
78	Thomas Brenner	
79	Jasper Brinton	
80	Gary Brockman	Environmental Integrity Project
81	Karen Brockman	Environmental Integrity Project
82	Linda Brodeur	
83	Regina Brooks	
84	Rebecca Brown	
85	Robert Bruckman	
86	John Brunt	
87	Gloria Brusoski	Environmental Integrity Project
88	Pamela Brusoski	Environmental Integrity Project
89	Vera Bryant	
90	Theodore Burger	
91	Geoff Burke	

ID	Name	Affiliation
92	Janet Burkhardt	
93	Delma Burns	
94	Michael Burns	
95	Duane Burtner	
96	John Bush	
97	Helen Buttel	
98	Robert Buttel	
99	Diane Calkins	
100	Mark Calvert	Clean Water Action
101	Gloria Cameron	
102	Roberta Camp	
103	Thomas Campanini	
104	Macyle Candela	
105	Anne M. Candreva	Environmental Integrity Project
106	Paula Capaldo	
107	Lauren Capella	
108	Dorothy Cardlin	
109	Jeff Carey	
110	Rex Carney	
111	Donna Carswell	
112	Jane Casella	
113	Sarah Caspar	
114	Scott Cassidy	Clean Water Action
115	Frank Castrina	
116	Connie Cavara	
117	Jane Cease	
118	Mary Cellucci	
119	Shirley Chilcott	
120	Rachel Chinian	Clean Water Action
121	Tina Chromey	
122	Barbara Cicalese	
123	Melanie Cohick	

Appendix A - List of Commentators

ID	Name	Affiliation
124	Ellis Coleman	
125	Jenny Collier	
126	Anne Collins	
127	Jane Collins	
128	John Comella	
129	Craig Conn	
130	Julianne Conway	
131	William Copestick	
132	Lynn Cornish	
133	Donna Cosgrove	
134	Caroline Cotugno	
135	Victoria Cox	
136	Charles Craft	
137	Claudia Crane	Member, Clean Air Council
138	Jason Crawford	
139	Dawn Crist	
140	Ene Cronk	
141	Susan Crowle	
142	Joyce Crowley	
143	John Csaszar	
144	Gary Cubler	
145	Donna Cummings	
146	Matt Curchain	
147	Dan Cush	
148	Barry Cutler	
149	R. D.	
150	R. D.	
151	K. Danowski	
152	Jerry Davies	
153	Nancy Davis	
154	Kipp Dawson	Environmental Integrity Project

ID	Name	Affiliation
155	Eleanor Day	
156	Virginia Day	
157	Richard Defazio	
158	Neena Deibler	
159	Elaine Dellande	
160	Rosemary DelPino	
161	Diana Delucca	
162	Sheri DeOrio	
163	Robert Depew	
164	Pat DeWolfe	
165	Nicholas Diamond	
166	Maureen Diaz	
167	Thomas Diehl	
168	Anne Dietrich	
169	Teri Dignazio	
170	Deborah DiLazzero	
171	Marc DiNardo	
172	Stephen Disch	
173	Ann Dixon	
174	Ryan Dodson	
175	Susan Dolan	
176	Kathleen Domenig	
177	Y. Donnell	
178	Jason Driesbaugh	
179	John Dulik	
180	Jack Dunham	
181	Dorothy Dunlap	
182	Thomas Dunlap	
183	Cindy Dutka	
184	Beth Dzwil	
185	Sandra Edmiston	
186	Roberta Edmon	
187	Nancy Egolf	

Appendix A - List of Commentators

ID	Name	Affiliation
188	Fayten El-Dehaibi	
189	Donna Elms	
190	Herbert Elwell	
191	Margaret Emerson	
192	Victoria English	
193	George Erceg	
194	Sheila Erlbaum	
195	Martha Evans	
196	Sherlene Evans	
197	Jill Fackenthal	
198	Mary Lou Fagan	
199	Laura Fake	
200	Jeff Fanok	
201	Edward Farley	
202	Sara Farneth	
203	Ivy Fasko	
204	Kristin Faulkner	
205	Marjorie Faust	
206	Helen Fendery	
207	Nanci Fenselau	
208	David Fiedler	
209	Steven Filante	
210	Mary Fineran	
211	Brian Fink	
212	Andrew Fisher	
213	Harris Fishkin	
214	Betty Flinchbaugh	
215	Linda Focht	
216	Michael Follman	
217	Sandra Folzer	
218	Judith Fordham	
219	Beverly Foster	
220	Henry Frank	

ID	Name	Affiliation
221	Leah Franqui	
222	Glenn Frantz	
223	Edward Freeman	
224	Karen Fritsch	
225	Lani Fritz	
226	John Fropou	
227	John Fryman	
228	Sharon Furlong	
229	Kathleen Furness	
230	F. G.	
231	F. G.	
232	Janice Gabriel	
233	Steven G. Gabriel M.D.	
234	Susan Gage	
235	Jim Gallagher	
236	John Gallagher	
237	Tina Gallaway	
238	Carol Garber	
239	Susan Garelik	
240	Lisa Gares	
241	Glenn Gawinowicz	
242	Melinda Geiger	
243	Carol Gelfand	
244	Donna Gensler	
245	Jim Gergat	
246	Jerome Getz	
247	Lisa Geyer	
248	Debasri Ghosh	Clean Water Action
249	Tom Gilhool	
250	Cynthia Gilliard	
251	Robert Gilmore	
252	Susan Glars	
253	James Glatz	

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ID	Name	Affiliation
254	Dorothy Glebes	
255	James Goble	
256	Jackie Goodman	
257	Margaret Goodman	
258	Peter Gottemoller	
259	Gillian Graber	
260	Carol Graham	
261	Anthony Grasso	
262	Rhyan Grech	
263	Bernard Greenberg	
264	David Greene	
265	Melissa Greenley	
266	Jay Grossman	
267	Timothy Grover	
268	Rex Grubb	
269	Elizabeth Guldán	
270	Ronald Gulla	
271	Dee Gussoni	
272	Mary Guzowski	
273	Evelyn Haas	
274	Katelyn Haas	
275	Jean Hackney	
276	William Haegele	
277	Janice Hahn	
278	John Hahn	
279	Bob Hamburg	
280	Bonnie Hamilton	
281	Melanie Hancock	Clean Water Action
282	Michael Hanna	
283	Donna Hannallah	
284	Linda Hansell	
285	Stephen Harding	
286	Emily Harman	Clean Water Action

ID	Name	Affiliation
287	Marilynn Harper	
288	Kathleen Harr	
289	E. Harris	
290	Mark Harris	
291	Brenda Hartman	
292	John Harvey	
293	Judy Harvey	
294	Mark Harvey	
295	Robert Havrilla	
296	Jane Hayward	
297	Lorraine Heagy	
298	Joseph Heefner	
299	Joseph Heidecker	
300	Jeanne Held-Warmkessel	
301	Andrew Hellen	
302	Matt Henderson	
303	Charles Henry	
304	Connie Hershman	
305	Megan Hess	
306	Kelsey Hill	
307	Ludiek Himes	Clean Water Action
308	Harry Hochheiser	
309	Jason Hochreiter	
310	Frances Hoenigswald	
311	Alexander Hoffman	
312	Jennifer Hoffman	
313	Patty Hoffman	Environmental Integrity Project
314	Barbara Hogan	
315	Elizabeth Hollar	
316	Joanna Hollis	
317	Karen Hollowell	
318	Jayne Holtman	

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ID	Name	Affiliation
319	Margaret Hoover	
320	Deborah Horan	
321	Laura Horowitz	
322	Chris Horwitz	
323	Harold Hoseholder	
324	Jennifer Hotaling	
325	Greta Hotmer	
326	Debra Hoven	
327	Tim Hoy	
328	Christopher Huffman	
329	Frances Hugg	
330	Kathleen Hughes	
331	Roger Hughes	
332	Diana Hulboy	
333	Marla Humphreys	
334	Joann Hunter	
335	Pat Hunter	
336	Laurel Husk	
337	James Hutchinson	
338	Mary Jane Hyde	
339	Krista Hyer	
340	Mollic Illenberger	
341	Charity Imbrie	Environmental Integrity Project
342	Donna Ingenito	
343	Francis Itzoe	
344	Anne Jackson	
345	Jared Jacobson	
346	Dianne Jacox	
347	Robert Janusko	
348	Robert Jasper	
349	Robert Jehn	
350	Michael E. Jenkin	

ID	Name	Affiliation
351	Herbert Jeschke	
352	Barbara Johns	
353	Emilie Johnsen	
354	Michele Johnson	
355	Patricia Johnson	
356	Patti Johnson	
357	Sherwood Johnson	
358	Lois Johnson-Hamerman	
359	Adrienne Jones	
360	Buckie Jones	
361	Sam Jones	
362	Samantha Jones	
363	Joseph Jordan	
364	Sharon Juli	Environmental Integrity Project
365	Dianne Justesen	
366	Lisa Kacmar	
367	David Kagan	
368	Elizabeth Kahn	
369	Paul Kalka	
370	Kevin Kane	
371	David Kannerstein	
372	Donna Kantner	
373	Elizabeth Karnes	
374	Melissa Katterson	
375	Brenda Kauffman	
376	Gerald Kaufman	
377	Curtis Kaufmann	
378	Virginia Kaufmann	
379	C. Kelly	
380	Nancy Kelly	
381	Kathleen Kenney	Environmental Integrity Project

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ID	Name	Affiliation
382	Ellen Kerr	Environmental Integrity Project
383	Karl Kimmich	
384	M. Kirby	
385	Muriel Kirkpatrick	
386	Robert Kistler	
387	Valerie Klauscher	
388	Gerald Klein	
389	Barry Kline	
390	Norma Kline	
391	Paula Kline	
392	Christian Klushman	
393	Theresa Knapp	
394	Judy Knueven	
395	Frank Kohn	
396	Steve Kokol	
397	Diane Kokowski	
398	Ian Kratter	
399	Patricia Kraus	
400	Darla Kravetz	
401	Fred Kraybill	
402	Joan Krebs-Barley	
403	Joanne Kreil	
404	Linda Kroft	
405	David Kronheim	
406	Jessica Krow	
407	Maureen Krowicki	
408	Diane Kuc	
409	Susan Kuder	
410	Kenneth Kukovich	
411	Marcia Kurland	
412	Ann Kuter	
413	Ellen Kutter	

ID	Name	Affiliation
414	Joan Kyler	
415	Michelle Landau	
416	Anita Landreau	Environmental Integrity Project
417	Dan Lara	
418	David LaVerne	
419	Michael Lawrence	
420	Robert E. LeBlanc, Jr.	
421	David Ledermann	
422	Metin Leggett	
423	Otto Lehrbach	
424	Linda Leiter	
425	Karen Lenahan	
426	Jennifer I. Lenway	
427	Louis Levi	
428	Jon Levin	
429	Mark Levin	
430	Meredith Levy	
431	Felicia Lewis	
432	Patricia Libbey	
433	Patricia Libengood	
434	Elsa Russell Lichtenberg	
435	MaryAnn Linehan	
436	Gina LoBiondo	
437	Cathy Lodge	Environmental Integrity Project
438	Christopher Lodge	Environmental Integrity Project
439	David Loeb	
440	Michael Lombardi	
441	Michael Long	
442	John Lopresti	
443	Alex Lotorto	

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ID	Name	Affiliation
444	Melissa Lublin	
445	Richard Ludwig	
446	Nancy Lutz	
447	Graham Lyman	Clean Water Action
448	R. M.	
449	Joanne Mack	
450	Joseph Magid	
451	Barbara Mail	
452	Catherine Malin	
453	Jeanne Mann	
454	Alexa Manning	
455	Deborah Marchand	
456	Kirby Marchand	
457	John Margerum	
458	Carla Mariani	
459	Eugene Mariani	
460	Yuleymi Mariano	Clean Water Action
461	Gabriele Markert	
462	Jackie Marks	
463	Cindy Marshall	
464	Craig Martin	
465	George Martin	
466	Judith Marvin	
467	Dawn Mason	
468	Marilyn Maurer	
469	Paige May	
470	Peter Mayes	
471	Rebecca Mazar	
472	Bryan McConnell	
473	Taylor McConnell	
474	Kristin McCrossin	
475	Darlin McDaniel	
476	Lerger McFadden	

ID	Name	Affiliation
477	Bonnie McGill	
478	Carol McGrath	
479	Pamela McIntyre	
480	Helen McKean	
481	Mary McKenna	
482	Christian McKinney	
483	Jimmy McKnight	
484	William Mclaughlin	
485	Mary McMahan	
486	Linda McNair	
487	Karla McNamara	
488	Susan McNamara	Member, NRDC
489	Mary McNeill Zell	Clean Water Action
490	Melissa McSwigan	
491	David McVeigh-Schultz	
492	David Meade	
493	Kim Mehler	
494	Christine Melograna	
495	Joseph Mercurio	
496	Gloria Merlino	
497	Gail Mershon	
498	Jennifer Meservey	
499	Richard Metz	
500	Annette Metzger	
501	Jennifer Meyer	
502	Alfred C. Miles, Jr.	
503	Diane Miller	
504	Margaret Miller	
505	Phyllis Miller	
506	Rebecca Miller	
507	Susan Miller	
508	Tim Miller	
509	Wendy Miller	

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ID	Name	Affiliation
510	Daniel Mink	
511	Lauren Mitchell	
512	Ogden Mitchell	
513	Joan Mitsuka	
514	Debra Mobile	
515	Patricia Moffat	
516	Robert Monk	
517	Barbara Montabana	
518	Carla Montalvo	Clean Water Action
519	William Montgomery	
520	John Monti	
521	Philip Moore	
522	Thomas Moore	
523	Michael Moppin	
524	Mary More	
525	Chrys Morris	
526	Linda Morris	
527	Todd Morris	
528	Amy Morrisroe	
529	Stephanie Mory	
530	Audrey Moskowitz	
531	Bruce Moyer	
532	John Moyer	
533	Stephen Moyer	
534	Margi Mulligan	
535	Linda Murphy	
536	Carol Murray	
537	Linda Murray	
538	Leonard Myers	
539	Linda Myers	
540	Sharon Narushoff	
541	Paul Nasuti	
542	Samantha Nathan	

ID	Name	Affiliation
543	Rachael Neffshade	
544	Nora Nelle	
545	Eric Nelson	
546	Heather Nelson	
547	Michelle Nelson	
548	Thomas Nelson	
549	Sharon Newman	
550	Tammy Nogles	
551	James Novak	
552	Mara Obelcz	
553	Alice O'Brien	
554	Deanne O'Donnell	
555	Susan O'Donnell	
556	Bernadette Ondus	
557	Carol O'Neill	
558	Jeffrey Onink	
559	Darcey Ortolf	
560	Peter Oswalk	
561	Cheryl Pace	
562	E. Pajak	
563	Paul Palla	
564	Tracie Palmer	Clean Water Action
565	Kathleen Parisi	
566	Barbara Parker	
567	Patricia Parker	
568	Nancy Parks	Sierra Club
569	Prachi Patel	
570	Susan Patrone	
571	Rhonda Patterson	
572	Margaret Pattishall	
573	Eric Pavlak	
574	Frank Peachey	
575	Mike Peale	

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ID	Name	Affiliation
576	Daniel Pearce	
577	Bonnie Peckham	
578	Joan Pelc	
579	Holly Perry	
580	Alan Peterson	
581	Maviah Petri	Clean Water Action
582	Nezka Pfeifer	
583	James Phipps	
584	Robert C. Pina	
585	Emily Pitner	
586	David Platt	
587	Joel Platt	
588	Lynn Plepis	
589	George Plummer	
590	Ellen Poist	
591	Ted Pomerantz	
592	Dr. Sabrina A. Poole	
593	Kris Popovich	
594	Janet Porter	
595	Susan Porter	
596	Randy Poulsen	
597	Veronica Pratt	Environmental Integrity Project
598	Philip Procker	
599	Susan Proietta	
600	Vincent Prudente	
601	Mary Puffenberger	
602	A. Puza	
603	Howard Quaintance	
604	Jennifer Quick	
605	Christopher T. Quinn	
606	Jennifer Quinn	
607	Janet Rafferty	

ID	Name	Affiliation
608	Kirk Ramble	
609	Deborah Randall	
610	Susan Randle	
611	Rayzel Raphael	
612	William Rastetter	
613	Marjorie Rathbone	
614	Rebekah Ray	Clean Water Action
615	Daniel Reed	Clean Water Action
616	Eileen Reed	
617	Stacy Reedy	
618	Sarah Reese	
619	Robert Reiland	
620	Kay Reinfried	
621	Sarah Reiser	Clean Water Action
622	Margaret Reiter	
623	Kathleen Rengert	
624	Donna Reppert	
625	Sam Ressin	
626	Alex Reuj	
627	Miriah Reynolds	
628	Ronda Reynolds	
629	Gail Richert	
630	David Ringle	
631	Patricia Risso	
632	Harry Ritter	Environmental Integrity Project
633	Donald Robinson	
634	Lewis Robinson	
635	Melinda Robinson-Paquette	
636	Angelease Rosa	
637	Helene Rosen	
638	Ernest Rosenberg	
639	Pauline Rosenberg	

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ID	Name	Affiliation
640	Diana S. Rosenstein PhD.	
641	Adam Rosenwald	
642	Barbara Rosenzweig	
643	Susan Ross	
644	Robert Rossachacj	
645	John Rossi	
646	Patricia Rossi	
647	Barbara Rowley	
648	Lionel Ruberg	
649	Allan Rubin	
650	Seth Rudman	
651	Alison Rupert	
652	Charlene Rush	
653	Ivan Russell	
654	Gary Ryan	
655	Lisa Ryder	
656	Madeleine S.-D.	
657	Jill Sablosky	
658	Daniel Safer	
659	Allison Saft	
660	Kyle Sakamoto	
661	Daniel Salmen	
662	Hannah Salvatore	
663	William Sanders	
664	James Sandoe	
665	Mina Sandusky	
666	Loretta Sant	
667	Anya Saretzky	
668	Mike Saris	
669	Karen Sattler	
670	John Scahill	
671	Dennis Schaef	
672	David Schleinkofer	

ID	Name	Affiliation
673	Linda Schmidt	
674	David Schogel	
675	Steven G. Schon, P.E.	
676	Stefan Schreffler	Clean Water Action
677	Carol Schrum	
678	Rebecca Schultz	
679	Susan Schulz	
680	Dan Schwartz	
681	Judy Scriptunas	
682	Ronald Sebastianelli	
683	Kimberly Seger	
684	Helen Seitz	
685	Elizabeth Seltzer	
686	Diane Selvaggio	
687	Kathleen Serrano	
688	Larry Seymour	
689	Susan Shaak	
690	Linda Shab	Environmental Integrity Project
691	Ann Shade	
692	Jesse Shade	
693	Suzanne Shaffer	
694	Julie Shapiro	
695	Leslie Sharlock	
696	Mary Jean Sharp	
697	Peter Sheridan	
698	Connie Sherman	
699	Lori Shermer	
700	Nancie Shillington	
701	Fred Shoemaker	
702	Megan Shoemaker	
703	Jeffrey Shuben	
704	Wendy Shuman	

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ID	Name	Affiliation
705	James Shuta	
706	Sheila Siegel	
707	Thomas Simatic	
708	Barry Simon	
709	Rachel Simpson-Loizou	
710	Jill-Ann Sims	
711	William Sitman	
712	Edmund Skowronski	
713	Greg Skutches	
714	Gregory Skutches	
715	Paul Slifco	
716	Susan Small	Environmental Integrity Project
717	Beverly Smalley	
718	Holly Smallwood	
719	Donna Smith	
720	Ellen Smith	
721	J.T. Smith	
722	James Smith	
723	Mark Smith	
724	Robert Smith	
725	V. Smith	
726	Debrorah Soodak	
727	Linda Spangler	
728	Rich Speer	
729	Paula Spivack	
730	Lea Stabinski	
731	Suzanne Staggenborg	
732	Glenn Stamm	
733	Judy Stanley	
734	Kimberly Staub	Environmental Integrity Project
735	Alice Stehle	

ID	Name	Affiliation
736	Daniel Sterner	
737	Lydia Stettler	
738	Kathryn Stevens	
739	John Stofko	
740	Kristin Stoltzfus	
741	Richard Stolz	
742	James Stoner	
743	W. Andrew Stover	
744	George Stradtman	
745	Robert Sullivan	
746	Diana Suns	
747	Sherri Suppa	
748	Robert Suter	Clean Water Action
749	Carrie Swank	
750	Larry Sydow	
751	Marian Szmyd	
752	Peter Tafuri	
753	Kathie E. Takush	
754	Garry Taroli	
755	Nancy Tate	
756	Elizabeth Tauser	
757	Arlene Taylor	
758	J. Scott Taylor	Environmental Integrity Project
759	Llew Taylor	
760	Brian Teare	
761	Eva Telesco	
762	Anna Temcheshen	
763	Cindy Tenaglia	
764	Betsy Teutsch	
765	Carol Thompson	
766	Susan Thompson	
767	Jim Thompson, Jr.	

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ID	Name	Affiliation
768	Edward Thornton	
769	Ronald Tokarchik	
770	Richard Tregidgo	
771	Mandy Tshibangu	
772	Walter Tsou	
773	Jill Turco	
774	Judy Turetsky	
775	Lisa Tuttle	
776	Collette Twyman	
777	Stephanie Ulmer	
778	Christian J. Urbany	
779	Leo Uzych	
780	Meghan Valentich	
781	Charles Valenza	
782	Richard Van Aken	
783	Beth Vanburen	
784	Brenda Vance	Environmental Integrity Project
785	Nolan Vance	Environmental Integrity Project
786	Barbara Vanhorn	
787	Karen Vasily	
788	Daniel Vass	
789	Diane Veath	
790	Richard Vieth	
791	Dolores Vinson	
792	Anne Vogel	
793	Dan Volpatti	
794	Anne W.	
795	Andrew Wadsworth	
796	John Waering	
797	Carol Wagner	
798	M. Wagner	

ID	Name	Affiliation
799	Jessica Walcott	
800	Ed Wallace	
801	JoAnn Wallace	
802	Gerald Walsh	
803	Jeff Walsh	
804	Mark T. Walsh	
805	Cynthia Walter	
806	Norene Walworth	
807	Marlene Warkoczewski	
808	Elizabeth Warner	
809	Zoe Warner	
810	Justina Wasicek	
811	Lisa Watson	
812	Ransom Weaver	
813	Jeanne Weber	
814	Wendy Weingarten	
815	Ransome Weis	
816	Barry Weiss	
817	Logan Welde	
818	Travis Wendel	
819	Tanya Wenrich	
820	Barry Werber	
821	Lorraine Whalen	
822	Frank Whetsell	
823	Madeline Whitehill	
824	Cheryl Whittaker	
825	Jean Wiant	
826	Melissa Wiesner	Environmental Integrity Project
827	Kevin Wiker	
828	David Wiley	
829	Holly Williams	
830	Karen Williams	

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ID	Name	Affiliation
831	Simone Williams	
832	Dawn Winters	
833	Gary Wire	
834	Karen Witkus	Environmental Defense Fund
835	Daniel Wojnar	
836	Sabrina Wojnaroski	
837	Mickey Wolk	
838	Barbara Wood	
839	Beckie Wood	
840	Jane Worthington	Environmental Integrity Project
841	Kim Wright	
842	Sharon Wushensky	
843	Eileen Yacknin	Environmental Integrity Project
844	K.C. Yocum	Clean Water Action
845	Andrea Young	
846	Anne Young	
847	Glenn Young	
848	Madalene Zale	
849	Orly Zeewy	
850	Jennifer Zielinski	
851	J.	
852	Sarah	
853	Sen. Jake Corman	PA Senate, 34th District
854	Rep. Dom Costa	PA House, 21st District
855	Rep. Pamela DeLissio	PA House, 194st District
856	Rep. Dan Frankel	PA House, 23rd District

ID	Name	Affiliation
857	Rep. Robert Freeman	PA House, 136th District
858	Sen. Art Haywood	PA Senate, 4th District
859	Rep. Patty Kim	PA House, 103rd District
860	Rep. Stephen Kinsey	PA House, 201st District
861	Rep. Steve McCarter	PA House, 154th District
862	Rep. Daryl Metcalfe	PA House, 12th District
863	Rep. Dan Miller	PA House, 42nd District
864	Mike Ochs	Green Party of PA
865	Rep. Adam Ravenstahl	PA House, 20th District
866	Rep. Greg Rothman	PA House, 87th District
867	Sen. Joe Scarnati	PA Senate, 25th District
868	Sen. Sharif Street	PA Senate, 3rd District
869	Rep. Greg Vitali	PA House, 166th District
870	Rep. Jake Wheatley	PA House, 19th District
871	Sen. Gene Yaw	PA Senate, 23rd District
872		City of Philadelphia City Council
873		Milford Township Supervisors
874		Pittsburgh City Council

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ID	Name	Affiliation
875	Peter Drasher	Black Bear Environmental Asset Advisors, LLC
876	Christina Herman	Interfaith Center on Corporate Responsibility
877	Lynwood Keister	Keister Miller Investments LLC
878		Aquinas Associates
879		Dana Investment Advisors
880		Dignity Health
881		Dominican Sisters of Hope
882		Everence and the Praxis Mutual Funds
883		Friends Fiduciary Coporation
884		Maryknoll Sisters
885		Mercy Investment Services
886		Miller/Howard Investments, Inc.
887		Northwest Coalition for Responsible Investment
888		OIP Trust
889		Region VI Coalition for Responsible Investment
890		Sisters of Saint Joseph of Chestnut Hill, Philadelphia

ID	Name	Affiliation
891		Sisters of St. Francis of Philadelphia
892		Sisters of the Humility of Mary
893		Socially Responsible Investment Coalition
894		Society of the Holy Child Jesus - American Province
895		The Grey Nuns of the Sacred Heart
896		Trillium Asset Management
897		Trinity Health
898		Ursuline Sisters of Tildonk, US Province
899		Zevin Asset Management
900	Jennifer Anderson	Cabot Oil & Gas Corporation
901	John Barnes	
902	John Beach	
903	Rob Bealko	Nuverra Environmental Solutions
904	John Beimel	Beimel Transportation, Inc.
905	Joshua Beimel	Beimel Transportation, Inc.
906	Carol Bell	Cabot Oil & Gas Corporation
907	Dale Betts	
908	Scott Blauvelt	JKLM Energy, LLC
909	Richard Borden	

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ID	Name	Affiliation
910	Mike Broeker	Epiphany Environmental
911	Steven Buffone	CONSOL Energy Inc.
912	Connie Carden	Cabot Oil & Gas Corporation
913	Scott Catz	
914	Daniel Colton	
915	JP Crawford	Cabot Oil & Gas Corporation
916	Alice Curtiss	NFG Midstream Corporation
917	Chad Daloia	Comtech Industries, Inc.
918	Roger Davy	
919	Michael De Witt	SWEPI, LP
920	Matthew DeCamp	HiCrush
921	R. Robert DeCamp	HiCrush
922	Diane Deljanovan	Deljanovan Trucking, LLC
923	Hunter Dibble	
924	Brandon Dodge	Weir Oil and Gas
925	Kelsey Dowling	
926	Steve Dussault	GE Distributed Power, Inc.
927	James Edwards	Cabot Oil & Gas Corporation
928	Chad Eisenman	Chevron
929	Jody Eldridge	New Pig Energy
930	David Felcman	Enbridge
931	Remie Ferreira	US Business Development Patriot Drilling Fluids
932	Keith Fetch	
933	Austin Foutz	

ID	Name	Affiliation
934	Randall Frantz	Hillsdale Construction and Excavation Company, Inc.
935	Ted Gayman	Eichelbergers, Inc.
936	Maureen Geary Krowicki	National Fuel Gas Supply Corporation
937	Chuck Gerbe	Total Equipment Company
938	Robert Hamilton	
939	Joseph Harrick	East Management Services, LP
940	Patrick Hoopes	Patrick Hoopes Trucking Inc.
941	Preston Hoopes	RevHoopes Trucking, LLC
942	Sean Housler	Key Energy Services, Inc.
943	Terrence Jacobs	Penneco Oil Company
944	Glenn Johnson	Dominion Energy Services, Inc.
945	Jackie Johnson	Edward S. Kocjancic, Inc. Forestry Solutions
946	Tom Joseph	Epiphany Environmental
947	Sherri Kashuba	Cabot Oil & Gas Corporation
948	Jody Kenyan	
949	Rick Kessy	Repsol Oil and Gas USA, LLC
950	Chad Ketchum	Heckmann Water Resources, Inc.
951	Lacey Kitchen	
952	Edward Lush	MarkWest Energy Partners, LP

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ID	Name	Affiliation
953	Martin Madden	Comtech Industries, Inc.
954	James Malone	Quality Distribution
955	Nicole Marbaker	Diane Dlejanovian
956	Tom Mathison	Comtech Industries, Inc.
957	Darren McCauley	M&M Total Service HVAC
958	Taylor McConnell	Artelax Energy Services, LLC
959	Mike McDermott	Diane Dlejanovian
960	Kenneth McMahon	American Waste Management Services, Inc.
961	Doug Mehan	PennEnergy Resources, LLC
962	Michael Mirobelli	Cabot Oil & Gas Corporation
963	Bob Mosier	Beimel Transportation Inc.
964	Roger Myers	RRM Completions, LLC
965	Michael Neff	Diane Dlejanovian
966	Cory Norris	Diane Dlejanovian
967	Gus Pagonis	Epiphany Environmental
968	Mark Papalia	Principle Enterprises, LLC
969	Heather Pepper	Diane Dlejanovian
970	Tyler Ragan	East Management Services, LP
971	Laura Ragozzino	Range Resources
972	Bart Roberts	Cabot Oil & Gas Corporation

ID	Name	Affiliation
973	Tracey Romero	Sierra Hamilton, LLC
974	Greg Ruff	Rockwater Energy Solutions, LLC
975	Mike Selfridge	Diane Dlejanovian
976	Ronald Shawver	Cabot Oil & Gas Corporation
977	Guy Shirey	
978	John Sieminski	JKLM Energy, LLC
979	Paul Slater	Diane Dlejanovian
980	Terry Sliemann	
981	John Smelko	Cabot Oil & Gas Corporation
982	Thomas Smith	Diane Dlejanovian
983	Erwin Spencer	Diane Dlejanovian
984	Nathan Spire	Diane Dlejanovian
985	DuWayne Stainbrook	Cabot Oil & Gas Corporation
986	Michael Steiner	Diane Dlejanovian
987	Afton Sterling	Southwestern Energy
988	Jason Strushensky	Cabot Oil & Gas Corporation
989	Zachary Susko	Comtech Industries, Inc.
990	Sue Tarr	Cabot Oil & Gas Corporation
991	Christopher Trejchel	Highland Field Services, LLP; Seneca Resources Corporation
992	Stephanie Tubridy	JKLM Energy, LLC
993	Michele Watkins	
994	Jeffrey Watts	J.L. Watts Excavating, Inc.
995	Travis Wendel	Energy Corporation of America

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ID	Name	Affiliation
996	Lindsey Wesneski	
997	R. Christopher Wheat	Comtech Industries, Inc.
998	Robert Wheat	Comtech Industries, Inc.
999	Tim Williams	Pine Run Midstream, LLC
1000	Leslie Witherspoon	Solar Turbines
1001	Kathy Wood	
1002	Chris Wunz	Hydro Recovery, LP
1003		Rex Energy Corporation
1004	Robert Altenburg	Citizens for Pennsylvania's Future (PennFuture)
1005	John K. Baillie	Group Against Smog and Pollution
1006	Beverly Braverman	Mountain Watershed Association
1007	Evan Endres	Pennsylvania Chapter of The Nature Conservancy
1008	Lesley Fleischman	Clean Air Task Force
1009	Meleah Geertsma	Natural Resources Defense Council
1010	Lisa Graves Marcucci	Environmental Integrity Project
1011	Rev. Anna Lisa Gross	PA Interfaith Power & Light
1012	Carrie Hahn	Citizens Alliance Upholding a Safe Environment
1013	Lisa Hallowell	Environmental Integrity Project

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ID	Name	Affiliation
1014	Mitchell Hescoc	The Evangelical Environmental Network
1015	Cricket Hunter	PA Interfaith Power & Light
1016	Steve Hvozdoch	Clean Water Action
1017	Amanda John	National Parks Conservation Association, PA Program
1018	Joanne Kilgour	Sierra Club
1019	Ralph Kisberg	Responsible Drilling Alliance
1020	Emily Krafjack	Mehoopany Creek Watershed Association
1021	Hilary Lewis	Earthworks
1022	William Lochstet	PA Interfaith Power & Light
1023	David McCabe	Clean Air Task Force
1024	Megan McDonough	Protect Elizabeth Township
1025	Matthew Mehalik, Ph.D.	Air Quality Collaborative
1026	Jan Milburn	Westmoreland Marcellus Citizens' Group
1027	Joseph Minott	Clean Air Council
1028	Rev. Bret Myers	PA Interfaith Power & Light
1029	Ed Oles	Citizens to Preserve Ligonier Valley
1030	Elizabeth Paranhos	Environmental Defense Fund
1031	Andres Restrepo	Sierra Club

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ID	Name	Affiliation
1032	James Rosenberg	Fayette Marcellus Watch
1033	Robert Routh	Clean Air Council
1034	Larry Schweiger	Citizens for Pennsylvania's Future (PennFuture)
1035	Diane Sipe	Marcellus Outreach Butler
1036	Ron Slabe	Upper Burrell Citizens Against Marcellus Pollution
1037	Nadia Steinzor	Earthworks
1038	Kevin Stewart	American Lung Association of the MidAtlantic
1039	Mark Szybist	Natural Resources Defense Council
1040	Matt Walker	Clean Air Council
1041	John Walliser	Pennsylvania Environmental Council
1042	Andrew Williams	Environmental Defense Fund
1043	Henri Azibert	Fluid Sealing Association
1044	David Clark	PA Grade Crude Oil Coalition
1045	Mark Davis	Gas Compressor Association
1046	Timothy French	Truck & Engine Manufacturers Association
1047	Patrick Henderson	Marcellus Shale Coalition

ID	Name	Affiliation
1048	Matthew Hite	GPA Midstream Association
1049	Richard Hyde	Our Nation's Energy Future
1050	Teresa Irvin McCurdy	TD Connections, Inc
1051	Keith Naughton, Ph.D.	Silent Majority Strategies
1052	Sandra Snyder	Interstate Natural Gas Association of America
1053	Dave Spigelmyer	Marcellus Shale Coalition
1054	Kevin Sunday	Pennsylvania Chamber of Business and Industry
1055	Dan Weaver	Pennsylvania Independent Oil and Gas Association
1056	Stephanie Wissman	Associated Petroleum Industries of Pennsylvania
1057	E. A.	
1058	Jody A.	
1059	Sabine A.	
1060	Peter Adams	
1061	Roger Allen	
1062	Russ Allen	
1063	LaVonne Althouse	
1064	Erik Ammon	
1065	Gail Amshel	
1066	Taylon Ancone	
1067	Carl Anderson	
1068	Nadine Anderson	
1069	Sharon Anderson	

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ID	Name	Affiliation
1070	April Applegate	
1071	Kathleen Arcuri	
1072	Chara Armon	
1073	Susanne Arnold	
1074	Dennis Artley	
1075	Brittney Aston	
1076	Margo Azzarelli	
1077	D. B.	
1078	Dawn B.	
1079	Dianne B.	
1080	J. B.	
1081	K. B.	
1082	Kathy B.	
1083	John Bachalis	
1084	Lyn Back	
1085	Rebecca Baehr	
1086	Bill Baer	
1087	Randall Baird	
1088	Janice Baker	
1089	S. Baley	
1090	John Balicki	
1091	Allison Barnes	
1092	M.J. Barnett, Jr.	
1093	Purnima Barve	
1094	Moses Bates	
1095	Rebecca M. Batty	
1096	Athena Bauerle	
1097	Terrie Baumgardner	
1098	Barbara Beamesderfer	
1099	Elisa Beck	
1100	Karen Bedics	
1101	Jessica Bellas	
1102	Jeff Bence	

ID	Name	Affiliation
1103	Kevin Bennett	
1104	Simone Bennett	
1105	Eric Benson	
1106	Lamberto Bentivoglio	
1107	Mary Ann Bentz	
1108	Neil Beresin	
1109	Ben Bergman	
1110	Linda Berkhein	
1111	H. Bernhardt	
1112	Joseph Bertz	
1113	Jill Betters	
1114	Tiffany Betz	
1115	Anthony Bieak	
1116	Nina Bisbee	
1117	Pamela Bishop	
1118	Carol Bitter	
1119	P. Bittle	
1120	Jim Black	
1121	Nancy Blair	
1122	Louis Blau	
1123	Mark Blaustein	
1124	Roberta Blaylock	
1125	Martha Blood	
1126	Valerie Bloom	
1127	Ralph Blume	
1128	Hailey Blyant	
1129	Ellen Bobet	
1130	Casey Bohan	
1131	Hannah Bohn	
1132	Alexander Bomstein	
1133	Ind. Bona	
1134	Lisa Bonitatibus	
1135	Denise Bonk	

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1136	Deborah Borbonus	
1137	Michael Bourg	
1138	Gail Bower	
1139	Nora Boyd	
1140	Lori Braunstein	
1141	Nicholas Breinich	
1142	Anne Brennan	
1143	Anna Briker	
1144	Jana Brink	
1145	Valentine Brkich	
1146	Arthur Brogley Brogley	
1147	Clarence Brommer	
1148	Carter Brown	
1149	Elaine Brown	
1150	Maryann Brown	
1151	Paul Brown	
1152	Florence Buckley	
1153	J. Bufino	
1154	Beth Burke	
1155	David Bursky	
1156	Jeanette Bussen	
1157	Stacey Butterfield	
1158	Angelina C.	
1159	B. C.	
1160	M. C.	
1161	Marilyn C.	
1162	William C.	
1163	Ind. Calahil	
1164	Sandi Camunale	
1165	Mike Cantella	
1166	Jack Cardinal	
1167	Carol Carlson	
1168	William Carlson	

ID	Name	Affiliation
1169	Wayne Carr	
1170	Jim Carriage	
1171	C. Carson	
1172	Barbara Castay	
1173	James Castellan	
1174	Deborah Cate	
1175	Ellen Cathopoulos	
1176	Diane Cauley	
1177	Janet Cavallo	
1178	Siles Chance	
1179	Donna Chapin	
1180	Rachel Chaput	
1181	Andrew Cheung	
1182	Nicole Chinoppi	
1183	S. Chodosh	
1184	D. Ci	
1185	Jennifer Clark	
1186	Malinda Clatterbuck	
1187	Kristina Cliff-Evans	
1188	Heather Clire	
1189	Linda Cobb	
1190	Amy Cohen	
1191	Elaine Cohen	
1192	Nancy Cohen	
1193	Rachel Val Cohen	
1194	Edward Colerich	
1195	Mitchell Collier	
1196	Sarah Collier	
1197	Victor Colon	
1198	Jordana Composto	
1199	Russell Composto	
1200	Carol Conaway	
1201	Leigh-Anne Congdon	

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ID	Name	Affiliation
1202	John Cooke	
1203	Carolyn Cooper	
1204	Mary E. Corbett	
1205	Joseph Cornibe	
1206	James Corrodi	
1207	Tonya Coskey	
1208	Gwendolyn Coverdale	
1209	Julie Cox	
1210	Ind. Crane	
1211	Annette Crawford	
1212	Jason Crook	
1213	Rachel Crowley	
1214	Sarah E. Cruz	
1215	Susan Curry	
1216	James Curtis	
1217	Jason Curtis	
1218	E. D.	
1219	G. D.	
1220	K. D.	
1221	P. D.	
1222	Seth D.	
1223	Renae Daniels-Simmons	
1224	David Danner	
1225	Phyllis Davidson	
1226	Sarah Davidson	
1227	Karen Davis	
1228	Susan Davis	
1229	Peggy Dawson	
1230	Daniel Dayton	
1231	Kit Dee	
1232	Frances DeMillion	
1233	Frank Denbowski	
1234	Jane Derbenwick	

ID	Name	Affiliation
1235	Kasey Deslatte	
1236	Roger Desy	
1237	Nicole Deter	
1238	Carol Deutsch	
1239	Lynn Dewees	
1240	Virginia Di Ilio	
1241	Kerry Dibble	
1242	Stephen Dieringer	
1243	Brock Dilling	
1244	Sue DiMoia	
1245	Boris Dirnbach	
1246	Anne Dishong	
1247	Christine Dolle	
1248	Jean-Pierre Dolle	
1249	Roberto Dominguez	
1250	Michael Drake	
1251	Diane Dreier	
1252	Joseph Dreier	
1253	Sean Duffin	
1254	Connor Duffy	
1255	Michelle Dugan	
1256	Tyler Dumney	
1257	Bert Dunlop	
1258	Michael Dunn	
1259	Loretta Dunne	
1260	Linda Duttera	
1261	Beth Dutton	
1262	Diane Eagan	
1263	Aminda Edgar	
1264	Robert Edmund	
1265	Katie Edwards	
1266	Robert Edwards	
1267	Gerald Ellefson	

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1268	Diane Esser	
1269	L. Evans	
1270	Richard Eynon	
1271	Daryl Ezzo	
1272	William Ezzo	
1273	M. F.	
1274	Mark Fabian	
1275	Jessica Fahey-Petrack	
1276	Ashley Famularo	
1277	Martin Fanrak	
1278	Joan L Farb	
1279	Kathleen Farrington	
1280	Ruth Fauman-Fichman	
1281	Sybille Fedor	
1282	James Feldman	
1283	Norman Feldman	
1284	Al Ferrucci	
1285	Bill Ferullo	
1286	J. Allen Feryok	
1287	Josh Fidel	
1288	Matt Fidel	
1289	Noah Fidel	
1290	Robert Fidel	
1291	Rosemary Fielding	
1292	Charles Fields	
1293	Sergey Filatov	
1294	Frank Fiman	
1295	Kelly Finan	
1296	Jonathan Fine	
1297	Susan Fineman	
1298	Dru Finkbeiner	
1299	Enrico Fiore	
1300	Thom Fistner	

ID	Name	Affiliation
1301	Lori Flanagan	
1302	LaShawn Flewellen	
1303	Sandra Foehl	
1304	Kerry Foose	
1305	Antoinette Forrest	
1306	Karin Fossum	
1307	Kathy Fox	
1308	Will Fraser	
1309	Danielle Friedman	
1310	Frank Frieri	
1311	Sherri Fryer	
1312	Allison Frymoyer	
1313	Keira Fuener	
1314	Patricia Fuller	
1315	Dorothy Fulton	
1316	Park Furlong	
1317	Mathew G.	
1318	Jessica Gamble	
1319	Joseph Gammaitoni	
1320	Kris Gannon	
1321	Marcia Garb	
1322	Bonnoe Garci	
1323	Zoe Garcia	
1324	Jim Garetti	
1325	Timothy Gaughan	
1326	Claire Gawinowicz	
1327	Geltosky Geltosky	
1328	Marianne Gentry	
1329	Ellen Gerhart	
1330	James Gilmore	
1331	Helene Glaser	
1332	Ann Godshalk	
1333	Ind. Gonzalez	

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ID	Name	Affiliation
1334	Rev. Alan Gordon	
1335	Kristi Gracis	
1336	Karen Granche	
1337	Alison Gray	
1338	Gina Gray	
1339	Morgan Greenly	
1340	Jason Gregory	
1341	Amy Griffin	
1342	Judy Grisel	
1343	Brent Groce	
1344	Eric Grote	
1345	Bob Groves	
1346	Krista Guerrieri	
1347	L. H.	
1348	R. H.	
1349	Donna Haagen	
1350	K. Haegele	
1351	Julie Hagen	
1352	Lauren Hahn	
1353	S. Hall	
1354	Lois Hamerman	
1355	Nancy Handwerker	
1356	Cecelia Hard	
1357	Kris Harker	
1358	Fran Harkins	
1359	Dale Harris	
1360	Thomas Harris	
1361	Tom Harris	
1362	Dennis Hartenstine	
1363	Judy Hartl	
1364	Mary Hartley	
1365	Zach Hartman	
1366	Don Hawkins	

ID	Name	Affiliation
1367	Harry Heatherby	
1368	Donna Held	
1369	Carol Henning-Franczyk	
1370	Heidi Herholz	
1371	Pamela Herlong	
1372	Heidi Hess	
1373	Donald Hetrick	
1374	S. Higlpayn	
1375	Samantha G. Hippler	
1376	Bill Hoffman	
1377	Karen Hoffman	
1378	Charles Hollister	
1379	Richard Hom	
1380	Lynne Hoon	
1381	Jordan Hoover	
1382	Alan Horowitz	
1383	Lauren Howard	
1384	Jordan Howells	
1385	William Huff	
1386	William Hufford	
1387	Liz Hughes	
1388	Jacqueline Humphries-Bickley	
1389	L. Hurd	
1390	Paul Hurley	
1391	Kate Hurly	
1392	Timothy Inglis	
1393	Suzette Ippolito	
1394	Shafiqul Islam	
1395	David J.	
1396	Roland J.	
1397	Colleen Jackson	
1398	Laura Jackson	
1399	Joel Jacobs	

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ID	Name	Affiliation
1400	Barb Jarmoska	
1401	Kristin Jaros	
1402	Victoria Jenkins	
1403	Shirley Johannsen	
1404	John Johnson	
1405	Kris Johnson	
1406	Kyle Johnson	
1407	Renee Johnson	
1408	Eurhi Jones	
1409	John Jonik	
1410	Marie Jordan	
1411	S. Joscelyn	
1412	Thomas Josephi	
1413	A. K.	
1414	Ind. K.	
1415	P. K.	
1416	Kristle Kabrowski	
1417	Tom Kahler	
1418	Aleta Kahn	
1419	Janet Adler Kahn	
1420	Karen Kaighin	
1421	Suzanne Kalbach	
1422	Tracy Kalesnik	
1423	Tomi Kamihira	
1424	Dee Kane	
1425	Paul Karpich	
1426	Jane Kauer	
1427	John Kearney	
1428	Marjorie Kelly	
1429	Pamela Kennedy	
1430	Jon-Michael Kerestes	
1431	Covnelia King	
1432	Janis Kinslow	

ID	Name	Affiliation
1433	Jane Kirk	
1434	Michael Kleiner	
1435	Spencer Koelle	
1436	Barbara Koester	
1437	Georgann Kovacovsky	
1438	Jennifer Kovak	
1439	Diane Krassenstein	
1440	Kathleen Krebs	
1441	Ginny Kreitler	
1442	Deborah Kurilla	
1443	Jeff Kyle	
1444	Louis Kyle	
1445	Nicholas Kyriazi	
1446	Courtney L.	
1447	Joseph L.	
1448	Linda L.	
1449	M. L.	
1450	John Lahr	
1451	John D. Lahr	
1452	Ind. Lankee	
1453	Gary LaNoce	
1454	Mareen LaNoce	
1455	Edwina Lapham	
1456	Deane Lavender	
1457	Duc Anh Le	
1458	Megan LeCluyse	
1459	Beckham Lee	
1460	Michael Leeling	
1461	Laura Leete	
1462	Nora Lehmann	
1463	Mary Ann Leitch	
1464	Ethan Letherbarrow	
1465	Red Levinthal	

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1466	Patricia Libbey Libbey	
1467	Alan Libove	
1468	Alexis Lieberman	
1469	Andrea Likovich	
1470	Angela Locher	
1471	Sharon Loder	
1472	Ind. Lolento	
1473	Susan Loucks	
1474	John Lucci, Jr.	
1475	Tiani Luciano	
1476	Andrea Luckring	
1477	Susan Lundell	
1478	Mary Lynn Lynch	
1479	Michelle Lynn	
1480	Paula Lynn	
1481	Amy M.	
1482	E.M. M.	
1483	Heather M.	
1484	Ind. M.	
1485	Ind. M.	
1486	K. M.	
1487	Max M.	
1488	Alex Mabel	
1489	Leo Macdonald	
1490	Reverend Sandra Mackie	
1491	M. Maclow	
1492	Janyse Madsen	
1493	J. Magnano	
1494	Megan Mangun	
1495	Joann Manka	
1496	Toni Manol	
1497	Louis Mariani	
1498	Jill Marks	

ID	Name	Affiliation
1499	Dean H. Marshall	
1500	Robin Martin	
1501	Abbie Marx	
1502	Priscilla Mattison	
1503	Alan Maurer	
1504	Dorothy Maurer	
1505	Judith Max	
1506	Rebecca Maxwell	
1507	Sean McCarson	
1508	Dianne McCauley	
1509	Patrick McDaniel	
1510	Emme McDermott	
1511	John McGovern	
1512	Megan McGowan	
1513	Edward McGre	
1514	Deborah McIlvaine	
1515	Harold McIlvaine	
1516	Kathleen McKinley	
1517	Linda McLen	
1518	Karen M'Closkey	
1519	Deb McMullen	
1520	Sherry McNeil	
1521	Laurel Person Mecca	
1522	Person Mecca	
1523	Kathleen Meitz	
1524	Thomas Melle	
1525	Judith Melvin	
1526	Phyllis Mercurio	
1527	Wesley Merkle	
1528	J. Merlino	
1529	Marlynne Micalizzi	
1530	C. Miles	
1531	Christopher Miles	

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1532	Jack Miller	
1533	Nancy Miller	
1534	Patricia Miller	
1535	Michael Miller, Jr.	
1536	Don Millinger	
1537	David Mindel	
1538	Christopher Minich	
1539	Robert D. Missimer, Jr.	
1540	Erin Moffat	
1541	Blair Mohn	
1542	Thomas Molieri	
1543	Melissa Montini	
1544	Brian Moore	
1545	Kyle Moore	
1546	Pete Moore	
1547	Susan Moore	
1548	David Morgan	
1549	Susan Morris	
1550	Tyler Mossman	
1551	Anne Moyer	
1552	Glenn Moyer	
1553	Andrew Mramor	
1554	Susan Mucha	
1555	Julie Mull	
1556	Ind. Muller	
1557	Fawn Mullinary	
1558	Daphne Murray	
1559	Kristina Myers	
1560	Susan Myers	
1561	Dr. Vivianne Nachmias	
1562	Jon Nadle	
1563	Donna Napolien	
1564	Nora Nash	

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1565	Janice Nathan	
1566	Karen Natt	
1567	Elaine Nayayen	
1568	J.D. Neill	
1569	Laura Neiman	
1570	Craig Newberger	
1571	Harvey Nickey	
1572	Douglas Nightengale	
1573	Rachel Noll	
1574	Linda Noonan	
1575	Brenda Norris	
1576	Julie Nydes	
1577	Leslie Nyiri	
1578	Judy O.	
1579	John Oakes	
1580	David Ochmanowicz	
1581	Shannan O'Connor	
1582	Shannon O'Keefe	
1583	Steven Orlando	
1584	Katherine Oshana	
1585	Jim Overly	
1586	Chris Ozbun	
1587	Kathleen P	
1588	A. P.	
1589	J. P.	
1590	Lisa P.	
1591	G. Page	
1592	Elizabeth Pajak	
1593	Pauline Palko	
1594	John Palmer	
1595	John M. Palumbo	
1596	Ann Pannick	
1597	Jenny Park	

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1598	William Parker	
1599	Eric Pash	
1600	Leslie Patrick	
1601	Rev. A. Patrulla	
1602	Harper Patterson	
1603	Aggie Perilli	
1604	Cynthia Peterson	
1605	Orlan Peterson	
1606	Allison Petra	
1607	Michael Petrock	
1608	Karen Phillips	
1609	Beth Pirolli	
1610	Dan Piser	
1611	Donna Plummer	
1612	Tara Poe	
1613	Amy Pohelman	
1614	Kari Pohl	
1615	Suzanne Polen	
1616	John Poole	
1617	Linda Porter	
1618	John Prellwitz	
1619	Lauretta Prince	
1620	Michael Quickel	
1621	Natalie R.	
1622	S. R.	
1623	Josh Raizman	
1624	Stephanie Randall	
1625	Jason Rash	
1626	Lori Raymond	
1627	Janet Reese	
1628	Jenny Reeverts	
1629	Mary Reichart	
1630	Sa Reilly	

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1631	Lee Reinert	
1632	Erika Reinhard	
1633	Abby Resnick	
1634	Robert Reynolds	
1635	Robert W. Rhodes, III	
1636	Laurel Rice	
1637	Ron Richter	
1638	Stephanie Rieffanaugh	
1639	Kelly Riley	
1640	Kathleen Riordan	
1641	Shane Ritter	
1642	Eva Roben	
1643	Wayne Robertson	
1644	Don Robinson	
1645	Linda Robinson	
1646	Eleanor Rodda	
1647	Milton Rodriquez	
1648	John Rohrer	
1649	Beverly Rolfsmeyer	
1650	Melisa Romano	
1651	Donald Rosenberger	
1652	Doug Ross	
1653	Douglas Ross	
1654	Ind. Roth	
1655	Mary Ann Rotondo	
1656	Kathryn Rox	
1657	Lynda Rubin	
1658	Kathleen Rueppel	
1659	Karl Rureman	
1660	Jan Marie Rushforth	
1661	Joan Russo	
1662	Hannah Ryan	
1663	A. S.	

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1664	C. S.	
1665	N. S.	
1666	Michelle Salerno-Sigman	
1667	Ind. Salutta	
1668	Janet Sanders	
1669	Robert Sanders	
1670	Carol Sandt	
1671	Assij Sartru	
1672	Andrea Saunders	
1673	Julia Saurbaugh	
1674	Debby Schaaf	
1675	Bob Schmetzer	
1676	Chris Schmidt	
1677	Gerrie Schmidt	
1678	Jennifer Schnakenberg	
1679	Mary B. Schneider	
1680	R. Schoenholtz	
1681	Alain Schremmer	
1682	Richard Schultz	
1683	Michele Schwartz	
1684	Alicia Scott	
1685	Ind. Scott	
1686	Julie Scott	
1687	Tanya Seaman	
1688	Steve Sears	
1689	JoAnn Seaver	
1690	Margaret Sedlack	
1691	Sara Sefroerrig, RN	
1692	Pauleen Segal	
1693	Janet Seltman	
1694	Mark Sentesy	
1695	Brooke Severe	
1696	Gloriana Sewell	

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1697	Barbara Seymour	
1698	Shahana Shamim	
1699	Wenclay Shant	
1700	William Shapiro	
1701	Jaime Sharp	
1702	Deborah Shepard	
1703	Kate Sherman	
1704	Heather Shultz	
1705	Bonnie Shuman	
1706	Betty Sides	
1707	Linda Sieber	
1708	Pamela Sierra	
1709	Kathy Silvis	
1710	Randall Sindlinger	
1711	Eleanor Skibo	
1712	Susan Smith	
1713	Haley J. Sople	
1714	Alexandra Spaciano	
1715	Ana Noel Stanley	
1716	Kathleen Stehman	
1717	Beverly Sterner	
1718	Suzanne Stewart	
1719	Julia Stone	
1720	Katie Stone	
1721	Meredith Stone	
1722	William Van Stone	
1723	Sandra Strauss	
1724	Jamie Straw	
1725	Dawn Suchy	
1726	Susan Sullivan	
1727	Rich Surdyk	
1728	Susan Sussman	
1729	Lily Swartz	

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1730	Jay Sweeny	
1731	Margaret Swerdloff	
1732	Ind. T.	
1733	Jessica Tarica	
1734	Jordan Tegtmeyer	
1735	Jan Tenboom	
1736	Linda Theophilus	
1737	Lynda Thomason	
1738	Sally Thompson	
1739	Ron Tonnessen	
1740	Tamera Toy-lytle	
1741	Tracy Tracy	
1742	Scott Trees	
1743	Nicole Trefsger	
1744	Caroline Trindal	
1745	George Trovato	
1746	Miriam Tucker	
1747	susan tucker	
1748	Margaret Turcich	
1749	Ece Ulus	
1750	Jane Uptegrove	
1751	Elizabeth Urban	
1752	Nathan Van Velson	
1753	Aileen Varner	
1754	Chester Varner	
1755	Sarah Vinski	
1756	Jason Volpe	
1757	Ind. W.	
1758	J. W.	
1759	Jane W.	
1760	Jess W.	
1761	Tanya Wagner	
1762	Matt Walker	

ID	Name	Affiliation
1763	Kristy Walsh	
1764	Robyn S. Walters	
1765	Tom Wardell	
1766	Helen Warfield	
1767	Justin Wasser	
1768	Frances Wayne	
1769	Rodney Weaver	
1770	Suzanne E. Webster-Roberson	
1771	Janice Wedell	
1772	Ruby Weeks	
1773	Fran M. Welan	
1774	Lora Werner	
1775	Ellen Wert	
1776	Claire Westbrook	
1777	Katlyn Westman	
1778	Mevin Wexler	
1779	Dorothy Whipple	
1780	Carla White	
1781	Ind. white	
1782	Kenny Whiteblom	
1783	Charlotte Whiting	
1784	Jay Wiley	
1785	Jo Ann Williams	
1786	JoAnn Williams	
1787	Rebecca Williams	
1788	Beverly Williamson-Pecori	
1789	William Willis	
1790	Joy Wiltenburg	
1791	Ind. Witzel	
1792	Eric Wobb	
1793	S.R. Woesika, Jr.	
1794	Ind. Wolf	
1795	Paige Wolf	

Appendix A - List of Commentators

ID	Name	Affiliation
1796	Allen Wolk	
1797	Ellen Womer	
1798	Chris Wood	
1799	Jennifer Wood	
1800	D. John Woodcock	
1801	Susan Wooley	
1802	James Wray	
1803	Huron Wright	
1804	Joe Wyzkoski	
1805	Linnea Xue	
1806	G. Y.	
1807	Jerry Yeager	
1808	John Zachmann	
1809	Jonathan Zaikowski	
1810	Daniel Zales	
1811	Holllis Zelinsky	
1812	B.J. Zellers	
1813	Tina M. Zellie	
1814	Melissa Zillhardt	
1815	Kelly Zimmerman	
1816	Kathleen Zoll	
1817	Suzanne Zwerling	
1818	B.	

ID	Name	Affiliation
1819	Carol	
1820	D.	
1821	Deborah	
1822	E.	
1823	Kendal	
1824	Nancy	
1825	P.	
1826	P.	
1827	Paul	
1828	R.	
1829	Rebecca	
1830	T.	
1831	V.	
1832	Tammy Crouthamel	
1833	There are 396 submissions of this form letter that are either anonymously submitted or the signatures are illegible.	
2228		
2229	Carol Adams	
2230	Richard Aken	
2231	William Bader	
2232	Rev. Dr. Elizabeth Baker-Smith	
2233	Rev. Dr. Gerritt Baker-Smith	
2234	Jacqueline Baruch	

Appendix A - List of Commentators

Commentators Affiliated with Common Sense Measures:

ID	Name
2235	Teresa Baumgardner
2236	Suzanne Baxter
2237	Sandra Beitler
2238	Marliese Bonk
2239	Debra Brandis
2240	Roberta Bunsick
2241	Scott Cannon
2242	Dr. Rosemary Caolo
2243	Mary E. Christman
2244	John Colgan-Davis
2245	Dr. John Comella
2246	John Cooper
2247	Nady Corvers
2248	Nancy Crane
2249	R. A. Dayton
2250	Mike Dellapenna
2251	Ann Demerlis
2252	Carol Ann DeSanto
2253	Ed Dornheim
2254	Shadoc Drury
2255	Melissa Elder
2256	Dr. As Er
2257	William Ferullo
2258	David Fieldler
2259	Dr. C. Fisher
2260	Dr. Silvio Fittipaldi
2261	John Flynn
2262	Helen Freedman
2263	Rev. Carol Fridley
2264	Kathleen A. Gaultieri
2265	Kathy Grabowski

ID	Name
2266	Linda Granato
2267	Karen Guarino-Spanton
2268	Linda Harrington
2269	Judy Heald
2270	Rev. Gordon Hills
2271	Michelle Hoff
2272	Cathy Hoskins
2273	Clifford Hritz
2274	Nancy Iannuzzelli
2275	Renea Ingram
2276	C. Jayne
2277	Shelly Joscelyn
2278	Melissa K.
2279	Richard Keefer
2280	Jeffrey Kelly
2281	Linda Kilby
2282	Mary Kirby
2283	Deb Kline
2284	Warren Knapp
2285	Alan Kohn
2286	Lyda Kolesar
2287	Stephen Kunz
2288	Marc Leeson
2289	Margaret Lenahan
2290	Tim Lennox
2291	Angela Leventis
2292	Paula Lim
2293	Bernard Lizak
2294	Edward Loeber
2295	Pat Lupo
2296	Jameson McDonnell

ID	Name
2297	Dr. Justin Mikach
2298	Regina Milione
2299	James Sam Miller
2300	Patti Miller
2301	Thomas Miller
2302	Dianne Moore
2303	DeDe O'Donnell
2304	Ruth Olsen
2305	Marisol Passy
2306	Rita Pesini
2307	Susan Plubell
2308	Betsy Restly
2309	William Ridgeway
2310	Matt Rosa
2311	Suzan Rovin
2312	Rachel Rozum
2313	Bonnie Sadowskas
2314	Bruce Sadowskas
2315	Ann Marie Sardineer
2316	Anthony Sauro
2317	Eric Schnabel
2318	Beth Seibel
2319	Tawnya Shields
2320	Dr. Diane Sicotte
2321	Rev. J. T. Smith
2322	Timmie Smith
2323	Karen Guarino Spanton
2324	Lea Stabinski
2325	Bob Steininger
2326	Sheila Stevens
2327	Carrie Swank

Appendix A - List of Commentators

ID	Name
2328	Kathie E. Takush
2329	Garry Taroli
2330	Stanley Tomkiel

ID	Name
2331	Susan Verbalis
2332	James Vogt
2333	Lee Wolf

ID	Name
2334	Ted Wray
2335	Steven Zserai

Commentators Affiliated with Clean Water Action Form Letter:

ID	Name	Affiliate
2336	Jaime Abbanato	
2337	Steve Abrams	
2338	Jim Adnir	
2339	Tiffany Albright	
2340	Mark Alderman	
2341	Sue Ellen Alderman	
2342	Ann Aldrich	
2343	Maivy Alexander	
2344	Margo Allegra	
2345	Challee Allen	
2346	Chris Allen	
2347	Karin Allen	
2348	Priyanka Amir	
2349	George Amisos	
2350	Meeker Amos	
2351	Misty Andon	
2352	Merret Andrews	
2353	Samuel Angell	
2354	Wendy Ankrom	
2355	Bob Ansast	
2356	Lisa Anthony	
2357	Janet Antl	
2358	Mary Beth Appel	
2359	Nancy Artus	

ID	Name	Affiliate
2360	Rachel Ashourizdegan	
2361	T. Atrunklin	
2362	Madison Auch	
2363	Barbara Auerbach	
2364	Rabbi Tsurah August	
2365	Yosaif August	
2366	Stephen Austin	
2367	Jean Claude Awiduhaye	
2368	Susan Babbit	
2369	Janet M. Badolato	
2370	Margaret Badore	
2371	Kane Baker	
2372	Mike Baldino	
2373	Mark Baldwin	
2374	Barb Ballenger	
2375	Jess Ballenger	
2376	Nicole Barber	
2377	Andrew Barend	
2378	Molly Barg	
2379	Philip Barile	
2380	Ed Barnand	
2381	Meghan Barrett	
2382	Madalyn Barsoh	

ID	Name	Affiliate
2383	Nan Batcho	
2384	Linda Battiste	
2385	Aaron Bauman	
2386	Vick Bazarbashian	
2387	Eric Bazillian	
2388	Jessica Beasley	
2389	Eleanor Beaver	
2390	Polly Bech	
2391	Rody W. Beer	
2392	Andrea Belasco	
2393	M. Christine Benner Dixon	
2394	Paul Bente	
2395	Lorenzo Benton	
2396	Anne Marie Berenato	
2397	Gabriel Beresia	
2398	Noah Beresia	
2399	Stuart Berg	
2400	Maryanne Berner RSM	
2401	Justin Bernstein	
2402	M. Birdleboush	
2403	Dave Blair	
2404	Kathy Blessing	

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ID	Name	Affiliate
2405	Tom Bloh	
2406	Henry Boarsting	
2407	Jennifer Bohn	
2408	Melissa Bonilla	
2409	Paul Bonomo	
2410	Charles Boodsky	
2411	Mausol Botz	
2412	Mark Boudreau	
2413	Zachary Bove	
2414	Camelia Bowle	
2415	Phyllis Bowman	
2416	Meredith E. Boyd	
2417	Katie Boyle	
2418	Rachel Brandoff	
2419	Sasha Brandoff	
2420	M. Brannan	
2421	Henry Braun	
2422	Joy Braun	
2423	Shanon Brea	
2424	Kathie Breckenridge	
2425	Michael Breslin	
2426	Rosalie Breslin	
2427	Joseph D. Brett	
2428	Karen Breznicky	
2429	Shoshana Brickehn	
2430	Carol Bricker-Mcku	
2431	Benta Britz	
2432	Paul E. Brock	
2433	Ind. Brooks	
2434	Linda Brown	

ID	Name	Affiliate
2435	Rachel Brown	
2436	Matt Brownlee	
2437	Jennifer Brownlie	
2438	Mary Brucker	
2439	Kimberly Brunner	
2440	Beth Bruton	
2441	Toni Budd	
2442	Christina Burn	
2443	Kelly Busato	
2444	Christine Bush	
2445	Tara Busher	
2446	Shanee Butler	
2447	J'lon Butter	
2448	Live Byland	
2449	Sam Byland	
2450	Derdel Y. C.	
2451	Lanlen C.	
2452	Justina Calgiam	
2453	Andrew Calhoun	
2454	Jessica Calloon	
2455	Joseph Calvarese	
2456	Don Campbell	
2457	E. T. Canfe	
2458	Denise Capek	
2459	Aries Carangi	
2460	Kirsten Carangi	
2461	Gathro S Cardoas	
2462	Jennifer Cardoso	
2463	Jennifer Carney	
2464	Shannon Carney	
2465	Jaime Carr	
2466	Carol T. Carsello	
2467	Sandra Carter	

ID	Name	Affiliate
2468	Dorothy Cary	
2469	Susan Cassanella	
2470	Howard R. Cell	
2471	Paula Cell	
2472	Meredith Chang	
2473	Dominica Chiavaroli	
2474	Jan Chide	
2475	Emily Chutsos	
2476	Thomas Ciambrone	
2477	James Cimorelli	
2478	Isa Clark	
2479	Linda Clarke	
2480	Irene Clemens	
2481	Mez Clements	
2482	Tamara Clements	
2483	Marianne Coady	
2484	David Coal	
2485	Francine Cohen	
2486	Judy Cohen	
2487	Sheryl Cohen	
2488	Sue Cohen	
2489	Deborah Collins	
2490	Candice Conway	
2491	Charles Cook	
2492	Maren Cooke	
2493	Hazel Cope	
2494	Erin Copeland	
2495	Maureen Copeland	
2496	Audeere Cordoba	
2497	C. Corey	

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ID	Name	Affiliate
2498	Kevin Corey	
2499	Carya Cornell	
2500	Bonnie Lee Cotten	
2501	Christopher Coxe	
2502	William Cozzens	
2503	Erika Crawford	
2504	Maria Crespo-Gantley	
2505	Jon Crobem	
2506	Doug Crosby	
2507	Connie Cuddebach	
2508	Rich Cuddebach	
2509	Erica Cunningham	
2510	Greg Cunningham	
2511	Jim Cunningham	
2512	Sue Cunningham	
2513	Anastasia Currihan	
2514	Ula M. Cutten	
2515	Ind. D.	
2516	John D.	
2517	Kristin D.	
2518	Jeremy Danner	
2519	Rober Dans	
2520	Stephanie D'Argenio	
2521	Steven Daum	
2522	Ranon Daves	
2523	Ted Davis	

ID	Name	Affiliate
2524	Charlene Day	
2525	Harriet Day	
2526	Darlene Dech	
2527	Elijah Deegan	
2528	Monica Dehih	
2529	Dionne Delgado	
2530	Caleb Delp	
2531	Jal Denigo	
2532	Jessica Depavh	
2533	Mary Lou Dertuci	
2534	Claire DeSalme	
2535	Dennis Desalme	
2536	Lynnette Dethieldo	
2537	Kim Dieckhais	
2538	May Diehich	
2539	Davis Diehl VMD	
2540	Marie DiEmidio	
2541	Kathie A. DiFeo	
2542	Steven DiLenno	
2543	Shelley Dillard	
2544	Angela DiMaria	
2545	Heidi Diskin	
2546	Jim DiTaranto	
2547	Mark Dixon	
2548	Me Dohm	
2549	Corey Dolan	
2550	Lisa M Donahue	
2551	Neil Donahue	
2552	Andrew Donaldson-Evans	
2553	Aaron Dongle	
2554	Tasha Doremus	

ID	Name	Affiliate
2555	Kristin Dormuth	
2556	Kathleen Dougherty	
2557	Kyle Dowdy	
2558	Jeanne C. Downing	
2559	JoAnn Doyle	
2560	Susan DuBois	
2561	Maria Duca	
2562	Susan Dugan	
2563	Yvonne Duin Howard	
2564	Jared Dunleavy	
2565	Alex V. Dunn	
2566	Francis Dunn	
2567	Heather Dunn	
2568	Mary Dunwoody	
2569	Lois S Dursa	
2570	J. Dyle	
2571	Susan E	
2572	Anat Eckhoff	
2573	Brian Edwards	
2574	Geogs Edwards	
2575	George Edwards	
2576	Martha Edwards	
2577	Kathleen H. Egan	
2578	Elizabeth Egg Krings	
2579	Magrielle H. Eisen	
2580	Kelsey Eldridge	
2581	Eleanor M. Eliknton	

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ID	Name	Affiliate
2582	Tom Elkinton	
2583	Connor Ellis	
2584	R.D. Ellis	
2585	Sue Levi Elwell	
2586	Katherine Ernst	
2587	Zac Ernst	
2588	Kevin P. Eronin	
2589	J. Esty	
2590	Brian Evans	
2591	Michelle A. Fabuy	
2592	Melanie Fagan	
2593	Margaret Fahringer	
2594	Deborah Falte	
2595	Mark Fanell	
2596	Marcus Fanery	
2597	Betty Farabelle	
2598	R. Hampton Farrar	
2599	M.J. Fecher	
2600	Thomas Feeney	
2601	Claudia Feire	
2602	Tina Fellner	
2603	Cassie Fennell	
2604	Elizabeth Ferben	
2605	Jessica Ferreira	
2606	Jason Fialkovich	
2607	Rose Fike	
2608	Rachel Filippini	
2609	Frank Fisher	
2610	Paul M. Flangan, III	

ID	Name	Affiliate
2611	Anna Flannery	
2612	Don Flannery	
2613	Ashley Fleming	
2614	Hillary fletcher	
2615	Roger Florio	
2616	Henry Flory	
2617	Dominic Foleno	
2618	Brian Forbackre	
2619	Vincenzo Formoso	
2620	Jill Fowler	
2621	Kevin Fowler	
2622	Lynne Frank	
2623	Sam Franklin	
2624	Don Freedom	
2625	Mark Freilich Ph. D.	
2626	Joshua Friedman	
2627	Alison Fritz	
2628	T. Frouers	
2629	Megan Fuller	
2630	J. G.	
2631	Steve Gadknecht	
2632	Thomas Gain	
2633	Daliah Gansalves	
2634	Angel Garcia	
2635	Michael Gardner	
2636	Patrick Garo	
2637	Mark Garranone	
2638	Kevin D. Gatton	
2639	Hanna Gatty	
2640	Genevieve Gavin	
2641	Nancy Day Gavin	

ID	Name	Affiliate
2642	Christine Geaney	
2643	Abdi Gedeta	
2644	Rebecca Gellen-Puchahky	
2645	A. Gentile	
2646	Anne George	
2647	Natalie Gerace	
2648	Stella Gerardi	
2649	Carolyn Gessner	
2650	Maria Ghisa	
2651	Nancy Gibbs	
2652	Margo Gilliam	
2653	Karen Ginsburg	
2654	Christine Ginverich	
2655	Shanese Givers	
2656	Sandy Glatter	
2657	Lena Glickman	
2658	Stephanie Glutts	
2659	Paul Glynn	
2660	Laurie Goldberg	
2661	Matthew Goodman	
2662	Sheri Gordon	
2663	Sandra Gosciminsk	
2664	Corri Gottesman	
2665	Dana Graham	
2666	Eileen Graub	
2667	Celina Gray	
2668	Michael A. Graziano	
2669	Marla Greenberg	

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ID	Name	Affiliate
2670	Alan Greenburn	
2671	Maureen Gregory	
2672	Nicholas Gregory	
2673	Dexter Gresh	
2674	Greta Gretz	
2675	Kyle Griegs	
2676	Crystal Griffin	
2677	Jane Grod	
2678	Michael Gross	
2679	Michael Grunwald	
2680	Margaret Guerra	
2681	Heidi Guhnz	
2682	Alex Hackett	
2683	Emilie Haertsch	
2684	Denise Haines	
2685	Dasha Halkin	
2686	G. Hall	
2687	Luia Hallquin	
2688	Missy Hallwett	
2689	Harry Han	
2690	Amanda Hanburg	
2691	Peter Handler	
2692	Kathleen Hansell- Prigg	
2693	Sarah Harissis	
2694	Ellen Harlan	
2695	Edward Hart	
2696	Ellen Hart	
2697	Matt Hart	
2698	Eleanor Harty	
2699	Kay Harty	
2700	Richard Harvey	

ID	Name	Affiliate
2701	Sue Harvin	
2702	Sherma Hasselstrom	
2703	Eric Mitchell Healey	
2704	Mary Heinz	
2705	Anne Hel	
2706	Rone Hellem	
2707	Jason Henderson	
2708	Jen Heness	
2709	Maureen Hennessey	
2710	Barb Hill	
2711	Keith Hinshaw	
2712	Connie Hoester	
2713	Gerald Hoffman	
2714	Gloria Hoffman	
2715	John Hoffmeyer	
2716	Curtos Hoganson	
2717	Jennifer Holmen	
2718	Joyce Holn	
2719	Jaelea Holt	
2720	Linda Holtzman	
2721	Thomas Hood	
2722	Alex Houell	
2723	Mike Houghton	
2724	Marian S. Houston	
2725	Lee Houtner	
2726	Rebecca Huggins	
2727	John Husshue	
2728	Julie Hust	
2729	Ayesha Imani	

ID	Name	Affiliate
2730	Nia Imani-Farrar	
2731	Sally Ironfield	
2732	Ellen L. Isun	
2733	J. J.	
2734	Alicia Jackowiak	
2735	Joyce R. Jackson	
2736	Walter Jackson	
2737	Anrae James	
2738	Domenica Janikic	
2739	Jasha Janikic	
2740	Johannes Jarka- Sellers	
2741	Peter Jarsicas	
2742	Evicalynn Jasionowsk	
2743	Iy Johnson	
2744	Kelly Jones	
2745	Tim Jones	
2746	R. Juty	
2747	John K.	
2748	Bobbie Kaering	
2749	Rachael Kalan	
2750	Cary Anne Kane	
2751	Sarah Kane	
2752	Sam Kanuth	
2753	Debra S. Kardon- Brown	
2754	Amir Kareem	
2755	Janet Karp	
2756	Lyndsey Karp	
2757	Keita Kary	
2758	Joy Katz	
2759	Lee Katzenbacll	

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ID	Name	Affiliate
2760	Denise Kay	
2761	Ian Keating	
2762	Gina Keiffer	
2763	Scott Kelerer	
2764	Deanna Kelmer	
2765	Mike Kent	
2766	Victoria Kepeslay	
2767	Rachel Kern	
2768	Thomas M. Kerr	
2769	Lauren Kibe	
2770	R. Adam Killos	
2771	Doug Killough	
2772	Ye Kim	
2773	Morgan King	
2774	Sarah King	
2775	Douglas Kingsbury	
2776	Stuart Kinkner	
2777	Barton Kirk	
2778	David Kleiner	
2779	Leslie klinefelter	
2780	Max Klink	
2781	Sandra Klos	
2782	Jane Kneyzse	
2783	Peter Knok	
2784	Sandra Knuth	
2785	Margie Kojoury	
2786	Donna Korczyk	
2787	Judith A. Kramer	
2788	Kev Kramer	
2789	Joshua G. Krangl	
2790	D. Kratz	
2791	Kathy Kruger	

ID	Name	Affiliate
2792	Kara Krumm	
2793	Patty Kubicek	
2794	Elaine Kuhan	
2795	Jessica Kushner	
2796	Yu L.	
2797	Gayle Lacks	
2798	Brian LaMarre	
2799	Jill A. Landler Ligi	
2800	Dawn Lane	
2801	Erik LaSalle	
2802	Susan Lathrop	
2803	Monica Laurace	
2804	Robert Lawrie	
2805	Sebastien Lecloveq	
2806	Cindy Lee	
2807	Rachel J. Lee	
2808	Sharon Len	
2809	Lavisa Leon	
2810	Joseph Leopold	
2811	Dan Lesinski	
2812	David A. Leury	
2813	Curyl Levin	
2814	Miranda Levine	
2815	Judd Levingston	
2816	Ryan Lewis	
2817	Xia Li	
2818	Jean Lichstein	
2819	Megan Lichtenwelter	
2820	Kristen Lieberman	

ID	Name	Affiliate
2821	Kurt Lieberman	
2822	Karen Lightner	
2823	Brian Ligi	
2824	Donald Lill	
2825	Grace Limaye	
2826	Brianna Lindsay	
2827	Amy Lipshie	
2828	Peter Litev	
2829	Bonnie Lloyd	
2830	Christine Logan	
2831	David Loke	
2832	Lynn Lopez	
2833	Joan Lothery	
2834	Lynneth J. Louse	
2835	Laura Ludbey	
2836	Justin Lujan	
2837	Kathleen Lynch	
2838	Joe Lyons	
2839	B. M.	
2840	Alexandra Mabel	
2841	Ira Mabel	
2842	Pat Macdiore	
2843	Cristia Mack	
2844	June Macon	
2845	Reka Magge	
2846	Joel Mahon	
2847	June B. Makara Rn	
2848	Sean Maloney	
2849	Paul Mamoni	
2850	Autumn Mansor	
2851	Christopher Marc	
2852	Shaun Marc	

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ID	Name	Affiliate
2853	Sharon Marcone	
2854	Quin Marge	
2855	Mary Mark	
2856	Alan Markoutz	
2857	Morley Marks	
2858	Michele M. Marsh	
2859	C.K. Marshitell, PhD.	
2860	Rhyle Masaly	
2861	Kylie Mash	
2862	Michael Massey	
2863	Matthew Mastronardi	
2864	Lynn Mather	
2865	Monica Mathis	
2866	Nicole Matthesen	
2867	Rob Matusevic	
2868	Laura Mauchesare	
2869	Mr. Maxwell	
2870	Mrs. Maxwell	
2871	Ben May	
2872	Dianne Mayer	
2873	Cathy Mazza	
2874	Sharon Mazzi	
2875	Emily McAlpin Rauch	
2876	LaToya McCargo	
2877	Dennis McCarthy	
2878	B.C. McCulloch	
2879	Tara McDaniel	
2880	Emlyn McFarland	
2881	Mary McGarn	

ID	Name	Affiliate
2882	Kevin McGee	
2883	Kate McGinley	
2884	Donald M. McGuire	
2885	John McKee	
2886	Kathy McKee	
2887	Betsy McKinsty	
2888	David McLaughlin	
2889	Donna McNulty	
2890	Maggie McWilliams	
2891	M.B. Meakin	
2892	Kara Medow	
2893	Jodi Meier	
2894	Laura Melane	
2895	Angelina Melsu	
2896	Steve Menyer	
2897	Gregory Mercurio	
2898	Lou Ann Merkle	
2899	Andy Merrell	
2900	Dominique Messini	
2901	Toni C. Mett	
2902	W.M. Mettler	
2903	May Alysse Metzger	
2904	Jae C. Meyer	
2905	Linda Meyeresh	
2906	M.B. Mfakee	
2907	Jim Miades	
2908	Sara-Claude Michon	

ID	Name	Affiliate
2909	Curis Micuael	
2910	Daud Miller	
2911	Erik Miller	
2912	John Miller	
2913	N'Deereah Miller	
2914	Josh Millhouze	
2915	Josh Mindlin	
2916	Tori Mittelman	
2917	Jon Moffett	
2918	Marilynn Moger	
2919	C.J. Momow	
2920	John Monaghon	
2921	Deborah Monde	
2922	Nick Monkell	
2923	John Montes	
2924	Cassie Mook	
2925	Alex Moore	
2926	Maureen Morello	
2927	Elizabeth Moselle	
2928	Megan Mount	
2929	Jessica Moyer	
2930	Erin Mras	
2931	Teresa M. Muldrow	
2932	Peter Mulgey	
2933	Jim Mulhani	
2934	Debbie Mullen Mren	
2935	Christine Muller	
2936	Nathan Muller	
2937	Joshua Munn	
2938	Katherine Muns	
2939	Blair Murdock	

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ID	Name	Affiliate
2940	Megan Murgeson	
2941	Rod Murray	
2942	Jarrett Muzi	
2943	Anulel Mx	
2944	Mark Myava	
2945	B. N.	
2946	Fred Nadris	
2947	Ingrid Nagin	
2948	Shibabrat Naik	
2949	Michael Nakuden	
2950	Bryce Napier	
2951	Art Nealsen	
2952	Dan Neeld	
2953	Julia Neely Rn	
2954	Antonia Neflue	
2955	Orit Netter	
2956	Shira Neuberger	
2957	Tom Newman	
2958	Ellen Newth	
2959	Sam Nicaise	
2960	Emilie Nichols	
2961	Chris Nicholson	
2962	Helen Nicholson	
2963	Lynn Nicholson	
2964	Robyn Noack	
2965	John Noel	
2966	Alex Norquist	
2967	Elizabeth A. Norris	
2968	Stephanie Notarianni	
2969	Mitch Null	
2970	Mima O'Ann	

ID	Name	Affiliate
2971	Andie Obrien	
2972	Stephen O'Connell	
2973	Ashley O'Dacre	
2974	Alethea Okonak	
2975	Marilyn Okonak	
2976	Kelly O'Neill	
2977	Rebecca Ortenberg	
2978	Jennifer Orusco	
2979	Lisa Oswald	
2980	Michael Oswald	
2981	Sharon Oveiton	
2982	Andrew Owens	
2983	Nicole P.	
2984	Jacquelyn A. Paige	
2985	Joe Painter	
2986	Lee Painter	
2987	Lynn Palewicz	
2988	Pinky Parikh	
2989	Stefan Parisi	
2990	Jo Parker	
2991	Kevin Parker	
2992	Ron Parker	
2993	Michele Parney	
2994	Susan Patron	
2995	Sandra Paugh	
2996	Jess Paulraj	
2997	Marilyn Pease	
2998	Jenny Perinovic	
2999	Christian Peshek	
3000	Chris Petro	

ID	Name	Affiliate
3001	Ronald Petrou	
3002	Alex Pezzati	
3003	Mary Phip	
3004	Reg Pilletier	
3005	Allyson Pinel	
3006	Sommer Pirrong	
3007	Nikki Pizzi	
3008	Robert H. Pollack	
3009	Sammi Ponato	
3010	Katie Poor	
3011	Steve Por Shaw	
3012	Jenna Possner	
3013	Whitney Posterhach	
3014	Josh W. Powell, III	
3015	Steven Preiss	
3016	Denise M.B. Prentice	
3017	Norma Procaccino	
3018	Jenn Prusk	
3019	Christen Purtt	
3020	Andrea Putnam	
3021	Maureen Puzan	
3022	Cheryl Pyrch	
3023	Ind. Pyroja	
3024	Caroline Quincan	
3025	Michael J. Quirk	
3026	Michelle Quirk	
3027	C.J. R.	
3028	L.C. R.	
3029	Adams Rakes	

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ID	Name	Affiliate
3030	Amy Ragsdale	
3031	Durgesh Raj	
3032	Piera Rallaele	
3033	Angie Ramos	
3034	E. Ray	
3035	Bruce Rean	
3036	Annie Regan	
3037	Paul G. Regan	
3038	Robert Regan	
3039	Christine Reilly	
3040	Mary Reindorf	
3041	Jocelyn Reinertsen	
3042	Mary Beth Reinhagn	
3043	David Reppert	
3044	Daniel Reyes	
3045	La Ri	
3046	Marge Richman	
3047	Michele Rick	
3048	Diane Rissinger	
3049	Elise Rivers	
3050	C. Rizzo	
3051	Margi Roberts	
3052	Russell Robinson	
3053	Kristen Rodriguez	
3054	Michael Rodriguez	
3055	Keeley Rogers	
3056	Ellen Rogvinhart	
3057	Gloria Rohlfz	
3058	Michael Rominl	
3059	Carol Roossin	

ID	Name	Affiliate
3060	Rocco Rosanio	
3061	Rachel Rose	
3062	Judith Rosenbury	
3063	Penny Roser	
3064	Sam Rotax	
3065	Fred Roth	
3066	Jessica Rowe	
3067	John Roxly	
3068	Roman Roytman	
3069	Dawn Rstillo	
3070	Elayne Ruehstein	
3071	Althea D. Ruffin	
3072	Chadeve Rul	
3073	Edwin Rupert	
3074	Chris Rupps	
3075	Morgan Rust	
3076	Maureen Rutkowski	
3077	A. S S.	
3078	Lynne Sablack	
3079	Talia Sainclair	
3080	Stephanie Salvatore	
3081	Carl Salz	
3082	Mary Alice Salzer	
3083	Jessica Sandbery	
3084	Anna Sanderson	
3085	Kate Sanderson	
3086	Jessica Sariego	
3087	Matthew Sarn	
3088	Alexandria Sasek	
3089	Slaveiko Savov	
3090	Susan Saxe	

ID	Name	Affiliate
3091	Tony Scanz	
3092	Kristen Scatton	
3093	John Scep	
3094	Bob Schachner	
3095	Robin Schafler	
3096	Rebekkah Scharf	
3097	Caroline Scherer	
3098	Maxine Scherz	
3099	Christian Schill	
3100	Cindy Schmidt	
3101	Barbara Schmock	
3102	Johanna Schoeller	
3103	Kevin Schuster	
3104	Marc Schuster	
3105	Moiria Schwartz	
3106	Shoshana Schwartz	
3107	Ed Segal	
3108	Mary Segal	
3109	Matt Serell	
3110	Michael Settanni	
3111	Sarah Shaffer	
3112	Angela Shaw	
3113	Nancy Sheiff	
3114	Nurit Shein	
3115	Mike Sheldrake	
3116	David C. Shelton Jr.	
3117	Reed Sherbrooke	
3118	Grace Shoemaker	
3119	Jane Siaell	
3120	Elissa Siegel	
3121	Jane Siegel	

Appendix A - List of Commentators

ID	Name	Affiliate
3122	Sid Siegel	
3123	Wanda Siller	
3124	Carlos Silva	
3125	Timothy J. Simmons	
3126	Natalie Simon	
3127	B. S. Simpson	
3128	Bernadette Sims	
3129	Rick Skoh	
3130	Troy Slirangi	
3131	Sue Smadrue	
3132	Barbara Smiley	
3133	Alice P. Smith	
3134	Gabe Smith	
3135	Janice Smith	
3136	Laura Smith	
3137	Marianne Smith	
3138	Rose Smith	
3139	Timothy Smith	
3140	Jennifer Smolenski	
3141	Witney Snyder	
3142	Carrie Solari	
3143	Gheorghe Solgan	
3144	Chris Sonetto	
3145	Marjorie Spaeth	
3146	Edmund B. Spaeth, III	
3147	Kelley Splaush	
3148	Karen Stachelek	
3149	Lauryn Stalter	
3150	Cassi Steenblok	
3151	Ali Stefanik	

ID	Name	Affiliate
3152	Rodi Steinig	
3153	Deborah Stern	
3154	Harris Stern	
3155	Julie Sternson	
3156	Joe Stevenson	
3157	Brandon Stiles	
3158	Justin Stillwell	
3159	Nathan Stoley	
3160	Ashey Strepp	
3161	Alison Stuart	
3162	Caitlin Stuetz	
3163	B. Daniel Suntt	
3164	Susan Supres-Well	
3165	C.R. Sutter	
3166	Rebecca Szhnok	
3167	H. T.	
3168	J. T.	
3169	C.M. Talucki	
3170	Robin Tama	
3171	K.B. Tan	
3172	Debra Tannerbaum	
3173	Kathy Tarka	
3174	Tein G. Taylor	
3175	Vickie Taylor	
3176	Jillian Terry	
3177	John Terry	
3178	William Thames	
3179	Mary Thetan	
3180	Angela Thomas	
3181	Annamarie Thompson	

ID	Name	Affiliate
3182	Katrina Thurman	
3183	Jogena Tillinger	
3184	Carrie Tliulhoy	
3185	Annie Toghantti	
3186	Ellen Tomlinson	
3187	Grace Tomlinson	
3188	Nicole Towres	
3189	Angelo Trivelli	
3190	Lorena Trujillo	
3191	Steve Truong	
3192	Meriel Tulante	
3193	Casey Turner	
3194	Del Turner	
3195	Matthew Tuyiel	
3196	Roman Tyeniko	
3197	Nancy Tyson	
3198	Lee Urwiler	
3199	Ashely Vagham	
3200	Diane Valade-Pelletier	
3201	Elizabeth Vallen	
3202	Marge Van Cleef	
3203	Margaret van Naerssen	
3204	Jennifer Varrasse	
3205	Joanna Vaughan	
3206	Salone S. Vaughn	
3207	Paula Venen	
3208	Judith R. Venuto	
3209	Jeremy Vern	
3210	Ann Vicario	
3211	Sueli Vieira	
3212	Janis Vinson	

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ID	Name	Affiliate
3213	Theresa M. Viola	
3214	Natalie Volz	
3215	William Voros	
3216	Jackie Voss	
3217	Rob Vrana	
3218	R. W.	
3219	Reuben Wade	
3220	Leslie Wagner	
3221	Katie Wahling	
3222	A. S Waksman	
3223	Joy Waldinger	
3224	April Walker	
3225	David Wallace	
3226	Karen L. Waller	
3227	Sandra Walls	
3228	Allan Walters	
3229	Margaret Walters	
3230	Elizabeth Warrick	
3231	Jon Warzel	
3232	Lenny Washington	
3233	Renee Watley	
3234	Barbara Watson	
3235	Madeline Watson	
3236	Matthew Watson	
3237	Rhona Watson	
3238	Ellen Weaver	
3239	Edward Webster	
3240	Sheila Weinberg	
3241	Elizabeth Weiner	
3242	Harrison Weiss	
3243	Norman Weiss	
3244	David Wells	

ID	Name	Affiliate
3245	Kenny Wells	
3246	Wendy Wells	
3247	Kevin Welsh	
3248	Mike Welsh	
3249	Jayson Wenstrup	
3250	J.M. Went	
3251	Mary Werler	
3252	Jay West	
3253	Sharon J. Westerman	
3254	Mary Whelan	
3255	Shelley White	
3256	Leanna Lee Whitman	
3257	Randal Whitman	
3258	Hillary Wiemoth	
3259	Acadia Wilcox	
3260	David L Wilcox	
3261	Dennis Will	
3262	David Williams	
3263	Susan Windle	
3264	Lisa Winograd	
3265	Reirra Winters	
3266	Marjorie Winther	
3267	Karen Wisniewski, RN	
3268	Ellen Wisnosky	
3269	Blake WI	
3270	Andrea Wo	
3271	Leigh Woldenberg	
3272	J. Wolf	
3273	Shelly Wolf	

ID	Name	Affiliate
3274	Katie Wolff	
3275	Caitlin Wolfinger	
3276	Carolyn Woll	
3277	John Patrick Wood	
3278	Melissa Wood	
3279	Shannon Wood	
3280	Jennifer Woodfin	
3281	Allen Woodruff	
3282	Jen Woodward	
3283	Connor Worny	
3284	Bernell Worrell	
3285	Tyler Wray	
3286	Donna M. Wrignes	
3287	Annelle Wuncn	
3288	Clals Wunr	
3289	Emilia Xavier	
3290	Shelly Yanoff	
3291	Nathaniel Yesner	
3292	Jason Young	
3293	Michael Young	
3294	Olivia Young	
3295	Lotus Yu	
3296	Courtney Zajac	
3297	Catherine A. Zajko	
3298	Paul Zarut	
3299	Afshin Zavareh	
3300	Wen Zheng	
3301	George Zotalis	
3302	Adrienne	
3303	Amanda	

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ID	Name	Affiliate
3304	Betsy	
3305	Bif	
3306	Jacob	
3307	Jenny	
3308	John	
3309	L.	
3310	Larry L.	

ID	Name	Affiliate
3311	Luig	
3312	Maura	
3313	Meseere	
3314	Michael	
3315	Ross	Clean Water Action

ID	Name	Affiliate
3316	Ruby	
3317	Ye	
3318	There are 15 anonymous submissions of this form letter.	
3332		

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Affiliated with DEP Must Develop Emission Control Standards Form Letter:

ID	Name
3333	Eric Aberle
3334	Vicki Adams
3335	Linda Addis
3336	Ashley Adelgren
3337	Gayle A'Harrah
3338	Owen Ahearn
3339	George Ainsworth
3340	Jordy Albert
3341	Julie Ann Allender
3342	Melanie Aloï
3343	Mary Lou Altfather
3344	John Ambler
3345	Cynthia Ambrose
3346	Tara Ambrosine
3347	Sidney Amster
3348	Dianne Anderson
3349	Elizabeth Anderson
3350	Erik Anderson
3351	Ruth Anderson
3352	Lisa Androski
3353	Jocelyn Anthony
3354	Terry Antonacci
3355	Kathryn Armstrong
3356	John Arnao
3357	Grace Van Artsdalen
3358	Sarah Aslam
3359	Thomas Au
3360	Mary Ruth Aull
3361	Robin Aurandt
3362	James Baas
3363	Michael Babb

ID	Name
3364	Terry Bachman
3365	Susan Baer
3366	Robin Baily
3367	John Balavage
3368	Sean Barker
3369	Ann Barnes
3370	Daniel M. Barr
3371	Jack Barrett
3372	Dorothy Bash
3373	Anne Baumann
3374	Linda Bazan
3375	Patricia Beaman
3376	Daniel Beaston
3377	Lisa Beatty
3378	Janet Beaver
3379	Ann Beck
3380	D. Beck
3381	Genevieve Becker
3382	Rose-Anna Behr
3383	Tom Bejgrowicz
3384	John Belch
3385	Judy Bell
3386	Jennifer Bellano
3387	Avital Ben-Josef
3388	Robert Benner
3389	Arlene Benny
3390	Nancy Bergey
3391	Patricia Berrian-Marrujo
3392	Jacqueline Berry
3393	Linda Berry

ID	Name
3394	Andrea Bertram
3395	Michael Berwind
3396	Benjamin Betz
3397	Patricia Beville
3398	Michelle Bilbrough
3399	Richard Bills
3400	Beth Bintrim
3401	Roy Bires
3402	Janet Bischoff
3403	Paul Bisio
3404	Kim Bjarkman
3405	Lois Bjornson
3406	Richard Bleam
3407	Gayle Blendick
3408	Carol Blum
3409	David Blumenthal
3410	Barry Blust
3411	Katherine Boas
3412	Santiago Bobadilla
3413	William Boehme
3414	Daniel Boff
3415	Jon Bogle
3416	Emily Borcz
3417	Jessica Bordas
3418	Debra Bortnick
3419	Scott Bostic
3420	Bruce Bouchard
3421	Rita Bouchard
3422	Kosta Bounos
3423	Anna Bower
3424	Jerry Bower

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ID	Name
3425	Adrienne Bowley
3426	Laura Boyer
3427	Audrey Braam
3428	Kerry Brace
3429	Heather Marg Bracken
3430	Stacey Bradley
3431	Michael Bratsis
3432	Conchita Braun
3433	Pamela Breneman
3434	Kristin Brennan
3435	Liz Brensinger
3436	Donna Bresaw
3437	Linda Bressler
3438	Donna Brice
3439	June Bricker
3440	Charles Brinker
3441	Maryjo Brinker
3442	Lindsay Brinton
3443	Robert Brobst
3444	Arthur Brogley
3445	Theresa Bromley
3446	Norma Bronder
3447	Ilona Brost
3448	Patricia Brotman
3449	Beatrice Broughton
3450	Brian Brown
3451	David Brown
3452	Douglas Brown
3453	Lynne Brown
3454	Terry Brown
3455	Aja Brownell
3456	Eric Brubaker

ID	Name
3457	T. Bruster
3458	Aleta Bruzzese
3459	John Bryan
3460	Alexis Brzuchalski
3461	Michael Buchanan
3462	Russ Buchanan
3463	Genevieve Bullock
3464	George Bullwinkle
3465	Terry Burck
3466	Elizabeth Burger
3467	Susan Burke
3468	Janis Burkhardt
3469	Cathy Burnes
3470	Reid Burnes
3471	Denise Burstein
3472	Pam Burton
3473	Rhonda Buttacavoli
3474	David Byman
3475	Ann Callahan
3476	Mona Callahan
3477	Jamie Cammarata
3478	Joseph Candela
3479	Rosemary Caolo
3480	Anthony Capobianco
3481	Erin Caretti
3482	Sydney Caretti
3483	Jeffrey Carlin
3484	David Carlson
3485	Kathleen Carlson
3486	Matthew Carlson
3487	Sy Carman
3488	Marc Carrella
3489	Enrique Del Castillo

ID	Name
3490	Carole Castro
3491	Melissa Cavell
3492	Cassandra Cecchi
3493	Mitchell Chaikin
3494	Cheryl Champy
3495	Clarke Chapman
3496	C Gerald Chetkowski
3497	Jeff Chivetta
3498	Ann-Marie Christopher
3499	Jack Ciak
3500	Donna Cicalese
3501	Tom Cihil
3502	Monica Clark
3503	Sandi Clark
3504	Barbara Clarke
3505	Christopher Close
3506	Karen Clossey
3507	Susan Cobleigh
3508	Raymond Coccia
3509	Martin Coffey
3510	Gary Cohen
3511	Jon Cohen
3512	Judith Cohen
3513	Rachel Cohen
3514	Dotty Cokinos
3515	Ellen Cole
3516	Carrie Collins
3517	Laurie Pisarcik Connolly
3518	Alicia Connors
3519	John Conrad
3520	Mary Conroy

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ID	Name
3521	Harold B. Cook
3522	Sharon Cookson
3523	Jeff Cooper
3524	Richard Cooper
3525	Colin Coppola
3526	L. K. Castañeda Cordero
3527	Deborah Cornwell
3528	Marissa Covell
3529	Lorie Cracken
3530	Erin Crawley-Woods
3531	Patricia Craychee
3532	David Creagan
3533	Eugene Creany
3534	Stephen Crescimanno
3535	Matthew Crespi
3536	Charles Cresson
3537	Rose Cripps
3538	Jesse Crouse
3539	Cynthia Crowner
3540	Melissa Cruise
3541	Mariam Cruz
3542	Katherine Cubeta
3543	Brinton Culp
3544	Karen Culp
3545	Wendy Culp
3546	Mary Jean Cunningham
3547	Tina Curran
3548	Rebecca Custer
3549	Cheryl Cutler
3550	Barbara Czyrnik
3551	Elisabeth Dalrymple

ID	Name
3552	Tammy D'Amore
3553	Mark Daniel
3554	Barb Daniels
3555	Frank Dannert
3556	Joanne Dantonio
3557	LaMoyne Darnall
3558	Rita Darragh-Connors
3559	Pat Dashbach
3560	Alan Dasilva
3561	Beth Daubert
3562	Barbara Davis
3563	Carol Davis
3564	Dan Davis
3565	Edward Davis
3566	Emily Davis
3567	Mark Davis
3568	Michael Davis
3569	Pat Davis
3570	Teresa Davis
3571	Ruth Anne Dayton
3572	Karen Dean
3573	Tina DeCarla
3574	Diana Decembrino
3575	Carol Deem
3576	Mitzi Deitch
3577	Patricia Delaney
3578	Judy Delestienne
3579	Shawn Delmar
3580	Linda Deluca
3581	Francis Demuro
3582	George Denlinger
3583	Margaret Denton
3584	Paul Derrickson

ID	Name
3585	David Dewalt
3586	Ann Dickman
3587	Pamela Diesel
3588	Frank Dietrick
3589	Scott Dillon
3590	Debbie Dintenfass
3591	Ellen Dionna
3592	Annamarie Diraddo
3593	Donald Dixon
3594	Kendall Dobbins
3595	Anne Doerr
3596	Stephanie Doleniak
3597	Jeanette Donahue
3598	Carolyn Doric
3599	Will Doric
3600	Mercedes Dotter
3601	Bill Dougherty
3602	Leonard Douglass
3603	John Dowdell
3604	Fatima D'Oyen- Waley
3605	Alison Dray
3606	C. Daniel Drissel
3607	Jon Drucker
3608	Jackie Dufalla
3609	Alison Duncan
3610	Faustino Dunckhorst
3611	David Dunning
3612	Douglas Durfey
3613	Ronald Dutton
3614	Stanley F. Dylinski
3615	Brian Earley
3616	Philomena Easley

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ID	Name
3617	Dave Eberhardt
3618	Robert Eby
3619	Lynne Echard
3620	Beth Edwards
3621	Nancy Ehmann
3622	Gerald Eicher
3623	Brenda Eisenhauer
3624	David El
3625	Shannon Elliott
3626	Edward Engler
3627	Theresa Epp
3628	As Er
3629	Karen Erb
3630	Zuleikha Erbelinger-Bjork
3631	Joseph Erdeljac
3632	Mark Erickson
3633	Steven Erisoty
3634	Eruch Ernst
3635	Brooke Espersen
3636	Char Esser
3637	Kathleen Estes
3638	Frank Evelhoch
3639	Sarah Everett
3640	Steven Fackenthall
3641	Larry Falcone
3642	Melissa Farr
3643	Ronald Farrell
3644	Karen Faul
3645	Tim Faul
3646	Mark Feder
3647	Nicholas Fedorek
3648	John Feighner

ID	Name
3649	Heather Ferranti
3650	Marcus Ferreira
3651	Travis Ferrell
3652	Justine Ferretti
3653	Mary Ferrigno
3654	Susan Fidelman
3655	Chad Fierros
3656	Wesley G. Finkbeiner
3657	Cheryl Finley
3658	Ann Finn-Cusick
3659	Thomas J. Finn-Cusick
3660	Brian Fiorello
3661	Ken Fisher
3662	Janet Fishman
3663	Silvio Fittipaldi
3664	Marie Fitzpatrick
3665	Amanda Flagle
3666	Karen Fleck
3667	Kim Fleischer
3668	Annette Fleischman
3669	Gregory Flory
3670	Shannon Flynn
3671	Monty Foley
3672	Travis Ford
3673	James Fordham
3674	David Forney
3675	Lesley Forrester
3676	Cheryl Forte
3677	Marguerite Foster
3678	Andrew Fox
3679	Bruce Fox
3680	Richard Fox

ID	Name
3681	Robert Fox
3682	Richard Franco
3683	Joseph De Frank
3684	Lindsey Frazer
3685	Donna Frazier-Byrd
3686	Elaine Frech
3687	Bryn Frederickson
3688	Robert Freeborn
3689	Linda Freedman
3690	Robert Freeman
3691	Jeff Fremont
3692	Harry Frey
3693	Kimberly Frey
3694	Monica Frolander-Ulf
3695	Elaine Frost
3696	Ann Fruth
3697	Corey Fuhrer
3698	Sandra Fulton
3699	Gayle Funk
3700	John Funk
3701	Stanley Furrow
3702	Sherry Gagne
3703	John Gajewski
3704	B. Gallagher
3705	George Gallagher
3706	Leanne Ganser
3707	Deborah Gardner
3708	Judith Garrett
3709	Thomas Garrett
3710	Emily Gates
3711	Linda Gauntt
3712	James Gaynor

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ID	Name
3713	Nicholas Genger-Boeldt
3714	Mike Genz
3715	Colin George
3716	Sandy Gera
3717	Terri Gerace
3718	Jean Gerdes
3719	Julie Gery
3720	Charles Gettes
3721	Indrani Ghosh
3722	Robert Gibb
3723	Arthur Gibbs
3724	Angelo Giganti
3725	Alaina Gilchrist
3726	Madeleine Gill
3727	William Gleason
3728	Matthew Glinn
3729	Lynn Glorieux
3730	Leslie Goldsmith
3731	Libby Goldstein
3732	June Gollatz
3733	William Gontram
3734	Edmund Good
3735	Kyle Goodell
3736	Robert M. Goodman
3737	Marcia Gordon
3738	Edward Goryl
3739	Susan Gottfried
3740	Amanda Gower
3741	Eileen Graham
3742	Tyler Graham
3743	David Grancell
3744	Renee Grant

ID	Name
3745	Denise Grasser
3746	Jeffery Graver
3747	Kathy De Graw
3748	Mimi Graybill
3749	Jo Green
3750	Ken Green
3751	Patrick Grenter
3752	Bonnie Gribshaw
3753	Patricia Griffey
3754	Polly Grimm
3755	Ronald Grimm
3756	Tracey Griser
3757	Steve Grodis
3758	Joan Groff
3759	Sharon Gross
3760	Kathleen Grosso
3761	Barbara Grover
3762	Linda Groves
3763	Jane Gruen
3764	Alexandra Gruskos
3765	Albert Gruswitz
3766	Susan Guido
3767	Larissa Gula
3768	Katherine Gulick
3769	Chat Gunter
3770	Greg Gurev
3771	M. H.
3772	Sue Habecker
3773	Susan Habecker
3774	Cindy Hackman
3775	Kira Hadalski
3776	Paul Hagedorn
3777	Peter Hager

ID	Name
3778	Jennifer Hallam
3779	Sonja Hallett
3780	Wesley Hamilton
3781	Nick Hammer
3782	Ronald Hammill
3783	Richard Hammond
3784	Arden C. Hander
3785	Joanne Hangen
3786	Julia Hanks
3787	Karen Hanley
3788	Josephine Hansen
3789	Janet Harbauer
3790	Cathy Harbert
3791	Eleanor Harding
3792	Joan Harding
3793	Frances Harkins
3794	Nancy Harkins
3795	David Harnish
3796	Dave Harnly
3797	Beverly Harrison
3798	Gerald Harrison
3799	Mary Hart
3800	Regina Hart
3801	Melissa Harvey
3802	Charles Mcghee Hassrick
3803	Joni Hauck
3804	R. Havrilla
3805	Erin Hayes
3806	Chelsea Haylett
3807	Neil Haylett
3808	Carol Hayward
3809	Amy Hayworth

Appendix A - List of Commentators

ID	Name
3810	Gretchen Heacock
3811	Jeffrey Hearn
3812	Steve Hearn
3813	Martin Hecht
3814	Paul Heckbert
3815	George Hee
3816	Ruth Heffner
3817	Barbara Hegedus
3818	Melissa Heid
3819	Lisa Heinz
3820	Doug Heinze
3821	Michael Held
3822	Kurt Heller
3823	Melanie Heller
3824	Mark Helman
3825	David Hemberger
3826	Judith Henckel
3827	David Hendel
3828	Jon Hendricks
3829	Robert Hendricks
3830	Willard Hennemann
3831	Grace Henning
3832	Dan Henninger
3833	Francis J Hensler
3834	Lynne Heritage
3835	John Herrmann
3836	Anthony Hess
3837	Douglas Heyman
3838	Brendan Hickey
3839	Thomas Higgins
3840	Karen High
3841	Jim Highland
3842	Diana Hill

ID	Name
3843	Susan Hill
3844	Joyce Hines
3845	Daniel Hinkle
3846	Mark Hirschman
3847	Janet Hitz
3848	Lois Hluhan
3849	Aftan Hoffer
3850	Alexander Hoffer
3851	Donna Hoffman
3852	Jan Hoffman
3853	Curtis Holgate
3854	Dianna Holland
3855	Jill Hollingshead
3856	Kent Holmes
3857	Glen Holt
3858	Dorothy Holtzman
3859	Danielle Holubowski
3860	Frances Homer
3861	Nancy Hopping
3862	Ronald Horiszny
3863	Lee Horne
3864	Ben Hoskins
3865	Paul Houck
3866	Diane House
3867	Carole Hovis
3868	Amy Howe
3869	John Hrabar
3870	Laura Hrabar
3871	Gregory Huber
3872	Kristie Hudzik
3873	Deb Hughes
3874	Elaine Hughes
3875	Kimberly Hugo

ID	Name
3876	Ashley Hunsberger
3877	Donald Hunt
3878	Harry Hunt
3879	Lynne Hurd
3880	Francine Hyde
3881	Daniel Anthony Iezzi
3882	Donald Imler
3883	Bridget Irons
3884	Lynne Isopi
3885	Debra Istvanik-Strotman
3886	Steven Iszauk
3887	W. Jackson
3888	Eric Jacobs
3889	Robert James
3890	Charles Jasnosz
3891	Jon-Paul Jaworski
3892	Douglas Jeeves
3893	Christine Jeffords
3894	Krista Jeffries
3895	Clara Jellinek
3896	Jane Jesteadt
3897	Curt Johnson
3898	Jean Johnson
3899	Sara Johnston
3900	Sandy Jones
3901	Marilyn Jordan
3902	Thomas Josephi.
3903	Ira Josephs
3904	Lawrence Josephs
3905	Beth Kairush
3906	Jerry Kalinoski
3907	Anne Kaplan

Appendix A - List of Commentators

ID	Name
3908	Adam Kapp
3909	Ruche Kapur
3910	Steve Karas
3911	Grace Karschner
3912	Marcia Karuba
3913	Martha Kasanow
3914	Dale Kashner
3915	Suzanne Kause
3916	Kenneth Kay
3917	Dee Kearney
3918	Sam Keiser
3919	Nancy Keiter
3920	Mary Kelchak
3921	Joanne Kellar
3922	Dennis Keller
3923	Mary Ann Kelliher
3924	Anne Kemmerer
3925	Renee Kenendy
3926	Jackie Kennedy
3927	Thomas Kennedy
3928	Leni Kerekgyarto
3929	Mark Kern
3930	Lori Kershner
3931	Anne Keys
3932	David Kichman
3933	Carolyn Kidder
3934	F. Kiefner
3935	Scott Kierzek
3936	Linda Kilgore
3937	Jasper King
3938	Jim Kippen
3939	Jim Kirby
3940	Michael Kirby

ID	Name
3941	Karen Kirchdoerfer
3942	Debra Kirchhof- Glazier
3943	George Klaes
3944	Donna Klaput
3945	Lydia Klasnikov
3946	Betty Klauk
3947	Kelyn Klein
3948	Mary Lou Kleinbach
3949	Robertta Klimovich
3950	Robert Kline
3951	Thomas Klusaritz
3952	Cath Knapik
3953	Pat Knauss
3954	Sheila Knerr
3955	Barbara Knickerbocker
3956	Laura Knight
3957	Marlene Knight
3958	John Kocer
3959	Bobbie Koenig
3960	Robert Kohler
3961	Erika Kolecki
3962	Carol Koontz
3963	Frank Koskovich
3964	John Kostesich
3965	John Kotarski
3966	Rosemarie Kozdron
3967	Denise Kozminsky
3968	Laura Kramer
3969	Melissa Krauss
3970	John Kremer
3971	Madeline Krentz

ID	Name
3972	Melissa Krug
3973	Dennis Kubrak
3974	Claudette Kulkarni
3975	Jennifer Kulp
3976	Angela Kump
3977	Joanne Kundrat
3978	Derek Kunz
3979	Annmarie Kuter
3980	David Kutish
3981	Amy Kwasnicki
3982	Joseph Lahm
3983	Robert Lahner
3984	Matthew Lam
3985	Donald Lambert
3986	Daniel Lammot
3987	Jesse Landis
3988	Shirley Landis
3989	Sharon Lane
3990	Beverly Lang
3991	Barbara Langan
3992	Wieslawa Langenfeld
3993	Alan Lapayover
3994	Lauren Laska
3995	Margaret Laske
3996	Wendy Latzgo
3997	Kathleen Lawless
3998	Helen Lawman
3999	Lucinda Lea
4000	Judith Leach
4001	Therrss Leach
4002	Milton Leake
4003	Katherine Leary
4004	James Leasure

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ID	Name
4005	Jim Leasure
4006	Joanne Leatherman
4007	Sharon Lebon
4008	Ann Lee
4009	Mark Leeson
4010	Joan Lehman
4011	John Leitel
4012	Marianne Lemenager
4013	Dara Lemmon
4014	Deb Lennon
4015	Sarah Lenz
4016	Paul Lerman
4017	Joseph Lesniewski
4018	Lisa Lester
4019	Maryjane Letham
4020	Gina Librizzi
4021	Aaron Libson
4022	Carole Licht
4023	Kristen Lightbody
4024	Theodore K. Lilley, III
4025	John Lindberg
4026	John Linkes
4027	Gabrielle Lipkin
4028	Linda Listing
4029	Linda Litwin
4030	Thom Livingston
4031	Stephaney Lloyd
4032	Jennifer Loch
4033	Donna Logan
4034	Kathy Long
4035	Shakeerah Long
4036	Deb Longenhagen

ID	Name
4037	Mike Loomis
4038	Sarah Loosbrock
4039	Cheryl Lorditch
4040	Jennifer Lorenz
4041	Rachel Loudermilk
4042	Jean Lubonovich
4043	Peter Luborsky
4044	Wendy Luciw
4045	Jacqueline Lukas
4046	Tina Lusher
4047	Ashley Lutz
4048	Heather Lyba
4049	Charles Lyons
4050	Jonathan Lyons
4051	Jesse Lytle
4052	D. M.
4053	S. M.
4054	Matthew Macconnell
4055	Carol Macdonald
4056	Larry Macinnis
4057	Elizabeth Macken
4058	Mike Macleod
4059	Peter Macleod
4060	Brian Macwhinney
4061	E. Madarasz
4062	Christopher Madden
4063	Samuel Madeira
4064	Shirley Madison
4065	Barbara Maerten
4066	Mary Maguire
4067	Steve Mahan
4068	Kathryn Maier
4069	Valerie Majercsik

ID	Name
4070	Emma Majewski
4071	Rocco Malerbo
4072	Rina Malerman
4073	Marc Malkin
4074	Tracey Mangus
4075	Rhonda Manser
4076	Cindy March
4077	Marc Marchioli
4078	Roberta Marley- Merchant
4079	Thomas Marquis
4080	Christopher Marsh
4081	Jennifer Martin
4082	Louis Martin
4083	Sally Martin
4084	Becky Marx
4085	Jamie Masterson
4086	Amos Matsick
4087	Kelly Matthews
4088	Alaina Mauro
4089	Nancy May
4090	Ken Mayer
4091	Judy McAuley
4092	Suzanne McCabe
4093	Mike Mccampbell
4094	Steven Mccann
4095	Noreen McCarthy
4096	Susan Mccarty
4097	Joyce Mcclintock
4098	Maryllyle Mccue
4099	Carol Mccullough
4100	Frederick Mccullough
4101	Jerri McDermott

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ID	Name
4102	Sally Mcdermott
4103	William Mcdevitt
4104	Denise Mcgiboney
4105	Judith MCGovern
4106	Linda McGowan
4107	Ellie Mcguire
4108	Ann McHale
4109	Eileen Mcilhinney
4110	Terry Mcintyre
4111	Kelli Mckenzie
4112	Antoinette Mckeone
4113	Catherine McLaughlin
4114	Kathleen Mclaughlin
4115	Pat McLaughlin
4116	Cameron McMillan
4117	Timothy McNair
4118	Tom McNichol
4119	Richard McNutt
4120	Lisa Mcquarrie
4121	Ann Mcstay
4122	Patrick Mcvay
4123	Gabby Means
4124	Jarred Mechanick
4125	Diego Medina
4126	Lynne Medley
4127	David Meiser
4128	Victoria Meliodon
4129	Lisa Mell
4130	Betty Mellor
4131	Olivia Menc
4132	Arlene Mercurio
4133	Alfred Merritt

ID	Name
4134	Linda Messatzzia
4135	Susan Messenger
4136	Douglas Metzler
4137	Paul Metzloff
4138	Chris Meyer
4139	Kathleen Meyer
4140	Michael Meyer
4141	Donna Meyers
4142	Marian Liza Mientus
4143	Melissa D Miller
4144	Tom Miller
4145	Brenda Milligan
4146	Donald Milliman
4147	Frank Mc Million
4148	Dan Mills
4149	Peggy Miros
4150	Philip Mitzkavich
4151	Andrew Mix
4152	Melinda Mohoski
4153	Claudette Mompalao
4154	Andrew Mongar
4155	John Monok
4156	Keith Monroe
4157	Nancy Moore
4158	William Morgan
4159	Roy Morsch
4160	Seth Morth
4161	Mindy Moyer
4162	Sarah Moyer
4163	Margaret Mulligan
4164	Erica Mumford
4165	MaryMark Munday
4166	Carolyn Murphy

ID	Name
4167	Cortney Murphy
4168	James Murphy
4169	Karen Murphy
4170	M. Murray
4171	Timothy Murray
4172	Deb Muse
4173	Kathy Musser
4174	Mike Mutchler
4175	George Nagorny
4176	Ahmed Nasus
4177	William Natale
4178	Greg Navarro
4179	Jonathan Nelson
4180	Willie Nelson
4181	Sarah Boucas Neto
4182	Christine Neuwirth
4183	Crystal Newcomer
4184	Sarah Newman
4185	Connie Nicholas
4186	Nicola Nicolai
4187	Barbara Nilsen
4188	Holly Nissley
4189	Christine Nist
4190	Greg Noonan
4191	Nancy Anne Noonan
4192	Joni Novacich
4193	Jocelyne Noveral
4194	valerie nowak
4195	Therese Nowlan
4196	Marcia Nye
4197	Warren Nystrom
4198	Chuck Oatman
4199	Bill Obenour

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ID	Name
4200	William Obenour
4201	Dennis Ober
4202	Linda OBrien
4203	Mariann Oconnor
4204	P. Oconnor
4205	Dewey Odhner
4206	Candy Olesh
4207	Donna Oliver
4208	Johanna Oloughlin
4209	Robert Oppenheimer
4210	Daniel Orfe
4211	Jerry Orr
4212	Janet Oscar
4213	Edward Ost
4214	Christine Ostopoff
4215	Linda Ostrander
4216	Deborah Ott
4217	Patrick Pagano
4218	Marie Page
4219	Eleanor Pages
4220	Melanie Pallone
4221	Dorothy Palmer
4222	Tina Paloskey
4223	Zsuzsa Palotas
4224	Walter Pankoe
4225	Larry Parke
4226	Janet Parlett
4227	Paul Parowski
4228	Lois Pasco
4229	Chirag Patel
4230	George Patterson
4231	Sue Patterson
4232	Bryce Payne

ID	Name
4233	Ron Pazdro
4234	Michael Peale
4235	Barbara Pearce
4236	Richard Pearce
4237	Karen Pearlstein
4238	Chris Pearsall
4239	Kathryn Pelegrinelli
4240	Colleen Pellegrini
4241	Kathy Penro
4242	Christine Penrose
4243	Ann Peters
4244	Pamela Peters
4245	Max Peterson
4246	Mary Petrich
4247	Noel Petrie
4248	Robyn Walters Ph.D.
4249	Daniel Pickens
4250	Betty Pierce
4251	Jon Piersol
4252	Diane Pilotti
4253	Donna Pimble
4254	Juliann Pinto
4255	Jeremy Pitcairn
4256	Mary Grace Pivarnik
4257	Liz Plummer
4258	David Poder
4259	Andrew Polosky
4260	Vicki Poole
4261	Lorraine Poore
4262	James Porcello
4263	Rebecca Posner
4264	Denise Potash
4265	Kate Potter

ID	Name
4266	Emily Potts
4267	Barry Pounder
4268	Lawrence Povlow
4269	Loretta Powell
4270	Catherine Poynton
4271	Victor Pregel
4272	Annie Prince
4273	Maxine Pusateri
4274	Anna Qualey
4275	Matt Quinn
4276	Ron Rabold
4277	Thaddeus Rada
4278	Srikanth Raghunathan
4279	Marie Elaina Rago
4280	Joshua Raizman
4281	Lorraine Ralph
4282	John Ramirez
4283	Katherine Randall
4284	Lauren Rando
4285	Susan Rankin
4286	Catherine Raymond
4287	Mel Reader
4288	Ahren Ream
4289	Sara Ream
4290	B. Lynne Reba
4291	Sandy Reber
4292	James Reed
4293	Tabitha Reefer
4294	Dorothy Reichardt
4295	Donna Reicher
4296	Philip Reilly
4297	Patricia Reimer
4298	Gary Reinert

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ID	Name
4299	Susan Reinhart
4300	Eric Reitz
4301	Joyce Remillard
4302	Carol Reppert
4303	Brian Resh
4304	Daniel Resnick
4305	Chris Reynolds
4306	Trista Reynolds
4307	Don Rhoades
4308	Ann Rhoads
4309	Penny Rhodes
4310	Robert W. Rhodes, III
4311	Martha Richards
4312	Ashley Richman
4313	Alyse Richmond
4314	Jacob Richter
4315	Dan Ricketts
4316	Deborah Rinderknecht
4317	Kate Ritter
4318	Melissa Riviere
4319	Bob Roach
4320	Kathy Robb
4321	Eloise Robbins
4322	Joan Roberts
4323	Judith Roberts
4324	Ruth Roberts
4325	Kathy Robinson
4326	Jinada Rochelle
4327	Kelly Rogers
4328	Karol Roman
4329	Donna Lynne Rondolone

ID	Name
4330	Laurence Root
4331	Thomas Rose
4332	Abbi Rosen
4333	Glenn Rosenthal
4334	Sister Geraldine Rosinski
4335	Elliot Ross
4336	Catherine Rossman
4337	Lynne Rotan
4338	Judi Roth
4339	Christine Rothenbeck
4340	Marilyn Rousseau
4341	Susan Rovin
4342	David Roy
4343	Myrna Rubenstein
4344	Joanna Rubin
4345	Thomas Ruch III
4346	Karen Rudy
4347	Debra Ruppert
4348	Karen Rusen
4349	James Rush
4350	Karen Rush
4351	David Rusonis
4352	Michael Russ
4353	Darlene Ryniec
4354	Bernadette S.
4355	Diane Sadowski
4356	Dennis Saile
4357	Madeline Sambuchino
4358	Victoria Sams
4359	Amanda Santmyer
4360	Natasha Sapershteyn

ID	Name
4361	Pam Sapko
4362	Saralyn Sarandis
4363	Carol Saurman
4364	Lisa Sawchuk
4365	Martha Sawyer
4366	Robin Schaef
4367	Megan Schane
4368	Bonnie Schatz
4369	Vivian Schatz
4370	Hilary Schenker
4371	Bill Schill
4372	Joel Schilling
4373	Bonnie Schlueter
4374	Alice Schmid-Miller
4375	Brian Schmidt
4376	Jeff Schmidt
4377	Maretta Schmidt
4378	William Schmidt
4379	Michael Schmotzer
4380	Barbara Schneider
4381	Michael Schnierle
4382	Robert Schoenholtz
4383	Lauren Scholtz
4384	John Schubert
4385	Sheryl Schultz
4386	Crystal Schumacher
4387	Susan Schurer
4388	Victoria Schussler
4389	Loree Schuster
4390	Scott Schutz
4391	Marc Schwartz
4392	William Scott
4393	Malcolm Seaholm

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ID	Name
4394	Helene Segal
4395	Greg Seibert
4396	Paul Selapack
4397	Joseph Selph
4398	Sam Serratore
4399	Christopher Seymour
4400	Darcy Shaffner
4401	Suhail Shafi
4402	Amaya Shah
4403	Adrian Shanker
4404	Joanne Sharpless
4405	Deborah Shaver
4406	Barbara Shea
4407	Howard Sherman
4408	Thom Sherman
4409	Lorraine Shertzer
4410	Janice Shields
4411	Dale Shillito
4412	Beth Shimer
4413	Daniel Shively
4414	Abigail Shreero
4415	Erika Shumaker
4416	H. Dennis Shumaker
4417	Kristi Shupp-George
4418	Gail Sickles
4419	Willard Sickles
4420	Kathleen Sierra
4421	Genie Silver
4422	Ellen Silverberg- Brennan
4423	Paul Simon
4424	Cecilia Simonson
4425	Gus Sinadinos

ID	Name
4426	Lori Sinkovitz
4427	Taffi Skopinski
4428	Annette Slater
4429	Mary Slegel
4430	Allison Sly
4431	Victoria Smedley
4432	Cole Smietana
4433	Betty Smith
4434	Caroline Smith
4435	Catherine Smith
4436	Christine Smith
4437	Christopher Smith
4438	Kristen Smith
4439	Lisa Smith
4440	Marilyn Smith
4441	Roger Smith
4442	Ronald Smith
4443	Rosemary Smith
4444	Shelly Smith
4445	Stephen Smith
4446	Zaheer Smith
4447	Howard Snyder
4448	Loretta Soltis
4449	Ruth Souder
4450	Wood Souders
4451	Eric Spaar
4452	Patti Spadaro
4453	Janet Spahr
4454	Lori Spangler
4455	James Spano
4456	Jon Speicher
4457	Barbara Spiegelberg
4458	Marcy Spiron

ID	Name
4459	Declan Spring
4460	Beverly Springer
4461	Kathleen Spudes
4462	Richard St. John
4463	Kathy Stack
4464	Kate Stacy
4465	Gretchen Staff
4466	Gail Stamm
4467	Christoph Stannik
4468	Josh Staquet
4469	Paul Stavros
4470	Lisa Steckhouse
4471	Vivien Steele
4472	Nancy Steil
4473	Jill Steinig
4474	Michol Stelma
4475	David Stermer
4476	Rhonda Sternowski
4477	Ashley Steward
4478	Alexina Stine-Sevey
4479	John Stolz
4480	Peter Stone
4481	Mary Stoner
4482	Mark Strassle
4483	Steve Strawitz
4484	Erin Strelec
4485	Naomi Stroup
4486	Katie Suchan
4487	Bonnie Sumerfield
4488	Sharon Sundial
4489	Laura Surowka
4490	The Susang-Talamo Family

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ID	Name
4491	Russ Susko
4492	Mark Sustarsic
4493	Danielle Swank
4494	Thomas Swimley
4495	Margaret Switzer
4496	Sheila Sykes-Gatz
4497	Peter Syre
4498	Tracy Szemanski
4499	John Szuchan
4500	Kathie E Takush
4501	Charlotte Tancin
4502	Nicola Tannenbaum
4503	Jay Tarler
4504	Jessica Tawney
4505	Scott Taylor
4506	Wendi Taylor
4507	Tracy Tellep
4508	Cassandra Tereschak
4509	Margaret Terleski
4510	Phyllis Terwilliger
4511	Allison Thomas
4512	Cheryl Thomas
4513	John Thomas
4514	Phyllis Thomas
4515	Barty Thompson
4516	James Thompson
4517	Peg Thompson
4518	Devon Tipp
4519	Anne Tiracchia
4520	Susan Tobia
4521	Maryanne Tobin
4522	Susan Tobin
4523	Merritt Toman

ID	Name
4524	Mary Tommelleo
4525	Michael Toner
4526	Eugene Torisky, Jr.
4527	Douglas Toro
4528	Michael Torrey
4529	Beth Townsend
4530	Dat Tran
4531	Magali Tranie
4532	Jay Treat
4533	Alex Trimble
4534	Marilyn Trybus
4535	Cheryl Tumola
4536	Jill Babore Turco
4537	Kim Turet
4538	Leann Turley
4539	Deborah Turner
4540	Kathy Turner
4541	Richard Tyminski
4542	Edwin Tyrrell
4543	Susanna U.
4544	Thomas U.
4545	Antoinette Uffner
4546	C. Uhler
4547	Kira Uleva
4548	Margaret Ullman
4549	Tyler Unger
4550	Rachel Urbanowicz
4551	Pamela Utterback
4552	Richard Vance
4553	Donna D. Varcoe
4554	Joan Vaughan
4555	Wilford Vaulx-Smith
4556	Eugenia Veley

ID	Name
4557	Kent Vendrick
4558	Raymond Verna
4559	Patrick Vetter
4560	Richard Villastrigo
4561	Morgan Vinokurov
4562	Rocco Viola
4563	Cece Viti
4564	Sharon Wack
4565	Nicole Wagman
4566	Joan Waldschmidt
4567	Mark Walters
4568	Robyn Walters
4569	Evelyn Warfield
4570	Stephanie Warning
4571	Mike Washil
4572	Craig Way
4573	Mike Weaver
4574	Joe Wehrle
4575	Gudrun Weinberg
4576	S. Weinberg
4577	Arlene Weiner
4578	Allison Weinkranz
4579	Eleanor Weisman
4580	Ronni Weiss
4581	Ted Weissgerber
4582	Nancy Weissman
4583	William Wekselman
4584	Martin Wells
4585	Patricia Wendell
4586	Brad Wertz
4587	Carol Weston-Young
4588	Burton Whalen
4589	Chris Wheatley

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ID	Name
4590	J. White
4591	Jessica White
4592	Pamela White
4593	William White
4594	Richard Whiteford
4595	Megan Whitmer
4596	Denise Whitney
4597	Heather Wiggins
4598	Kenneth Wildrick
4599	Debra Wile
4600	Emily Will
4601	Connie Williams
4602	Mr. Ronald Williams

ID	Name
4603	Donald Wilson
4604	Peter Wingerter
4605	Zak Winokur
4606	Natalie Winter
4607	Corey Wirzman
4608	Sara Wishnoff
4609	Robert Wisneski
4610	David Wolf
4611	Mara Wolfgang
4612	Elizabeth Wood
4613	Ted Woods
4614	R. Woodward
4615	Cas Workman

ID	Name
4616	Charles Workman
4617	Victoria Woshner
4618	Thomas Wozar
4619	Debra Yocca
4620	Lynnette Yoder
4621	Ann Young
4622	Nancy Young
4623	Suzanne Young
4624	Nicole Yun
4625	Nina Zabec
4626	David Zanardelli
4627	Karl Zimmerman
4628	Michael Zuckerman

Affiliated with Efforts to Limit Dangerous Methane Pollution Write-In:

ID	Name
4629	Chastity Abel
4630	Bobbi Achey
4631	Barbara Adams
4632	Mark Albaugh
4633	Josh Allain
4634	Dr. Lisa Allarde
4635	Megan Ambrose
4636	Christine Anderson
4637	Dr. Nadine Anderson
4638	Wendelyn Anderson
4639	Christopher Applegate
4640	Danielle Argueta
4641	Julio Aviles
4642	Donavon Aylard
4643	A. B.
4644	Cheryl Bachan

ID	Name
4645	Mary K. Bagley
4646	Michael Bailin
4647	Alana Balogh
4648	Nancy J. Balogh
4649	Mary-Grace Banyas
4650	Jay Bare
4651	Lisa Barsky
4652	Bill Bartholomew
4653	Bruce Bartle
4654	Herode Beauvais
4655	Dr. Karen Beck -Pooley
4656	Elizabeth Beeson
4657	Daniel Behl
4658	Sandra Bell
4659	Dr. Louis Benedict
4660	Dr. Kimberly Benston

ID	Name
4661	Susan Benston
4662	Ieva Berzins
4663	Amy Bieak
4664	Jean Billings
4665	Nina Bisirri
4666	Dionna Bittle
4667	Dr. Robert Blackburn
4668	Bill Blauvelt
4669	Janet Bloomfield
4670	Barbara Blynn
4671	Mark Bodenhorn
4672	Dr. Lily Bonga
4673	Gertrude Borres
4674	Kacie Boskey
4675	Barb Boudier
4676	Dr. Matthew Boulis

Appendix A - List of Commentators

ID	Name
4677	Gail Brainard
4678	Susan Bramson
4679	Joe Bratetich
4680	Joe Brevoort
4681	Ellen Briggs
4682	Dr. Lisa Brinton
4683	Joan Bristol
4684	Edward Broadbent
4685	Christine Brown
4686	Eileen Brown
4687	John Brown
4688	Lauren Brown
4689	Lisa Burick
4690	Marilyn Burke
4691	LaDonna Burton
4692	Diane M. Calkins
4693	Patrick Callaghan
4694	Eizabeth Cancelmo
4695	Dr. Denise D. Carr
4696	Elizabeth Castonguay
4697	Jean Cauller
4698	Marlene Chachkin
4699	Dr. Thulasi Chandran
4700	Richard Chieffo
4701	Dr. Charleen Chu
4702	Dee Cipollone
4703	Russell Clark
4704	Dr. Vanna Cleary
4705	Michael Coblenz
4706	Maureen Collins
4707	E. Collison
4708	Kathleen Colwill
4709	Eileen Conner

ID	Name
4710	Jan Connors
4711	Robert Cook
4712	Robert Cooke, Jr.
4713	Denyse Corelli
4714	Annalisa Crannell
4715	Teresa M. Crayne
4716	John Cross
4717	Marie D'Amore
4718	Amy Daniels
4719	Donna Davidheiser
4720	Barbra Davis
4721	Jolynn Davis
4722	Joyce Davis
4723	Julie Davis
4724	Kathryn Davis
4725	R.A. Dayton
4726	Sandra Dean
4727	Carrie DeHaven
4728	Barry Deist
4729	Joseph Denella
4730	Jean Dermott
4731	Dr. Peter Deutsch
4732	Virginia DeWitt
4733	Maria DiGiovanni
4734	Patricia DiRienzo
4735	Dr. Julie DiSano
4736	Diane Donato
4737	Lynn Doolan
4738	Patricia Doutre
4739	Carrie Doyle
4740	Sandy Drosnes
4741	Marta Duarte
4742	Christopher Dunham

ID	Name
4743	Erin Dunkel
4744	Cecilia DuPont
4745	Lois Durso
4746	Bill Ebel
4747	Florence Echtman
4748	Janet Eckbold
4749	Sally Edwards
4750	Noam Eisen
4751	Bill Elbert
4752	Pearl Elias
4753	Terry Elliott
4754	Dr. Robert Elser
4755	Ed Evans
4756	Dr. Kristin Farrell
4757	Melody Farrin
4758	Michele Feingold
4759	Charles Ferguson
4760	Dorothy Field
4761	Ruth Fields
4762	Dr. David Firely
4763	Maxine Fisher
4764	Susan Fitzpatrick
4765	Linda Fix
4766	Albert Fonda
4767	Thomas Fonda
4768	Chris Forrest
4769	Jean Forsberg
4770	Kathleen Fox
4771	Dr. Ivan Frank
4772	Anne Freas
4773	Ellen Freeman
4774	Dr. Veryl Frye
4775	John Furlong
4776	Martin Galbraith
4777	Dr. Constance Garcia-Barrio

Appendix A - List of Commentators

ID	Name
4778	Genevieveet Gavin
4779	Caitlyn Geist
4780	Robert Gelfand
4781	Julie Gerbino
4782	Chuck Gettes
4783	James Gibbel
4784	Mary Kathleen Gillespie
4785	Dr. Marcia Godich
4786	Mary Ellen Goldfarb
4787	Karen Gordon
4788	James Grant
4789	Itay Greenspan
4790	Dr. Mike Greenwald
4791	Carol Greer
4792	Janine Grisez
4793	Karen Gropman
4794	Thomas Gruver
4795	Dr. Susan Guido
4796	T. H.
4797	Marnie Haines
4798	Kathryn L. Hamilton
4799	Nina Hamilton
4800	Dr. Russell Hannula
4801	Clyde Hartenstine
4802	Travis Harvey
4803	Stephen Haspel
4804	Valerie Haus
4805	Dr. Kraig Haverstick
4806	Chad Hayes
4807	Elizabeth Heim
4808	Francis Hensler
4809	Tim Herman
4810	Hilary Hertzler
4811	Dwight Hetzell
4812	Karyn Heym
4813	Keith Hill

ID	Name
4814	Dr. Robert Hirsh
4815	Dr. Harry Hochheiser
4816	Dr. Christina Hoenig
4817	Jim Hoffman
4818	Chris Holder
4819	Matthew Holmes
4820	Ann Honzo
4821	Chris Horning
4822	Irving Horton
4823	Jane Horwitz
4824	Rosemary Hudy
4825	Erich Huff
4826	Ricki Hurwitz
4827	Dr. Gerald Isenberg
4828	Drucie Isenberg
4829	Corey Jacobs
4830	Rachel Jacobs
4831	Chris Jafolla
4832	Dr. David James
4833	Iris Jennings
4834	Grace Jeschke
4835	Amanda Joas
4836	Dr. Patricia Johnson
4837	Kate E. Johnson
4838	Michelle Johnson
4839	Dr. Lois Johnson-Hamerman
4840	Jeff Johnston
4841	Judith Johnston
4842	David Jones
4843	Lauren Jones
4844	Brian Joslyn
4845	Shannon Joyce

ID	Name
4846	Linda Kaintz
4847	Daniel Kane
4848	Ruchi Kapur
4849	Dr. Joseph Kargol
4850	Karen Karr
4851	Julie Kascal
4852	James Keenan
4853	Kevin Keene
4854	Jevelyn Kennedy
4855	Marie Ann Kickler
4856	Cathy Kiel
4857	D.M. Kingsley
4858	Den Kirby
4859	Joyce Kircher
4860	Karen Kirk
4861	Elizabeth Klauk
4862	Margaret Klein
4863	Clayton Kleinfelter
4864	Kristen Klimchak
4865	Holly Koenig
4866	Ernie Kohlstruk
4867	Ed Koons
4868	George Kopena
4869	Sue Kostenbauder
4870	William Krebs
4871	Erika Kreider
4872	Ireneusz-Jan Kryczka
4873	Kara Kubisiak
4874	Karen Lafferty
4875	Hermance Lahiri
4876	Nancy Lamason
4877	Suzanne Lamb
4878	Theresa Lamb

Appendix A - List of Commentators

ID	Name
4879	Donald Lancaster
4880	Liana Lang
4881	Steven Langjahr
4882	John Lawson
4883	Pat Layton
4884	Karen Lefkovitz
4885	Iona Legg
4886	Michelle Leposa
4887	Kim Lesamiz
4888	Dr. Sanford Leuba
4889	John Levan
4890	Randy Levine
4891	Gary Lewis
4892	Melanie Lewis
4893	Sean Lewis
4894	Veronica Liebert
4895	Lori Love
4896	MaryCatherine Lowery
4897	Marcia Luloff
4898	Jennene Lundy
4899	Alvaro Luque
4900	Dr. Jesse Lytle
4901	Judith Machemer
4902	Laurie Manney
4903	Heather Marin
4904	Gary Marshall
4905	Kathern Marshall
4906	Laura Martindale
4907	Josefina Martinez- Eskenasy
4908	Timothy Mateer
4909	Richard Mauck
4910	Jay McCahill

ID	Name
4911	Matt McCollum
4912	Brian McCray
4913	Lea McCrone
4914	Nancy McCullough
4915	Richard McFatridge
4916	Maureen McHugh
4917	Lynn Mcilvaine
4918	Colm Mclaughlin
4919	Mari McShane
4920	Mark Melchiorre, Jr.
4921	Dale Melton
4922	Donna Messina
4923	Amy Miller
4924	Geraldine Miller
4925	Kathleen Miller
4926	Maurice Miller
4927	Ralph Miller
4928	Donna Millosky
4929	Rosanne Minich
4930	August Mirabella
4931	Robert D. Missimer, Jr.
4932	Raymond Mlynczak
4933	Dr. Lawrence Moir
4934	Barbara Moore
4935	Lyssa Morehart
4936	Jason Morris
4937	Penny Morse
4938	Bob Moyer
4939	James Moyer
4940	Brian Murray
4941	Scott Nairn
4942	Rich Neill
4943	Linda Ness

ID	Name
4944	Jean Nick
4945	Mark Nordyke
4946	Joel Oberman
4947	Matthew O'Brien
4948	Mary Lou O'Connell
4949	Craig O'Connor
4950	Erik Ohberg
4951	Mollie Oleyar
4952	Jim Ollis
4953	Judith Orouke
4954	Wayne Ott
4955	Dr. Vikram Palanivel
4956	Stephen Parks
4957	Joanne Parris
4958	Deb Paterline
4959	Patricia Perfect
4960	Aggie Perilli
4961	Ann-Joyce Peters
4962	Arlene Petite
4963	Mary T. Petrich
4964	Diane Pieri
4965	Joe Pipitone
4966	Laurie Pisarcik-Connolly
4967	Paul Popiel
4968	Eric Potter
4998	Debra Rubin
4999	Kathleen Rummel
5000	Nicole Ruscitto
5001	Laura Russak
5002	Elsa Russell-Lichtenberg
5003	Joseph Ruth
5004	Judith Ryan
5005	Dr. George Sakheim

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ID	Name
5006	Ilse Sakheim
5007	Cheryl Sandberg
5008	Dr. Hisham Sati
5009	Joan Sattler
50010	Joe Sayre
5011	Frances Scalise
5012	Phoebe Schaub
5013	Chris Schlack
5014	Jack Schonewolf
5015	Joe Schreiber
5016	Brett Schultz
5017	Barbara Schulz
5018	Samantha Serratore
5019	Wanda Sheaffer
5020	Mary Cheryl Sheedy
5021	Dr. Howard Sherman
5022	Tom Sherman
5023	Richard Shiles
5024	Judith Simpson
5025	Richard J. Singer
5026	Paula Skopow
5027	Joyce Small
5028	Serge Small
5029	Vince Small
5030	Cody Smith
5031	Dr. Christopher Smith
5032	Dr. Jean Smith
5033	Mara Smith

ID	Name
5034	Sara Smith
5035	Carol Smolen
5036	Margaret Soares
5037	Kathy Sock
5038	Suzanne Spangler
5039	Sandra Spatz
5040	Sandra Stabilito
5041	James Stahelek
5042	Judith Stangl
5043	Fran Staret
5044	Diane Stehman
5045	Susan Stein
5046	Earlene Stough
5047	Jason Straub
5048	Carole Stremple
5049	Andrea Strout
5050	Cristan Strus
5051	Dirk Suereth
5052	Thomas Sullivan
5053	James R. Swenson
5054	Dr. Deborah SwirskySacchetti
5055	Ritchie Thomas
5056	Melissa Thomas-Brumme
5057	Julie Tonnessen
5058	Marilyn Toplitz
5059	Ray Torres

ID	Name
5060	Rose Traupman
5061	Robert Tucker
5062	Elizabeth Tuminski
5063	Margaret Turner
5064	Christina Uhler
5065	Halia VanKirk
5066	Stamatios Varias
5067	Alex Vazquez
5068	Amy Vazquez
5088	Thomas Willis
5089	Andrew Wilson
5090	Dr. Richard Wilson
5091	Dr. Gene Witiak
5092	Joan Witiak
5093	Stephanie Wolfe
5094	Rachael Wonderlin
5095	Debra Wontor
5096	Dr. Elizabeth Wood
5097	Dr. E.K. Worthington
5098	Dr. Lynda Yankaskas
5099	Dr. Sandra Yeager
5100	Andrew Yuen
5101	Ingrid Zemanick
5102	Angela Zerance
5103	Sandra L. Zimmerman
5104	Karen Zingermann
5105	Patricia Zlatkin

Affiliated with Oil and Gas Drilling Operations in Pennsylvania Form Letter:

ID	Name
5106	Barbara Abel

ID	Name
5107	Peggy Abrahamson

ID	Name
5108	Adrienne Abramson

Appendix A - List of Commentators

ID	Name
5109	Richard Abt
5110	Virginia Ackler
5111	Shelley Ackley
5112	Rosa Acosta
5113	Mary Acquaviva
5114	Deborah Adair
5115	Joyce Adam
5116	Evelyn Adams
5117	Joyce Adams
5118	Mary Adams
5119	Christine Addison
5120	Nicole Adrian
5121	Sarah Agran
5122	Jackeline Aguirre
5123	Sarah Aikman
5124	Arlene Albano
5125	Henry Albert
5126	Denise Albitz
5127	Aurora Albrand
5128	David Albright
5129	Wayne Albright
5130	Francesca Alcorn
5131	Gail Aldrich
5132	George Alexander
5133	Theresa Alfonsi
5134	Debra Alford
5135	Robin Allaway
5136	Catherine Allen
5137	Scott Allen
5138	Ramon Allende
5139	Mysti Alleyne
5140	Richards Alllison
5141	Eileen Allmayer

ID	Name
5142	Joan Almerini
5143	Samirah Amantullah
5144	Larry Ambrose
5145	Beth Aminov
5146	Don Amoruso
5147	John Amspacher
5148	Anne Amster
5149	Jacob An
5150	Jon Anderholm
5151	Bonnie Anderson
5152	Brigitte Anderson
5153	David Anderson
5154	Maureen Anderson
5155	Rhiannon Anderson
5156	Wendy Anderson
5157	Benjamin Andrew
5158	Victoria Angelucci
5159	Amanda Anglemyer
5160	Julianne Anglestein
5161	Barbara Ansfree
5162	Art Antal
5163	Joanna Antkowiak
5164	Patrick Antonello
5165	Lois Antosy
5166	Virginia Apostolacus
5167	Todd Appleman
5168	Karen Aquino
5169	Ann Archambault
5170	Tanya Arendt
5171	Julie Arlotti
5172	Harley Armentrout
5173	Lois Armstrong
5174	Janine Arnesen-Nolt

ID	Name
5175	Susan Arnhold
5176	Charles Arnold
5177	Kathleen Arnold
5178	Mark Arsenich
5179	Alice Artzt
5180	Jean Ashburn
5181	Carol Ashley
5182	Dr. Ashton
5183	Susan Atkinson
5184	Darlene Augustine
5185	Stacy Aungst
5186	Adrienne Austin
5187	Christine Austin
5188	Sandra Austin
5189	William Averill
5190	Kitrina Ayers
5191	Marlene Azeff
5192	Joan B.
5193	James Babkowski
5194	Mary L Bartlett Backes
5195	Elizabeth Bagnall
5196	Russell Bahn
5197	Linda Bahner
5198	Angela Baiano
5199	Robertta Bailey
5200	G. Bailey-Brown
5201	Kirk Bails
5202	Michele Baird
5203	Betty Baker
5204	Cheryl Baker
5205	Lauren Baker
5206	Renee Baker

Appendix A - List of Commentators

ID	Name
5207	Christine Baldonieri
5208	Keley Baldwin
5209	Shirey Baldwin
5210	Hannah Balko
5211	Brielle Ballantine
5212	Caroline Balliet
5213	Nikki Balog
5214	Branislava Balorda-Simic
5215	Maggie Balsley
5216	Patricia Baltimore
5217	Valerie Banas
5218	Debbie Bandrowsky
5219	David Bankes
5220	Janice Banks
5221	Dennis Bannon
5222	Connie Barajas
5223	Eileen Barbash
5224	Mark Barbash
5225	Jessica Barber
5226	Elizabeth Barbour
5227	Nick Barcott
5228	Patricia Bardzak
5229	Danielle Barge
5230	Ryan Bargerstock
5231	Ken Barker
5232	Dora Barkley
5233	Kimberly Barkley
5234	Scott Barlow
5235	Kathleen Barnes
5236	Rebecca Barnes
5237	Anne Barnhart
5238	Harriet Barone

ID	Name
5239	Stanley Barreto
5240	Barbara Barrett
5241	Gail Barrett
5242	Mary Barrett
5243	Samantha Barrett
5244	William Barrett
5245	Anne-Tracy Barros-Ruof
5246	Colby Barth
5247	William Barth
5248	Michael Bartha
5249	Elias Bartholomew
5250	Lori Bartholomew
5251	Katie Bartlett
5252	Lora Bartlett
5253	Thomas Bartlett
5254	Keith Bartley
5255	Cindy Bartos
5256	Sharon Basile
5257	Jeffrey Bastian
5258	Gina Bates
5259	Natalie Batovsky
5260	Glenn Battin
5261	Elizabeth Bauer
5262	Lyn Bauer
5263	Mary Bauer
5264	Pamela Bauman
5265	Todd Bauman
5266	Elizabeth Bayardi
5267	Linda Bayne
5268	Diana Beague
5269	Elaine Beall
5270	Eric Beall

ID	Name
5271	Barbara Beam
5272	Linda Bean
5273	Johanna Beatty
5274	Robin Bebla
5275	Connie Bechtol
5276	Bobbi Beck
5277	Julie Beck
5278	Elaine Becker
5279	Ellen Becker
5280	Judi Becker
5281	Tracy Becker
5282	J. Beckey
5283	Jean Becton
5284	Sharon Beggs
5285	Julia Behar
5286	Anita Behrman
5287	Deanna Beier
5288	Calvin Beinlich
5289	Barbara Bell
5290	Jessica Bell
5291	Lori Bell
5292	Donna Bello
5293	Theodore Beloin
5294	Barbara Bendall
5295	Bethany Bender
5296	Amelia Benner
5297	Kathy Bennese
5298	Cheri Bennett
5299	Gary Bennett
5300	Jesse Bennett
5301	Stacey Bennett
5302	Russell Bennicoff
5303	Juliana Benson

Appendix A - List of Commentators

ID	Name
5304	Kate Benson
5305	Alex Benvenuto
5306	Caroline Beohm
5307	Gins Beretsky
5308	Eric Bergdoll
5309	Grace Bergin
5310	Cecele Beringer
5311	Laurie Beringer
5312	Carol Berkeley
5313	Carol Berkery
5314	Glenn Berkheimer
5315	Geraldine Berlin
5316	Claudia Bermudez
5317	Suanne Bernacki
5318	Janice Bernard
5319	Carolyn Bernardi
5320	Gladys Bernet
5321	Leah Bernstein
5322	Marcia Berry
5323	Margaret Berry
5324	Dana Besser
5325	Matt Bethurem
5326	Linda Betz
5327	Rachelle Bevilacqua
5328	David Bickhardt
5329	Derek Bicksler
5330	Natasha Bieberfeld
5331	Kathy Biernat
5332	Beverly Biggs
5333	Eva Bijlmer
5334	Dawn Bilski
5335	Caroline Binder

ID	Name
5336	Heather Binder-Talak
5337	Robert Bingham
5338	Donna Bird
5339	Kaleo Bird
5340	Cheryl Birnbaum
5341	Nancy Biscontini
5342	Cynthia Bish
5343	Kayla Bishoo
5344	Ann Bishop
5345	Leonora Bishop
5346	Christa Black
5347	Hannah Black
5348	Linda Black
5349	Marnie Black
5350	Melissa Black
5351	Alan Blackburn
5352	Beth A. Blair
5353	Dale Blair
5354	James A. Blair
5355	Keith Blake
5356	Margaret Blanco
5357	Nita Blankenship
5358	Denise Blanyer
5359	Jane Blaser
5360	Barbara Blau
5361	Dawn Blaus
5362	Patricia Blazer
5363	Tara Bledsoe
5364	Jeremie Bley
5365	Mary Bloom
5366	Karen Blum
5367	Heidi Bobick

ID	Name
5368	Sam Boden
5369	Robert Bodine
5370	Bill Boehme
5371	Robert Bogan
5372	Paul Boger
5373	Tara Bohner
5374	Carole Bolard
5375	Barbara Bolden
5376	David Bolduc
5377	Theodore J. Bomba, Jr.
5378	Charles Bonner
5379	Kerry Bonner
5380	Richard Bono
5381	Elizabeth Bopp
5382	Tika Bordelon
5383	Joe Borghi
5384	Lisa Borghi
5385	Linda Borish
5386	Mary Borthwick
5387	Brenda Bortz
5388	Susan Bosak
5389	Christine Boselli
5390	Lee Bostedo
5391	Donald Bosworth
5392	Ruben Botello
5393	Migdalia Boulaabi
5394	Peter Bourdelle
5395	Sharon Bousquet
5396	Nabila Bouzar
5397	Janet Bove
5398	Karen Bowers
5399	Kelly Bowers

Appendix A - List of Commentators

ID	Name
5400	Thomas Bowes
5401	Cordell Bowman
5402	Jacqueline Bowman
5403	Jason Bowman
5404	Marlene Bowman
5405	Pamala Box
5406	Janice Boyce
5407	Thomas Boyce
5408	Carolyn Boyd
5409	Kathleen Boyd
5410	Mike Boyd
5411	Penelope Boyd
5412	Neil Boylan
5413	Patricia Boyle
5414	Florence Boyles
5415	Jennifer Braas
5416	Margaret Bradford
5417	Joelle Bradley
5418	Victoria Bradley
5419	Ann Brady
5420	Corinne Brady
5421	Robert Bragner
5422	Susan Bragner
5423	Jon Brams
5424	Jennifer Bramson
5425	Debby Brandis
5426	Nadine Brandt
5427	Rose Brandt
5428	John Branigan
5429	Sue Brawdy
5430	Carol Breen
5431	Judith Breen
5432	Karen Brendle

ID	Name
5433	Perri Brendzel
5434	Dolores Brennan
5435	Mary Brenner
5436	Robert Breslin
5437	Kevin Brett
5438	John Brewer
5439	Marilyn Brice
5440	Linda Bridges
5441	Susan Bridges
5442	Ellen Brier
5443	Pamela Brigani
5444	Christina Briggs
5445	Mary Brinker
5446	Virginia Britton
5447	Dennis Brock
5448	Patricia Brokaw
5449	Gene Brooks
5450	Lorna Brooks
5451	Rita Brooks
5452	Monica Brosam
5453	Becky Broskin
5454	Anne Brown
5455	Bonnie Brown
5456	Deb Brown
5457	Donald Brown
5458	Gail Brown
5459	Gary Brown
5460	Jessica Brown
5461	Jodie Brown
5462	Kathryn Brown
5463	Paula Brown
5464	Steven Brown
5465	Suzanne Brown

ID	Name
5466	Cynthia Brozenske
5467	Eileen Bruce
5468	Martin Bruegel
5469	Susan Bruegel
5470	Suzanne Bruhn
5471	Cheryl Brunner
5472	Babette Bruton
5473	David Bryan
5474	John Bryner
5475	Sharyn Buch
5476	Amanda Bucher
5477	Charles Buck
5478	Wanda Buck
5479	Susan Buda
5480	Leesa Buffer
5481	Susan Bugay
5482	Angelina Bugli
5483	Tom Buglio
5484	Maj Buhl
5485	Marsha Buhl
5486	Patricia bullard
5487	Naomi Bundy
5488	Mary Bunting
5489	Tammy Buonvicino
5490	Jane Burge
5491	Gloria Burger
5492	Gail Burgeson
5493	Carol Burgess
5494	Kathy Burgin
5495	Joseph Burka
5496	Chance Burke
5497	Dorothy Burke
5498	Melissa Burkett

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ID	Name
5499	Janet Burkhart
5500	Eugenia Burkholder
5501	Erica Burnett
5502	Elizabeth Burns
5503	Kathleen Burns
5504	Linda Burns
5505	Edward Burnside
5506	Pamela Burridge
5507	Anne Burris
5508	Ariana Burrows
5509	Cynthia Burton
5510	Sylvia Busby
5511	Beth Bush
5512	Kaelynn Bush
5513	Tera Bush
5514	Willard Bush
5515	Mary Bushur
5516	Kathleen Bussells
5517	Philip Bussiek
5518	Martha Bustos
5519	Corrine Butala
5520	Megan Butcher
5521	William Butler
5522	Michael Butor
5523	Sara Butson
5524	Philip Battenfield
5525	Julie Byerly
5526	Denise Byrne
5527	Cindy C.
5528	Mandy Cabot
5529	Jessica Cadorette
5530	Ann Caggiano
5531	Madaline Cahill

ID	Name
5532	Mike Cahill
5533	Sharon Cahill
5534	Cheyenne Cahoon
5535	Kathy Cairns
5536	Jacqueline Caliguiri
5537	Silvia Callegari
5538	Peg Calley
5539	Beth Calpin
5540	Mary Calvanese
5541	Sharon Camacho
5542	Mary Cameron
5543	Tonya Cameron
5544	Sandra Camomile
5545	Joan Campagna
5546	Mr. Campana
5547	Mrs. Campana
5548	Maria Campano
5549	Bobbi Campbell
5550	Cathleen Campbell
5551	Margaret Campbell
5552	Roberta Candy
5553	Rebecca Canmouise
5554	Dyana Cannon
5555	Barb Cano
5556	James Caola
5557	Eugene Caprio
5558	Steve Caramenico
5559	Timothy Carbone
5560	Joyce Carey
5561	Amy Carletti-Noji
5562	Phyllis Carlino
5563	Melissa Carlson
5564	Annie Carmitchell

ID	Name
5565	Jill Carney
5566	Christian Carpenter
5567	Laura Carpenter
5568	Nancy Carpenter
5569	Gaile Carr
5570	Janice Carr
5571	Kathy Carr
5572	L. Carr
5573	Susan Carr
5574	Barbara Carrodus
5575	Eileen Carroll
5576	Charlotte Carson
5577	John Carson
5578	Sue Carson
5579	JoAnne Carter
5580	Joi Carter
5581	Keyarra Carter
5582	Peggy Cartwright
5583	Norma Caruso
5584	Krista Case
5585	Patricia Casey
5586	Jeannie Cass
5587	Lillian Cassel
5588	Kevin Castellan
5589	Joan Catagnus
5590	Christina Catanese
5591	Heather Catizone
5592	Lindsey Caudill
5593	stephanie cauler
5594	Margaret Cauley
5595	Michael Cawley
5596	Margareta Cederroth
5597	Dina Cerase

Appendix A - List of Commentators

ID	Name
5598	Nancy Cerino
5599	Sandra Cesa
5600	Linda Chaffee
5601	Marlene Chaikin
5602	Nancy Chalfantwalker
5603	Sue Challis
5604	Robert Chalmers
5605	Katie Chamberlain
5606	Berry Chamness
5607	Michael Chang
5608	Cynthia Charles
5609	Kari Charles
5610	Charlie Charlesworth
5611	David Charlton
5612	Rev. J. Howard Cherry
5613	J. Chestnut
5614	Olivia Cheubell
5615	Caroline Chew
5616	Rebecca Chiartas
5617	Sarah Chiartas
5618	Elizabeth Chiodini
5619	Patricia Chiorello
5620	Andrea Chisari
5621	Holly Chisholm
5622	Patti Chisholm
5623	Elfriede Chmela
5624	Bonnie Chojnacki
5625	Katelynn Chong
5626	Kathleen Chovit
5627	Jamie Christian
5628	Tara Christman

ID	Name
5629	Teresa Christof
5630	Margaret Chromey
5631	Zofia Chrzan
5632	Sovia Chukwuma
5633	Carol Ciampi
5634	Justine Cimarolli
5635	Pam Cincel
5636	Michelle Ciotti
5637	David Citron
5638	Diane Ciullo
5639	Bonita Clark
5640	Britnee Clark
5641	Casey Clark
5642	Christin Clark
5643	Sarah Clark
5644	Terri Clark
5645	William Clark
5646	Susan Clarke-Mahoney
5647	Steven Clawges
5648	Anne Clayberger
5649	Deb Cleer
5650	Carmen Clemens
5651	Laurie Clement
5652	Katherine Clupper
5653	Wendy Coad
5654	Dena Coale
5655	Amy Coffman
5656	Judith Cogrove
5657	Barbara Cohen
5658	Mindy Cohen
5659	Renard Cohen
5660	michele cohig

ID	Name
5661	Heather Cole
5662	Michele Cole
5663	Ryan Coleman
5664	Luis Colindres
5665	Lynn Collester
5666	William Colligan
5667	Terry Collington
5668	Carol Collins
5669	Susan Collins
5670	Bonnie Collins-Kilgore
5671	Kevin Collison
5672	Samantha Colombo
5673	Ilonka Colvin
5674	Sofia Colvin
5675	Gail Comden
5676	Donna Comiskey
5677	Amy Comperatore
5678	Elizabeth Conarroe
5679	Hayley Concordia
5680	Karina Conkrite
5681	Linda Conley
5682	John Conneen
5683	Kathy Connelly
5684	Ellen Connolly
5685	Marilyn Conrad
5686	Brita Conroy
5687	Francis Convery
5688	Corey Conville
5689	Shannon Conway
5690	Gregory Cook
5691	Karin Cook
5692	Mary Cook

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ID	Name
5693	Norman Cook
5694	dawn cool
5695	Sera Coombs
5696	Siobhan Cooney
5697	Donna Cooper
5698	Laura Cooper
5699	Thomas Cope
5700	Melinda Copel
5701	Clivonne Corbett
5702	Beverly Corcoran
5703	Sandra Cordier
5704	Laurie Coritz
5705	Danielle Corley
5706	Lisa Corley
5707	Megan Cornejo
5708	Jared Cornelia
5709	Jeannette Cornish
5710	Magdalyn Cosgrove
5711	Christina Cosme
5712	Joy Coss
5713	Mary Costanzo
5714	Denise Costello
5715	Nancy Cotter
5716	Michele Cottingham
5717	Scott Cottrill
5718	Elizabeth Counselman
5719	Janice Courtney
5720	Andrea Cowen
5721	Anthony Cox
5722	Patricia Cox
5723	Sharon Coyne
5724	Kathryn Crafton

ID	Name
5725	Alice Craig
5726	Kristen Craig
5727	Vicki Craig
5728	Kay Cramer
5729	Lorraine Cramer
5730	Linda Crane
5731	Allison Crater
5732	Paula Crow
5733	Miriam Crawford
5734	Lori Creamer
5735	Sharon Creegan
5736	Alison Crescente
5737	Charles Cress
5738	K. Cressman
5739	Dorothy Cribbs
5740	Joyce Crider
5741	Daniel Cristinzio
5742	Ellen Criswell
5743	Cynthia Crittenton
5744	Kevin Crivelli
5745	Sandy Cromer
5746	Alice Cromwell
5747	Joely Cronrath
5748	Heather Cross
5749	Gerrit Crouse
5750	Clara Crowder
5751	Barb Crowe
5752	Lawrence Crowley
5753	Marian - please Crud
5754	Elizabeth Crum
5755	Silvester Cruz
5756	Myra Cruz-Spraw
5757	Lucas Csaszar

ID	Name
5758	Steve Csigi
5759	Pamela Cubbage
5760	Jane Cucchiara
5761	Mary Cuffari
5762	Bryan Cullen
5763	Evelyn Cullen
5764	Mary Cunney
5765	Mary Cunningham
5766	Donna Curlis
5767	Moiria Curlis
5768	Leonard Curry
5769	Charles Curti
5770	Barbara Curtis
5771	Savannah Curtis
5772	Marjorie Curtiss
5773	Zelda Curtiss
5774	Greg Czarnota
5775	Susan D.
5776	Melissa Dacierno
5777	Stacey Dahm
5778	Linda Dale
5779	Keith D'Alessandro
5780	Julie Dallett
5781	Barbara Dalleva
5782	Sue Daly
5783	Wendy Damario
5784	Sharon D'Amore
5785	Jane Dandrea
5786	Catherine Dangler
5787	Sandra Dangler
5788	Joyce Danko
5789	Barbara Dante
5790	April Daras

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ID	Name
5791	William Darling
5792	Hope Darrin
5793	Anna Dato
5794	Robert Daub
5795	Judy Dautcher
5796	Barbara Davey
5797	Charles Davids
5798	Edith Davidson
5799	Anne Davis
5800	Barry Davis
5801	Betty Davis
5802	Cheri Davis
5803	Chris Davis
5804	Coreen Davis
5805	Eunice Davis
5806	Jason Davis
5807	Lana Davis
5808	Scott Davis
5809	Tina Davis
5810	Judith Davison
5811	Audrey Dawida
5812	C. Day
5813	Ruth Dayton
5814	Howard Daywalt
5815	Gayle Dean
5816	Nikki Dean
5817	Trudy DeArment
5818	Joseph Deasey
5819	Christine DeBrody
5820	Stewart DeBruicker
5821	Becky Decker
5822	Jay Decker
5823	Mary Deerwester

ID	Name
5824	Colleen DeFazio
5825	Paul Deiana-Molnar
5826	Marcie Deiseroth
5827	Laure Deiters
5828	Vivian Delacy
5829	Linda Delaney
5830	Margaret DelColle
5831	Mercedes Deleguardia
5832	Judith Delestienne
5833	Pat DeLong
5834	Lillian DeLuccio
5835	Bonnie DeMartyn
5836	Lisa Dembrosky
5837	Thomas DeMellier
5838	Marilyn Demeter
5839	Carina Demi
5840	Anne Deming
5841	Stephanie DeMuro
5842	Anthony Denaro
5843	Jay Deneen
5844	Heather Dengler
5845	Brenda Dennis
5846	Kiersten Dennis
5847	Don Denton
5848	Rick Denzien
5849	Solange Deoliveira
5850	Elizabeth Depadua
5851	Dee DePaul
5852	Helen Derkac
5853	Dotty Derme
5854	Carrie Deschak
5855	Cathy Deschu

ID	Name
5856	Niffer Desmond
5857	Rebecca Desmond
5858	Debra Detweiler
5859	Rebecca Devan
5860	Tracy Devenyi
5861	Evelyn Devonshire
5862	Estra Devore
5863	Patricia DeWald
5864	Kathleen DeWan
5865	Bryan Dewey
5866	Clare DeWitt
5867	Rev Dheedene
5868	Jessica Diamond
5869	Anne Dibble
5870	Ann DiCampello
5871	Sydelle Dickerson
5872	Elizabeth DiCosimo
5873	Daniel Diehl
5874	Jean Dietrich
5875	Marlin Dietrich
5876	Lisa Dietz
5877	S. DiFluri
5878	C. DiGangi
5879	Sandra DiGiaimo
5880	Ginny Diilio
5881	Tami Dilley
5882	Corrine DiMarco
5883	Johanna DiMedio
5884	Thomas Dimuzio
5885	Mark Dinan
5886	Claire Dinsmore
5887	Rebecca Dion
5888	Grace Diotisalvi

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ID	Name
5889	Rachel Dishong
5890	Linda Dissinger
5891	Don Dixon
5892	John Dixon
5893	Kelsi Dobran
5894	Shana Dodge
5895	Tracy Dodge
5896	Carla Doggett
5897	Ashley Dohe
5898	Meg Doherty
5899	Amy Dolan
5900	Loisa Dombloski
5901	Dave Don, II
5902	Carolyn Donahue
5903	Patrick Donaldson
5904	Emily Donato
5905	Marie Donnelly
5906	Gabrielle Donofry
5907	William Donohue
5908	Bobbi Donovan
5909	Suzanne Donovan
5910	Ann Donton
5911	Susan Dorfman
5912	Judith Dornstreich
5913	Aimée Dougherty
5914	Irish Dougherty
5915	Joanne Douglas
5916	Denise Douros
5917	Tracy Dowler
5918	Bill Doyle
5919	Laurie Doyle
5920	Lynn Doyle
5921	Melissa Doyle

ID	Name
5922	Nancy Doyle
5923	Kelly Doyle-Bucci
5924	Megan Draper
5925	J. Drasher
5926	Don Dreisbach
5927	Diana Drennan
5928	Dorothy Drennen
5929	Thomas Dresser
5930	Marianne Drevna
5931	Anita Driscoll
5932	Marie Driscoll
5933	Gracie Dross
5934	Shanna Druckemillee
5935	Virginia Duckett
5936	Donna Duda
5937	Leslie Dudt
5938	Jess Duelfer
5939	Dave Dufford
5940	Maureen Duffy
5941	Michael Dugas
5942	Jane Dugdale
5943	Jessica Duggan
5944	Karen Duld
5945	Jeanie DuMont
5946	Julie Dunavan
5947	Victoria Dunay
5948	Barbara Duniec
5949	Maryann Dunn
5950	Mary Durando
5951	Christine Durst
5952	Candice Dusch
5953	Sharon Dusky
5954	Arthur Dworin

ID	Name
5955	Noreen Dwyer
5956	Cathy Dydyński
5957	Amanda Dyer
5958	Cheryl Dzubak
5959	Andrea E
5960	Nigel E.
5961	Dawn Eagle
5962	Barbara East
5963	Lynda Eastman
5964	Kristina Eaton
5965	JoAnn Eberle
5966	Philip Ebersole
5967	Cindi Eby
5968	Barbara Eccleston
5969	Carolyn Eckel
5970	Maggie Eckert
5971	Linda Eckhardt
5972	Vonny Eckman
5973	Katherine Eddis- LeMon
5974	Julia Eddy
5975	Susan Edelman
5976	Carreras Edivia
5977	Ind. Edmund
5978	Bill Edwards
5979	Dave Edwards
5980	L.B. Edwards
5981	Albert Eelman
5982	Marilyn Eelman
5983	Beth Egan
5984	Sheryl Eichenlaub
5985	Amy Elder
5986	Virginia Elder

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ID	Name
5987	Maurice Eldridge
5988	Michelle Elegy
5989	Tabatha El-Haj
5990	Amro El-Jaroudi
5991	Helen Elkins
5992	Sandra Ellifritz
5993	Mark Elliott
5994	Sherry Elliott
5995	Carol Ellis
5996	Cheyenne Ellis
5997	Sherri Ellison
5998	Johan Ellstrom
5999	Tina Elton
6000	Margaret Emanuel
6001	Joshua Emery
6002	Joan Engel
6003	Lisa Engle
6004	Laura English
6005	Margery English
6006	Bobbie Enke
6007	Hilary Entley
6008	D. E-Platt
6009	Jill Epstein
6010	Melinda Epstein
6011	Daniel Erdman
6012	Carrie Erickson
6013	Karol Erickson
6014	Sue Erle
6015	Barbara Ermold
6016	Jay Ernest
6017	Joanna Eros
6018	Kathleen Espamer
6019	Paulette Esq.

ID	Name
6020	Terri Estright
6021	Catherine Etters
6022	Sharon Ettinger
6023	Helaine Evancho
6024	Dawn Evans
6025	Pamela Evans
6026	Rich Evans
6027	Kathy Evans- Pamisano, RN, CNM, M
6028	Diane Even-Tov
6029	David Everett
6030	Denise Everyone
6031	Jennifer Eycler
6032	Morgan Eytcheson
6033	Elizabeth Fabritius
6034	Donna Facciponti
6035	Kathleen Fackenthal
6036	Michele Fadel
6037	Bea Fahy
6038	Scott Falcone
6039	Candice Falger
6040	Jennifer Falkner
6041	Norman Fallen
6042	Cheryl Familant
6043	Townes Familia, Jr.
6044	Joan Farb
6045	Annemarie Fariello
6046	Wanda Farmer
6047	Austin Farrell
6048	Genevieve Farrell
6049	Kathleen Farrell
6050	Rich Fasnacht

ID	Name
6051	Joseph Fassari
6052	Donna Faulkner
6053	Laura Faulkner
6054	Patty Fay
6055	Phyllis Fayocavitz
6056	Jennifer Feder
6057	Diana Federici
6058	Kathleen Federici
6059	Lisa Fedon
6060	William Feeley
6061	Anne Feeney
6062	Jessica Feeney
6063	Kathleen Feeney
6064	Sterling Feeser
6065	Corie Feiner
6066	Mary Feisenberger
6067	Diane Feliciano
6068	James Felizola
6069	Laura Felker
6070	Donna Fellenberg
6071	Elyse Fels
6072	Melissa Felten
6073	Karena Feng
6074	Janice Fenstermacher
6075	Amanda Ferguson
6076	Charlene Ferguson
6077	Lyn Ferguson
6078	Jude Ferraro
6079	Molly Ferster
6080	Shirley Feyers
6081	Joy Fidazzo
6082	Mary Fiedor
6083	Kimberly Fields

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ID	Name
6084	Jan Filios
6085	Liz Fincke
6086	Dennis Fink
6087	Eric Fink
6088	Heidi Finkelberg
6089	Brett Finley
6090	William Finnegan
6091	Matthew Fiorentino
6092	Linda Firlein
6093	Leewellyn Fischer
6094	Teri Fish
6095	Sanda Fishe
6096	Barbara Fisher
6097	Cheryl Fisher
6098	Keith Fisher
6099	Kimberly Fisher
6100	Mary Fisher
6101	Rita Fisher
6102	Vicki Fisher
6103	Bonnie Fishet
6104	Jon Fishwick
6105	Judy Fitzgerald
6106	Rene Fitzgerald
6107	Carol Fitzpatrick
6108	John Fitzurka
6109	Stephanie Fladung
6110	Karen Flagella
6111	Jean-Luc Flavenot
6112	James Fleming
6113	John Fleming
6114	Nancy Fleming
6115	Shirley Fletcher
6116	Monica Flint

ID	Name
6117	Becca Flitter
6118	Donald Flukinger
6119	David Flynn
6120	Barbara Fogal
6121	Tom Fonda
6122	Carol Foran
6123	Lisa Forbes
6124	Stephanie Forbes
6125	Betty Ford
6126	Lora Ford
6127	Angela Ford-Jones
6128	Fay Forman
6129	Janet Forman
6130	Kathleena Formica
6131	Mary Forrest
6132	Donald Fortenberry
6133	Mary Forthman
6134	Marie Fortis
6135	Deborah Foster
6136	Kevin Fountain
6137	Patricia Fowler
6138	Alan Fox
6139	Jean Fox
6140	Lynn Fox
6141	Rosemary Frain
6142	Rid Francisco
6143	Faith Franck
6144	Jill Frank
6145	Beth Franke
6146	Stanley Frankel
6147	Deirdre Franklin
6148	Andrew Franks
6149	Barbara Franzen

ID	Name
6150	Rose-Marie Fraser
6151	Kenneth Frawley
6152	Meryl Freedman
6153	Carolyn Freeland
6154	Allison Freeman
6155	Peg Freeman
6156	Vicky Frerotte
6157	Emily Freudenberger
6158	Eileen Frey
6159	Janice Frey
6160	M. Frick
6161	Margaret Frick-Raab
6162	Dylan Friedgen- Veitch
6163	Deborah Friedman
6164	Mary Frier
6165	Timothy Frock
6166	Kathryn Froeschl
6167	Diane Frostino
6168	Alexandra Fry
6169	John Fullen
6170	Arlene Fuller
6171	Erik Fuller
6172	Billie Funk
6173	Kathy Furlong
6174	Melanie Fusco
6175	Wendy Futrick
6176	Christina Gabonay
6177	Gerald Gabow
6178	Ind. Gabrielle
6179	Carl Gahley
6180	Ed Gahres
6181	Rebecca Gaidos

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ID	Name
6182	Florence Galatola
6183	Anna Galbraith
6184	William Galiano
6185	Catherine Gallagher
6186	Katherine Gallagher
6187	Mary Gallagher
6188	Mary Gallant
6189	Diane Gallo
6190	Irene Gannon
6191	Paula Garbarino
6192	Adam Garber
6193	Brenda Garber
6194	Todd Garcia-Bish
6195	Elizabeth Gardner
6196	Nina Gardner
6197	Isaac Garfield
6198	Deirdre Garland
6199	Eric Garland
6200	Alvin Garner
6201	Cheryl Garner
6202	Liz Garratt
6203	Dale Garrett
6204	Linda Garrity
6205	Cathy Garvey
6206	Deloris Gaskins
6207	Michelle Gasperine
6208	Marcia Gasser
6209	Dave Gates
6210	Carolyn Gathers
6211	Pamela Gaudet
6212	Judith Gauker
6213	Kathy Gaul
6214	Lo Gaul

ID	Name
6215	Tom Gauntt
6216	Josephine Gear
6217	Russell Geare
6218	Barb Gebelein
6219	Leslie Gebhart
6220	Amara Geffen
6221	John Gehman
6222	Marvin Gehrman
6223	Vicki Geib
6224	Patricia Geiger
6225	Pamela Geisinger
6226	Kathleen Geist
6227	William Gelsinger
6228	Ginna Gemmell
6229	Dina Gentile
6230	Debra George
6231	Judith George
6232	Sarah George
6233	Gigi Gerben
6234	Alan Gerber
6235	Robert Gerle
6236	Richard Gerome
6237	Patricia Gerrero
6238	Joseph Gervolino
6239	Warren Getchell
6240	Kathleen Gettigan
6241	Carol Getty
6242	Leila Ghaznavi
6243	Margaret Ghiardi
6244	Eileen Gibson
6245	Jody Gibson
6246	Karen Giddings
6247	Joyce Gieza

ID	Name
6248	Nancy Gilbert
6249	Tom Gilbert
6250	Tom Gilbreath
6251	Vincent Gilhool
6252	Kathleen Gill
6253	Joan Gillespie
6254	Bruce Gillettie
6255	Bettye Gilliam
6256	Lori Gilliam
6257	Carol Gilliotti
6258	Chantal Gin
6259	Kenneth Ginder
6260	Marsha Gingold
6261	Albert Giovanazzi
6262	Paul Girardi
6263	Brian Gitler
6264	Dorothy Gjurin
6265	Melanie Gladney
6266	Stephanie Gladulich
6267	Katherine Glatfelter
6268	Maria Gleason
6269	Janice Gleeson
6270	Andrea Gliber
6271	Allison Glickman
6272	Barbara Glore
6273	Sherida Glover
6274	Dianna Glusco
6275	Clarissa Godinez
6276	Kimberly Goedicke
6277	Barbara Goff
6278	Sara Gold
6279	Nancy Goldberg
6280	Keeley Golden

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ID	Name
6281	Justyna Goldman
6282	Julie Goldstein
6283	Eva Goll
6284	Anna Golub
6285	Joyce Gometz
6286	William Gonzalez
6287	Marjorie Gooch
6288	Karen Good
6289	Roni Good
6290	Linda Goodman
6291	Leanna Goodrich
6292	Anthony Goordano
6293	Susan Gorba
6294	Douglas Gordon
6295	Joanne Gordon
6296	Robert Gordon
6297	Jennina Gorman
6298	Julianne Gould
6299	Kate Gowen
6300	Joanne Gower
6301	Christine Gradel
6302	Susan Graf
6303	Suzann Graf
6304	Maureen Graham
6305	Andrea Granado
6306	William Granche
6307	Leonard Granda
6308	Kelly Grant
6309	Mike Grant
6310	Carolyn Grassi
6311	William Gravelle
6312	Dave Gravina
6313	Karen Gray

ID	Name
6314	Meghan Gray
6315	Agnes Green
6316	Amy Green
6317	Nancy Green
6318	Terry Green
6319	Kathy Greenage
6320	Monica Greene
6321	Sandra Greene
6322	Tracy Greggs
6323	Eric Gregory
6324	Kisa Gregory
6325	Judith Greif
6326	Elizabeth Greim
6327	Patricia Greiss
6328	Thomas Gribbin
6329	Bonnie Griffin
6330	Sarah Griffin
6331	Susan Griffith
6332	Terry Griffith
6333	John Grillo
6334	Lisa Grillo
6335	Sally Grimes
6336	Nicole Groff
6337	Joanne Groshardt
6338	Judy Gross
6339	Wendy Gross
6340	Rich Grosskettler
6341	Arden Groves
6342	Michael Groves
6343	Jeanette Gruber
6344	Lauren Gruber
6345	Robert Grudzinski
6346	Tom Gruver

ID	Name
6347	Mark Grzegorzewski
6348	Bethany Guarilia
6349	Cindy Guenther
6350	Nancy Guenther
6351	GianPaolo Guercio
6352	Joe Guest
6353	Jillian Guldin
6354	Trinda Gulley
6355	Frances Gundrum
6356	Cheryl gunning
6357	Peter Gunther
6358	Sandy Gurreri
6359	Donna Gwyer
6360	Lynn Hackenberg
6361	Katherine Hackney
6362	Debra Haddad
6363	Leslie Haerer
6364	Andrew Hager
6365	Bob Hager
6366	Jeraldine Hagerman
6367	Rick Hagerman
6368	Mary Haggerty
6369	Brigitte Hagman
6370	Elizabeth Hahn
6371	Beth Hain
6372	Karen Haire
6373	Curtis Haldy
6374	Dianne Hall
6375	Jeffrey Hall
6376	Jill Hall
6377	Kim Hall
6378	Susan Hall
6379	Michael Haller

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ID	Name
6380	Carol Hallinan
6381	Catherine Halper
6382	Jim Halsell
6383	Janice Haman
6384	Linda Hamel
6385	Maria Hamersveld
6386	Brian Hamilton
6387	Mary Hamilton
6388	Teresa Hamilton
6389	Catherine Hammell
6390	Elizabeth Hammons
6391	Kathleen Hander
6392	Beryl Handler
6393	David Haney
6394	Beth Hanley
6395	Michael Hannum
6396	J. Hansell
6397	Amy Hansen
6398	Amber Hanson
6399	Norman Hanson
6400	Elizabeth Hanulak
6401	Paula Haragos
6402	Kate Harder
6403	Cynthia Harding
6404	Janice Hargrove
6405	Martta-Liisa Harju
6406	Will Harker
6407	Sharon Harmon
6408	Marietta Harouse
6409	Robin Harper
6410	Shelah Harper
6411	Patricia Harrington
6412	Candice Harris

ID	Name
6413	Mary Harris
6414	R. Harrison
6415	Randy Harrison
6416	M. Harshaw
6417	Darle Harshman
6418	James Harshman
6419	Logan Hartlaub
6420	Kathleen Hartman
6421	Kelly Hartman
6422	Ruth Hartman
6423	Suesie Hartman
6424	Meghan Hartnett
6425	Cindy hartranft
6426	Jessica Hartwick
6427	Peggy Hartzell
6428	Anne Harvey
6429	Jo Harvey
6430	Cheryl Hatch
6431	Sally Hatt
6432	Monica Hatton
6433	Carol Hatton-Holmes
6434	Carol Haufler
6435	Alicia Haupt
6436	Linda Haus
6437	Alex Haussmann
6438	Chase Haven
6439	Richie Hawkins
6440	Sandra Hawkinson
6441	Sandra Hay
6442	Cathy Haynes
6443	Linda Hazel
6444	Judith Hazelton
6445	Debbie Hazlett

ID	Name
6446	Tom Heal
6447	Mark Heald
6448	Kathleen Heaney
6449	Jonelle Heany
6450	Nancy Heath
6451	Susan Heaver
6452	John Hechler
6453	Beatrice Heck
6454	Porter Hedge
6455	Barbara Hee
6456	Anna Heffner
6457	Rosalind Heid
6458	Patricia Heimbach
6459	Charles Heineke
6460	Richard Heinlein
6461	David Heisey
6462	Jenny Heitler-Klevans
6463	Nancy Heller
6464	Curtis Helm
6465	Tanya Hempfield
6466	Ester Henderson
6467	Janet Henderson
6468	Laurel Henderson
6469	Kathleen Hendricks
6470	Marilyn Hendricks
6471	Peggy Hendrickson
6472	Meena Hendrixson
6473	Dawn Hendry
6474	Trish Henn
6475	Paul Hennessey
6476	Diane Henrique
6477	Leigh Herbert

Appendix A - List of Commentators

ID	Name
6478	Patti Herbst
6479	Patricia Herbsttritt
6480	Helene Herman
6481	Nicole Herman
6482	Cara Herold
6483	Cathy Herrold
6484	Sherilyn Herron
6485	Karen Hershman
6486	Webb Hersperger
6487	Dottie Heskett
6488	Christine Hess
6489	Doug Hess
6490	Patty Hess
6491	Sandy Hetherington
6492	Ed Heverly
6493	Brian Hibbs
6494	Shirley Hickey
6495	Megan Hicks
6496	Tom Hiegel
6497	Karen Higgins
6498	Candice Highfield
6499	Penelope Highhouse
6500	Susan Hilderbrand
6501	Keith Hileman
6502	Darrell Hill
6503	Memphis Hill
6504	Cliff Hillis
6505	Donna Hilton
6506	Donna Hime
6507	Riley Himmelberger
6508	David Hincer
6509	Kevin Hindes
6510	Tara-Anne Hinds

ID	Name
6511	Diane Hine
6512	Gloria Hinrichs
6513	Anita Hirsch
6514	Kathleen Hirthler
6515	Donna Hirtley
6516	Elizabeth Hirtley
6517	Kristina Hitzelberger
6518	Cheryl Hixson
6519	Rebecca Hixson
6520	Maryann HM
6521	Jennifer Hoagland
6522	Lynn Hobaugh
6523	Sidney Hoblit
6524	Joy Hockman
6525	Cheryll Hodges
6526	Robert Hodges
6527	Janet Hoerle
6528	Brittany Hoeschele
6529	Bunny Hoff
6530	G. Hoffman
6531	Joshua Hoffman
6532	Karina Hoffman
6533	Sandra Hoffman
6534	Stacey Hoffman
6535	Tom Hoffman
6536	DarylN Hoffstot
6537	Mark Hogan
6538	Peggy Hoisington
6539	Bill Holbert
6540	Jeanne Holi-Brabson
6541	Sydney Hollabaugh
6542	Martha Holland
6543	Patricia Hollenbach

ID	Name
6544	Mary Hollis
6545	Larry Holman
6546	Catherine Holotyak
6547	Mary Holton
6548	Delores Hom
6549	Linda Homnick
6550	Barbara Hons
6551	Nick Hood
6552	Elizabeth Hooker
6553	Timothy Hoover
6554	Holly Hopkins
6555	Martha Hopkins
6556	Steve Hopkins
6557	Christine Hopson
6558	JoAnn Horanic
6559	Lori Horchos
6560	Mary Horn
6561	Cheryl Hornung
6562	Bonita Horsey
6563	Carol Horton
6564	William Hoskins
6565	Penny Hotchkiss
6566	Jany Hotte
6567	Ruby Houck
6568	Dennis Houlihan
6569	Judith House
6570	Patrick Houston
6571	Mary How
6572	Mary Howard
6573	Melanie Howard
6574	Patricia Howell
6575	John Howey
6576	Kara Howland

Appendix A - List of Commentators

ID	Name
6577	Wayne Hrabovsky
6578	Merek Hronowski
6579	Bruce Huber
6580	June Hubert
6581	Wolfgang Hucke
6582	Mark Hudson
6583	Lisa Huffine
6584	Sarah Hufnagle
6585	Janet Huggins
6586	Altheda Hughes
6587	Jean Hughes
6588	Gary Hull
6589	Shawn Hull
6590	Katie Humen
6591	Asher Humm
6592	Obie Hunt
6593	Samantha Hunt
6594	Jillian Hunter
6595	Maria Hunter
6596	Wendy Huntsman
6597	June Hurst
6598	Jason Husby
6599	Matt Huston
6600	Charlene Hutchison
6601	Darlene Huttenlock
6602	Alison Hutter
6603	Laura Hutterer
6604	Mary Hyland
6605	Beverly Ibanez
6606	Carmen Iglesias
6607	Anita Imbrescia
6608	Nathan Imbrescia
6609	Tom Imbrescia

ID	Name
6610	David Imgrund
6611	Rosann Imm
6612	Dianne Inghram
6613	Jacqueline Ionadi
6614	Roslyn Ionta
6615	Leigh Irvin
6616	Zachary Irwin
6617	Kerry Ishizaki
6618	Gina Italia
6619	Cara Ivens
6620	Danielle Iwanyszyn
6621	Steven Izzo
6622	Nathaniel Jacklin
6623	Bob Jackson
6624	Marylinda Jackson
6625	Kathleen Jacobson
6626	Martha Jaegers
6627	Nellie Jageler
6628	Kelli James
6629	Lyra James
6630	Teresa James
6631	Robert Jannarone
6632	K.D. Janney
6633	Amanda Janouskovec
6634	Sharon Janson
6635	Jessica Jarrett
6636	Virginia Jastromb
6637	Val Jeftic
6638	Fran Jenkins
6639	Keith Jenkins
6640	Ind. Jess
6641	Andy Jester

ID	Name
6642	Barb Johns
6643	Cindy Johnson
6644	Dorothy Johnson
6645	Gerald Johnson
6646	Gilda Johnson
6647	Hugh Johnson
6648	Jerie Johnson
6649	Karen Johnson
6650	Kathleen Johnson
6651	Lisa Johnson
6652	Nancy Johnson
6653	Richard Johnson
6654	Scott Johnson
6655	Shelby Johnson
6656	Shirley Johnson
6657	Merrill Johnston
6658	Patrick Johnston
6659	Kathy Johnston-Keane
6660	Marianne Jolin
6661	Lori Jolley
6662	Susette Jolley
6663	Barbara Jones
6664	Christine Jones
6665	Elisabeth Jones
6666	Helen Jones
6667	Janet Jones
6668	Jason Jones
6669	Jasper Jones
6670	Kevin Jones
6671	Matthew Jones
6672	Melody Jones
6673	Patricia Jones

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ID	Name
6674	Reginald Jones
6675	Tracy Jones
6676	William Jones
6677	Denise Jordan
6678	Pam Jordan
6679	Alberta Joyce-Bell
6680	Joe, Jr.
6681	Vincent, Jr.
6682	Kimberly June
6683	Danielle Junker
6684	Mike Jurczewski
6685	J. Jurgaitis
6686	Linda Justice
6687	Adele Juzi
6688	Joan K.
6689	James Kaff
6690	Margie Kahler
6691	Cheryl Kahn
6692	Emily Kahn
6693	Lisa Kalenevitch
6694	Joe Kaliszewski
6695	Judy Kaliszewski
6696	Diane Kalos
6697	Patricia Kaminski
6698	Deborah Kammenzind
6699	Jean Kammer
6700	Shobhana Kanal
6701	Claudia Kane
6702	Langdon Kane
6703	Linda Kane
6704	Helene Kane- Wildblood

ID	Name
6705	Marie Kania
6706	Lonny Kanouff
6707	Nathaniel Kanuch
6708	Amani Karamichalakos
6709	Paul Karausky
6710	Penny Kardon
6711	Kris Karpinski
6712	Andrea Karsh
6713	Sally Kashatus
6714	Susan Katz
6715	David Kaufman
6716	Donna Kaufman
6717	Laurie Kaufman
6718	Michelle Kaufman
6719	Denise Kausler
6720	Janice Kavanagh
6721	Liz Kay
6722	Victoria Kealy
6723	Mary Kearns
6724	Loretta Keating
6725	Julia Keegan
6726	Alison Keen
6727	Niki Keenan
6728	Robert Keenan
6729	Jean Keer
6730	Carl Kehley
6731	Andrea Kehoe
6732	Marji Kehoe
6733	Kim Kehs
6734	Val Kell
6735	Susan Kelleher
6736	Anne Keller

ID	Name
6737	Joan Keller
6738	Peter Keller
6739	Rhonda Keller
6740	Susan Keller
6741	Margaret Kelly
6742	Mary Kelly
6743	Melanie Kelly
6744	Robert Kelly
6745	Marie Kelsey
6746	An Kemp
6747	Leeanne Kendall
6748	Yoshiko Kendall
6749	Jessica Kenley
6750	John Kenneally
6751	Caryn Kennedy
6752	Ed Kennedy
6753	James Kennedy
6754	Marie Kennedy
6755	Pat Kennedy
6756	Diane Kent
6757	Rachel Kent
6758	Sally Keri
6759	Deb Kern
6760	Magi Kern
6761	Michael Kerns
6762	Christie Kerr
6763	David Kerr
6764	Jane Kerr
6765	Peggy Kerr
6766	Ellen Kessler
6767	George Kessler
6768	Sharon Kessler
6769	Rob Kettell

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ID	Name
6770	Robert Ketterlinus
6771	Edward Ketyer
6772	Elizabeth Kevilus
6773	Karina Khachatryan
6774	Janice Kielty
6775	Mary Kier
6776	Linda Kilgour
6777	Irene Killiany
6778	Cheryl Killion
6779	Virginia Kimak
6780	Julie Kimmel
6781	Cathleen King
6782	Barbara Kinney
6783	Laura Kinney
6784	Virginia Kintz
6785	Cassandra Kirby
6786	Deb Kirchdoerfer
6787	Chester Kirchman
6788	Bonnie Kirchner
6789	Stephanie Kirk
6790	Margaret Kirkey
6791	Lisa Kirkhoff
6792	Louise Kirkwood
6793	Rachel Kisic
6794	Stephen F. Kislock, III
6795	Donna Kistler
6796	Richard Kite
6797	Marion Kitty
6798	Cara Klavans
6799	Kurt Kleiber
6800	Carol Klein
6801	Daniel Klein

ID	Name
6802	James Klein
6803	Mary Klein
6804	Diana Kliche
6805	Susan Klnedinst
6806	Erik Klockemann
6807	James Knapp
6808	Mary Knight
6809	Mark Knobil
6810	Laurie Knoebel
6811	Jamie Knoll
6812	Joy Knoll
6813	Heidi Koch
6814	Joann Koch
6815	Bernard Kocon
6816	Joseph Koegler
6817	Joan Koester
6818	Jeanne Kolodner
6819	Pam Komm
6820	Daisy Konowal
6821	Peter Korch
6822	Cathy Kornfield
6823	Tom Kosmala
6824	Aleks Kosowicz
6825	Eileen Kosterich
6826	Suzanne Koury
6827	Greg Kovalick
6828	Jordan Kovnot
6829	Michael Kowal
6830	Sandra Kowalewski
6831	Brandon Kozak
6832	Tammy Kozrad
6833	Aimee Kraemer
6834	Linda Kranich

ID	Name
6835	Melissa Kraus
6836	Patricia Kraybill
6837	Janet Kreiner
6838	Judy Kreipe
6839	Betty Kremer
6840	Donna Krepin
6841	Samantha Kresge
6842	Theresa Kreuzburg
6843	Jacob Kriger
6844	Jean Kristie
6845	Andrea Krohe
6846	Rachel Krucoff
6847	Kathleen Krummenoehlrotz
6848	Patricia KRUPA
6849	K. Krupinski
6850	Mariel Kruse
6851	Pat Kubic
6852	Barbara Kucan
6853	Leo Kucewicz
6854	Debra Kucher
6855	Joan Kula
6856	Alex Kulanko
6857	Cynthia Kumor
6858	Lisa Kunin
6859	Cynthia Kunkel
6860	Glee Kunkle
6861	Steve Kunz
6862	Nancy Kurland
6863	Josh Kutyna
6864	Christine Kuzma
6865	Susan Kuzy
6866	Diane Kwolek

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ID	Name
6867	Peter Kyne
6868	Anita Kysor
6869	Carolyn Kytte
6870	Margaret Kytte
6871	Carol LaBelle
6872	Mercedes Lackey
6873	Melony Laco
6874	Cyndi Lacroix
6875	Louis Lafferty
6876	Theresa Lafferty-Steen
6877	Peggy LaForgia
6878	Bea Lagorio
6879	Nancy LaGrave
6880	Rosemary Lako
6881	Sandie Lamanna
6882	Werner Lamberger
6883	Susan Lambert
6884	Janet Lamborn
6885	Sue Lambright
6886	Shelley LaMont
6887	Lori Land
6888	Paul Landau
6889	Ann Landay
6890	Thomas Lander
6891	Anja Landis
6892	Lisa Landis
6893	Carol Lane
6894	Melissa Lane
6895	Patricia Lane
6896	Lynn Lang
6897	John Langdon
6898	Carolyn Lange

ID	Name
6899	Beatrice Langman
6900	Brenda Lanning
6901	Lynn Lantosh
6902	Candace LaPorte
6903	Wayne Laporte
6904	Nora Lappin
6905	Barbara LaPrairie
6906	Julia Larsen
6907	Lida Larsen
6908	Mary Lashley
6909	Robin LaSon
6910	Roger Latham
6911	Barbara Latoche
6912	Jayden Latona
6913	Rebecca Lattanzio
6914	Jaclyn Lattimore
6915	Tracey Lau
6916	Ann Lauber
6917	Carol Laudermilch
6918	Virginia Laughlin
6919	Mary LaValley
6920	Judy Laverty
6921	Kim Law
6922	Kyle Lawhead
6923	David Lawrence
6924	Muriel Lawrence
6925	Ruth Lawson
6926	Barbara Laxon
6927	Cynthia Layton
6928	Jade Lea
6929	Adrienne Leach
6930	Paula Leach
6931	Jean Leapson

ID	Name
6932	Joyce Leasher
6933	Sherri Leatherman
6934	Teri LeBlanc
6935	Brett Lebo
6936	Sarah Lebo
6937	Kathy Ledger
6938	Janice Lee
6939	Katherine Lee
6940	Ron Lee
6941	Phillip Leeson
6942	Sandra Leeson
6943	Yvonne LeFever
6944	Alexandra Lehman
6945	Louise Lehman
6946	Kathleen Lehner
6947	Mary Leibensperger
6948	Leonard Leibman
6949	Linda Leibold
6950	Patricia Leidner
6951	Janet Leidy
6952	Caryn Leifer
6953	Danna Leininger
6954	Bonnie Leisey-Bartsch
6955	Tiffani Lemen
6956	Roxanne Lemmon
6957	Nicholas Lenchner
6958	Arthur Lenhart
6959	Brook Lenker
6960	Tray Leo
6961	Mary Leonard
6962	Jeff Leong
6963	Dellaphine Leono

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ID	Name
6964	Maria Lepore
6965	Eleanor Leranian
6966	Sara Leschinsky
6967	J. Leslie
6968	Linda Lester
6969	Dan Lettrich
6970	Sonja LeVan
6971	Katie Levesque
6972	Beth Levin
6973	Karen Levy
6974	Kirsten Lewin
6975	Briana Lewis
6976	Lauren Lewis
6977	Mary Lewis
6978	Susan Lewis
6979	Marcel Liberge
6980	Mark Lichty
6981	Carol Lidz
6982	Amanda Lightcap
6983	David Lightcap
6984	Theodore Lilley
6985	Lisa Lilly
6986	John Limbach
6987	Deb Lincoln
6988	Ilona Lind
6989	Susan Lindemuth
6990	Tami Linder
6991	Christina Link
6992	Robert Linzmeier
6993	Kitsa Lipecky
6994	Francis Lipiecki
6995	Steve Lipman
6996	Jacqui Lipschitz

ID	Name
6997	Jane Litavish
6998	Ann Little
6999	Linda Little
7000	Matt Little
7001	Carole Livezey
7002	Michelle Llauger
7003	Adrianna Lloyd
7004	Azeria Lloyd
7005	Stephen Locke
7006	Laurie Lockman
7007	Paige Lockwood
7008	Donna Lodge
7009	Joan Loewen
7010	Susan Logan
7011	Wanda Logan
7012	Henry Londergan
7013	Barbara London
7014	Sandy London
7015	Angela Long
7016	Mary Long
7017	Robert Long
7018	Seth Long
7019	Charles Longenecker
7020	Carissa Longo
7021	Rosalind Lonsdale
7022	Mary looney
7023	Sarah Looney
7024	Kathryn Lopez
7025	Jairo Lorah
7026	Randi Lorah
7027	Marie Lord
7028	Frances Lorie
7029	Joe Love

ID	Name
7030	David Low
7031	Travis Lowe
7032	Kristine Luberto
7033	Paul Lubold
7034	D. Lubonovich
7035	Lyn Lucas
7036	Jen Luciani
7037	Sara Lujan
7038	Nancy Lukomski
7039	Sharon Lumb
7040	Jennifer Lurio
7041	Louis Lussky
7042	Kathleen Lutz
7043	Susan Lydon
7044	Alicia Lynch
7045	E. Lynch
7046	Earl Lynch
7047	Karyn Lynch
7048	Stacy Lynch
7049	Emily Lyons
7050	Jeanette Lyons
7051	Lisa Lyons
7052	Denise Lytle
7053	Anne M.
7054	Gino M.D.
7055	Stephen M.D.
7056	Wm. Maas
7057	Maryanne Macario
7058	John MacChesney
7059	Scott MacDougall
7060	Vincent Mach
7061	Sam Machemer
7062	Jane Mackie

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ID	Name
7063	Reverend Mackie
7064	Paula MacRae
7065	Lynnette Madden
7066	Deirdre Magarelli
7067	Arlene Magargal
7068	Charliene Magaro
7069	Lynn Magaro
7070	Celia MaGilton
7071	Valerie Magner
7072	Charles Mahler
7073	Helene Mahoney
7074	Mary Mahoney
7075	Tom Maier
7076	Louise Maine
7077	Catherine Maisey
7078	Elizabeth Makler
7079	Maureen Maksimoski
7080	Virginia Malachias
7081	Elizabeth Malarkey
7082	Gail Malcolm
7083	Raji Malik
7084	Brenda Mallette
7085	Gwyneth Mallinder
7086	Jamie Malloy
7087	Jennifer Malloy
7088	Vince Malone
7089	Patrick Maloney
7090	Tania Malven
7091	Christine Mancini
7092	Shawn Mankovich
7093	Mary Manly
7094	Connie Mann

ID	Name
7095	Anna Manners
7096	Caden Manson
7097	Aus Marburger
7098	Lisa Marchese
7099	Jeanne Marchiondi
7100	Tess Marchione
7101	Penelope Margoles
7102	Rosanne Mariani
7103	Alan Marie
7104	Dean Marinelli
7105	Laura Marinos
7106	Rachel Mark
7107	Monica Markarian
7108	Anne Markel
7109	Sarah Markel
7110	Brian Markley
7111	Dorothy Markowski
7112	Victoria Mars
7113	Sarah Marsh
7114	Constance Marshall
7115	Dean Marshall
7116	Helen Marshall
7117	Lauren Marshall
7118	Charlotte Martin
7119	Chas Martin
7120	Christopher Martin
7121	Janice Martin
7122	Michael Martin
7123	Petra Martin
7124	Richard Martin
7125	David Martinelli
7126	Dominic Martinelli
7127	Marilyn Martinelli

ID	Name
7128	Nicholas Martinelli
7129	Gilbert Martinez
7130	Suzanne Martinez
7131	Robert Martucci
7132	Susan Martucci
7133	Lori Marvin
7134	Laura Marx
7135	Lyndsay Marz
7136	Carolyn Massey
7137	Linda Massey
7138	Deborah Massie
7139	Francis Mastri
7140	Richard Masur
7141	Tim Matalaka
7142	Ron Matason
7143	Karen Matlack
7144	Melody Matteson
7145	Andrew Matthews
7146	John Matthews
7147	Nick Matthews
7148	Linda Mattioli
7149	Angela Mattoscio
7150	Anthony Matz
7151	Frederick Mauck
7152	Janice Maulick
7153	Ellen Maull
7154	Brad Maurer
7155	Jean-Jacques Maurer
7156	Kristine Maurer
7157	Linda Maurin
7158	Kelli Mawle
7159	Carol Maxfield
7160	Lynn Maxwell

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ID	Name
7161	Janet Mayne
7162	Ann Mazza
7163	Rebecca McAfee
7164	Nancy McAleer
7165	Ingrid McAuliffe
7166	Scott McBride
7167	James Mccafferty
7168	Margaret McCahon
7169	Carol McCall
7170	Libby McCall
7171	Cheryl McCallister
7172	Marie McCandless
7173	Kevin McCarthy
7174	Stacey McCarthy
7175	Nancy McCaughey
7176	Mark McCay
7177	Sabrina Mccleary
7178	Lynn McClelland
7179	Catherine McClenahan
7180	Dori McClennen
7181	Wanda McClune
7182	Jill McComsey
7183	Mike McCool
7184	Douglas McCormick
7185	Pat McCormick
7186	Ryan McCormick
7187	Donna McCoy
7188	Lyndi McCoy
7189	Cathy McCoy- Morgan
7190	Cassandra McCracken

ID	Name
7191	Kamillia McCracken
7192	Lorie Mccracken
7193	Clare McCuen
7194	Judy McCullough
7195	Kim McDaniel
7196	Linda McDermond
7197	Susan McDermot
7198	Alycia McDermott
7199	John McDermott
7200	Micky McDermott
7201	Barbara Mcdonough
7202	Troy McElroy
7203	Michele McErlean
7204	Becky McFadden
7205	Daniel McGarvey
7206	Jessica McGarvey
7207	Pat McGarvey
7208	Lisa McGee
7209	Mike McGilvray
7210	Marilyn McGlamary
7211	Jerilynn McGovern
7212	Pat McGuigan
7213	Andrea McGuire
7214	Ann McGuire
7215	Rebecca McHugh
7216	Brenda McIntyre
7217	Michelle McIntyre
7218	William McKane
7219	Murray McKay
7220	Don McKelvey
7221	Bonita McKenna
7222	Karen McKenna
7223	Virginia McKenna

ID	Name
7224	Richard McKenzie
7225	Cindy McKer
7226	Tracey Mckernan
7227	Rachel Mckinley
7228	Judy McKinney
7229	Debora McKivison
7230	Kendra McLain
7231	Suzanne McLaren
7232	Joan McLaughlin
7233	John McLaughlin
7234	Mark McLaughlin
7235	Robert McLaughlin
7236	Mischelle McMillan
7237	Bonnie McMillen
7238	Ingrid Mcmillen
7239	Ivy McMullen
7240	Shawn McMullen
7241	Vincent McMullen
7242	Paul McNamara
7243	Steve McNeal
7244	Kathleen Mcnenny
7245	Ellen McNerney
7246	Francesca McNichol
7247	Debra McNulty
7248	Deb McNutt
7249	B. McPeek
7250	Gloria McPherson
7251	Patricia McQuirns
7252	Lisa McSain
7253	Brianna McShane
7254	Richard McStay
7255	Rebecca Meador
7256	Rebecca Meals

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ID	Name
7257	Lawrence Meehan
7258	Misty Meekins
7259	Sandy Mehalko
7260	Siddharth Mehrotra
7261	Brad Meilak
7262	Thomas Meitzler
7263	Leo Melish
7264	Melissa Melissa
7265	James Melloh
7266	Lydia Melnyk
7267	Javier Mendez
7268	Juliet Menditto
7269	Ofelia Mendoza
7270	Anita Mentzer
7271	Dorothy Mercado
7272	Rosemary Merico
7273	Susan Merkel
7274	Cheryl Merlo
7275	Michael Merriam
7276	Edward Merriman
7277	Breanne Mertz
7278	John Mesaros
7279	Joseph Messantonio
7280	Linda Messer
7281	Bruce Messerly
7282	Joni Metzger
7283	Paul Metzler
7284	Doff Meyer
7285	Douglas Meyer
7286	Helen Meyer
7287	Ena Miceli
7288	Emory Michau
7289	Margaret Micsko

ID	Name
7290	Andrew Middleton
7291	Thomas Might
7292	Kathy Milano
7293	Joyce Mild
7294	Paul Milenkowic
7295	Alison Miller
7296	Andrew Miller
7297	Bridget Miller
7298	Cynthia Miller
7299	Eric Miller
7300	Joan Miller
7301	Joanne Miller
7302	Lloyd Miller
7303	Lucille Miller
7304	Richard Miller
7305	Robin Miller
7306	Timothy Miller
7307	Lisa Millhous
7308	Andrew Mills
7309	Judith Mills
7310	Karen Mills
7311	Laura Mills
7312	Scott Milo
7313	Kathryn Miltenberger
7314	Naomi Mindlin
7315	Madelyn Minehart
7316	John Minger
7317	Kim Minger
7318	Susan Miracle
7319	Janet Mirgan
7320	Michelle Misselwitz
7321	Gerald Mistal

ID	Name
7322	Beth Mitchell
7323	David Mitchell
7324	Dee Mitchell
7325	Melinda Mitchell
7326	Nicole Mitchell
7327	Melinda Mitravich
7328	Jennifer Mittereder
7329	Judy Miziumski
7330	Laura Mock
7331	Donna Mohan
7332	Faith Mohnke
7333	Elizabeth Molsen
7334	Carol Monaghan
7335	Virginia Monaghan
7336	Valerie Monick
7337	Gretchen Montebello
7338	Montgomery Moody
7339	Rona Moody
7340	Jamie Mooney
7341	Len Mooney
7342	Dawn Moore
7343	Dottie Moore
7344	Jean Moore
7345	Margaret Moore
7346	Nancylee Moore
7347	Patricia Moore
7348	Vincent Moore
7349	David Moorehead
7350	Cecilia MoralesBaker
7351	Denise Moran
7352	Wendy Moran
7353	Robert Moraux

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ID	Name
7354	Richard More
7355	Ramona Moreland
7356	Tasha Moreno
7357	Tirso Moreno
7358	Charles Moretti
7359	Christine Moretti
7360	Janelle Morgan
7361	Jill Morgan
7362	Kevin Morgan
7363	Kim Morgan
7364	Robert Morgan
7365	Alice Morgello
7366	Maria Morgounova
7367	Kathy Moritz
7368	Pauline Moritz
7369	Elizabeth Moro
7370	Chloe Morris
7371	Louise Morris
7372	Stephanie Morris
7373	Angela Morrish
7374	Agnes Morrison
7375	Charles Morrison
7376	Darlene Morrison
7377	Ed Morrison
7378	Ryan Morrison
7379	Tess Morrison
7380	Marina Morrone
7381	Craig Morrow
7382	Gayle Morrow
7383	Anne Morse
7384	Diana Morse
7385	Vanessa Mort
7386	William Morton

ID	Name
7387	Linda Moser
7388	Rory Mosko
7389	Nicholas Mosunic
7390	Coua Moua
7391	Carol Mowen
7392	Barry Moyer
7393	Karen Moyer
7394	Lee Moyer
7395	Peggy Moyer
7396	Marina Mozhayeva
7397	Ann Mozier
7398	Sandra Muchnick
7399	Charles Muehlhof
7400	Natalie Mueller
7401	Angela Mullen
7402	Peter Mulshine
7403	Jean Mumford
7404	Sherrie Munday
7405	Adam Mundok
7406	Lewright Munn
7407	Jean Munz
7408	Linda Murawski
7409	Andrea Murphy
7410	Cynthia Murphy
7411	Janet Murphy
7412	Joann Murphy
7413	Kelly Murphy
7414	Kimberly Murphy
7415	Barbara Murray
7416	Joyce Murray
7417	Richard Murray
7418	Catherine Mushaw
7419	Sharon Mushock

ID	Name
7420	Karen Musko
7421	Jane Musser
7422	Patricia Mutek
7423	Penney Muzyka
7424	Alfred Myers
7425	Courtney Myers
7426	Derald Myers
7427	Diane Myers
7428	Renee Myers
7429	Rev. Myers
7430	The Myers
7431	Bonnie Mylet
7432	Johanna Mylet
7433	Waste Mytime
7434	Laura N.
7435	Kelli Nachbar
7436	Megan Nachod
7437	Barbara Nadel
7438	Christine Naegle
7439	Marjorie Nailor
7440	Anika Nana
7441	Jason Nardell
7442	Barbara Nardone
7443	Elizabeth Naro
7444	Bonnie Narod
7445	Kathryn Narrow
7446	Ann Nasek
7447	Jonathan Nash
7448	Paul Nasutti
7449	Matt Nbert
7450	Jo Neal
7451	Robert Nease
7452	Tom Neely

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ID	Name
7453	Janet Neihart
7454	Susan Neis
7455	Sandy Nelson
7456	Valerie Nelson
7457	Lori Nemenz
7458	Diane Nerl
7459	Kathleen Nerz
7460	Austin Nester
7461	Heru Netier
7462	Barbara Nettleship
7463	Barbara Neumuller
7464	Carrie Neurohr
7465	Jolene Newcomer
7466	Barbara Newell
7467	Victoria Newell
7468	Cathy Newman
7469	Barbara Newsuan
7470	Vivian Nhan
7471	Jill Nicholas
7472	Renee Nichols
7473	Linda Nickell
7474	Denise Nickey
7475	Christine Nickles
7476	Jonathan Nicol
7477	Joann Nicoletti
7478	Chloe Nientimp
7479	Bethia Nier
7480	Jon Nieves
7481	Evelyn Nitka
7482	Ruth Noesner
7483	Renee Nogales
7484	Natasha Nogan
7485	Joan Non

ID	Name
7486	Mary Norman
7487	Vic Norris
7488	Jay Notartomaso
7489	Barbara Notte
7490	Jonathan Notte
7491	Tricia Notte
7492	Paul Notwick
7493	Connie Novak
7494	Emily Novak
7495	Sara Novelly
7496	Debra Novotny
7497	mark novotny
7498	Ruthelen Noysser
7499	Andre Nunez
7500	Judy Nussbaum
7501	Bill Nysse
7502	Mary O'Brien
7503	T. OConnell
7504	Suzanne O'Connell
7505	Sally O'Connor
7506	Dixie O'Connor
7507	Maureen O'Connor
7508	Lettie Odom
7509	Joanne ODonnell
7510	Mary ODonnell
7511	Dawn O'Donnell
7512	Victoria O'Donnell
7513	Carl Oerke
7514	John Oglesby
7515	Robert O'Hara
7516	Alan Okazaki
7517	Suzanne O'Keeffe
7518	Kevin Oldham

ID	Name
7519	Angela Olds
7520	Linda Olewnick
7521	Christine Olick
7522	Elinore Olsen
7523	Ellen Olson
7524	Erin Oluschak
7525	Maureen Omelia
7526	Maureen O'Neal
7527	Katie O'Neill
7528	Patricia O'Neill
7529	Erika Onsager
7530	Debra Orben
7531	Florence Orient
7532	Renee Orlandi
7533	Andrew Orliner
7534	Robin Orliner
7535	Judy Ormerod
7536	Thomas O'Rourke
7537	Linda Orr
7538	Sandra Orr
7539	Nicole Orth
7540	Jeanne Ortiz
7541	Leslie Osborne
7542	Tami Osborne
7543	Nicole Osevala
7544	Pamela Osgood
7545	Julie Ostoich
7546	Hillary Ostrow
7547	Henrietta Ott
7548	Diane Otten
7549	Marjorie Oughton
7550	Sharon Owen
7551	Vicky Owen

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ID	Name
7552	Sharon Owens
7553	Geoffrey Oxholm
7554	Tobey Oxholm
7555	Greg Pace
7556	Catina Paci
7557	Joyce Packer
7558	Patricia Packer
7559	Edith Paige
7560	Juan Palacio
7561	Judith Palaski
7562	Mary Palermo
7563	Ron Pallack
7564	Silvana Palm
7565	Charles Palmer
7566	Erin Palmer
7567	Justine Palmer
7568	Matthew Palmer
7569	Maureen Palmer
7570	Richard Palmer
7571	Ann Palmieri
7572	Mary Panaccio
7573	Eugenia Panf
7574	Kyle Panick
7575	Claire Paola
7576	Christina Pappas
7577	John Parana
7578	Jeannette Parisi
7579	Patricia Parisse
7580	Carole Parker
7581	Heather Parker
7582	April Parkins
7583	Hope Parks
7584	Nancy Parkton

ID	Name
7585	Kelly Parrish
7586	Mary Parrish
7587	Kimberley Parsley
7588	Antonionia Parson
7589	Barbara Pasqua
7590	John Pasqua
7591	Eugene Pasquale
7592	Aaron Passell
7593	Lisa Passeri
7594	James Pastucha
7595	Randy Patacity
7596	Kathleen Pathan
7597	Rajnanda Patil
7598	Willa Paton-Smith
7599	Frank Patrick
7600	Lynn Patten
7601	Patricia Patterson
7602	Junellis Patton
7603	Linda Patton
7604	Diane Paul
7605	Candice Paulus
7606	Robin Paur
7607	Darice Pauselius
7608	Robert Paustian
7609	Dr. Pavao
7610	Michelle Pavcovich
7611	Chris Paveglio
7612	Lawrence Payne
7613	Sunny Payne
7614	Rachel Pearl
7615	Donna Pearson
7616	Larry Pedersen
7617	Veronica Pedersen

ID	Name
7618	Murray Peet
7619	Susan Peirce
7620	Donna Pekar
7621	Stephanie Pengh
7622	Robin Pennsy
7623	Cathy Penta
7624	Aggie Per
7625	Virginia Perdue
7626	Olga Pereira
7627	Kathryn Perez
7628	Marialuisa Perez
7629	Judith Perfetti
7630	Patty Perhacs
7631	Sandra Perkins
7632	Sonny Perlebach
7633	Judith Perreault
7634	Nora Perron-Jones
7635	Beth Perry
7636	Jay Perry
7637	Natalie Perry
7638	Wesley Perry
7639	Garnett Persinger
7640	Debra Peryea
7641	Peggy Pesta
7642	Mariana Pesthy
7643	Benjamin Peters
7644	Carol Peters
7645	Gary Peters
7646	Howard Peters
7647	Kirsten Peterson
7648	Sheri Petitta
7649	Mike Petrock
7650	Jane Petroski

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ID	Name
7651	Nura Petrov
7652	John Petruzzi
7653	James Pettenati
7654	Deborah Pettersen
7655	Joseph Petto
7656	Kathy Pham
7657	Molly Philbin
7658	Dwight Phillips
7659	James Phillips
7660	Lisa Phillips
7661	Melanie Phillips
7662	Joyce Picard-Busse
7663	Gloria Picchetti
7664	Richard Picone
7665	Briana Pierce
7666	Luon Pierre
7667	Lillian Piff
7668	Leslie Pike
7669	Krish Pillai
7670	Venetia Pimley
7671	Lydia Pine
7672	Marilyn Pingree
7673	Amy Pinizzotto
7674	Isabel Pintado
7675	Michael Pitcher
7676	William Pithers
7677	Laurie Pittman
7678	Water Plan
7679	Lisa Pleasant
7680	Jim Ploger
7681	Jane Plotica
7682	Bryce Pluck
7683	Brad Pogachefsky

ID	Name
7684	Danielle Pogachefsky
7685	Sarah Polachek
7686	Christine Polcha
7687	Trish Poley
7688	Anne Poli
7689	Bret Polish
7690	Molly Polons
7691	Regina Polsinelli
7692	Pat Polter
7693	Harriet Ponessa
7694	Lynn Popovich
7695	Edward Poppert
7696	M. Port
7697	Marianne Porter
7698	Pat Porter
7699	Patricia Porter
7700	Susan Posen
7701	Linda Post
7702	Tina Potchen
7703	Patrick Potter
7704	Helen Poutre
7705	Linda Powell
7706	Johnathan Powers
7707	Theresa Powers
7708	Mary Pratt
7709	Michelle Preik
7710	Claudia Presser
7711	Kathryn Preston
7712	Ashley Price
7713	Carolyn Price
7714	Donna Price
7715	Priscilla Prisms

ID	Name
7716	Janice Prowant
7717	Kathryn Prozzoly
7718	Patricia Pruitt
7719	Laura Prushinski
7720	Sherri Prutzman
7721	Joseph Pucci
7722	Therese Puddu
7723	Melissa Pugh
7724	Chris Pugliese
7725	Andrew Puglionesi
7726	Stephanie Purdy
7727	Dorothy Pust
7728	Patricia Putz
7729	Sonni Quick
7730	Matt Quigley
7731	Heather Quinn
7732	Marie Quinn
7733	Frances Raab
7734	Michelle Raab
7735	Philomena Rad
7736	Sandra Radaszewski
7737	Samantha Radford
7738	Patricia Raezer
7739	Susan Raffensperger
7740	Todd Raffensperger
7741	Carol Rafferty
7742	Diane Rafferty
7743	Laura Raftery
7744	Anne Rahn
7745	Susan Raiders
7746	Sheri Raineair
7747	Marc Rajs
7748	Staci Rakowiecki

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ID	Name
7749	Joe Rakowski
7750	Elina Raksin
7751	MaryAnna Ralph
7752	Dale Ralston
7753	Brenda Rambo
7754	Prasad Ramnath
7755	Cathie Randall
7756	Molly Randolph
7757	Mary Ranii
7758	Becky Rankin
7759	Rev. Rapczak
7760	Mary Rasley
7761	Linda Rassavong
7762	Mark Rast
7763	Joseph Rattman
7764	Jeffrey Rattner
7765	David Raupach
7766	Helen Raymond
7767	Glynnis Rea
7768	Patricia Ream
7769	Jo Reckner
7770	Bob Redfern
7771	Terri Redmond
7772	Virginia Redner
7773	Carmen Redpath
7774	Kaitlin Reed
7775	Lois Reed
7776	Lyn Reed
7777	Melody Reed
7778	Robin Reed
7779	Sarah Reed
7780	Tom Reed
7781	Colleen Reese

ID	Name
7782	M.A. Rehm
7783	Ashley Reid
7784	Sandra Reid
7785	Stephen Reid
7786	Barbara Reinhart
7787	Julie Remp
7788	Gary Reneker
7789	Kaitlyn Renna
7790	Susan Renton-Dice
7791	Bonita Repp
7792	Jeffrey Rettig
7793	Jacqueline Revello-Gush
7794	Bruce Revesz
7795	Rachel Reynolds
7796	Michael Reznor
7797	Joyceann Rhein
7798	Cheryl Rhoades
7799	Polly Rhoads
7800	Ryan Rhodes
7801	Sylvia Riben
7802	Carol Ribner
7803	Stephen Riccardi
7804	Rich Riccio
7805	Barbara Rice
7806	Dixie Rich
7807	Bryn Richard
7808	Alexandria Richards
7809	Alice Richards
7810	Andrea Richards
7811	April Richards
7812	Teresa Richards
7813	Charles Richardson

ID	Name
7814	Fred Richardson
7815	Kathleen Richardson
7816	Niki Richardson
7817	Sandra Richardson
7818	Mary Richmond
7819	Waylon Richmond
7820	Allison Richter
7821	Dolores Ries
7822	Barbara Riley
7823	Joan Riley
7824	Maureen Riley
7825	Pamela Rimato
7826	Judith Rineer
7827	Virginia Rinkus
7828	Rose Risso
7829	Erin Ritson
7830	Karen Ritzic
7831	Iliana Rivera
7832	Javier Rivera
7833	Kellie Rivera
7834	Ann Rizer
7835	Kim Robben
7836	Julia Roberson
7837	Gail Roberts
7838	Mariann Roberts
7839	Tabitha Roberts
7840	Ted Roberts
7841	Georgine Robertshaw
7842	Jeanette Robertson
7843	Kyhle Robertson
7844	Helen Robinson
7845	Silas Robinson

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ID	Name
7846	Anne Robin-Waldman
7847	Jennifer Robnett
7848	Andrea Rockey
7849	Ryan Roderick
7850	Michael Rodgers
7851	Isela Rodriguez
7852	Miriam Rodriguez
7853	Valentin Rodriguez
7854	Yolanda Rodriguez
7855	Rick Rogers
7856	Marie Rohleder
7857	Kathlene Rohm
7858	Emily Rohrer
7859	Beth Rokus
7860	Carole Rolfe
7861	Susan Roller
7862	Sharon Rollins
7863	Stephanie Romano
7864	Beverly Rood
7865	Donald Rood
7866	Theresa Rook
7867	James Rose
7868	Lori Rose
7869	Carolyn Rosean
7870	Bill Roseberry
7871	Joan Rosen
7872	Linda Rosen
7873	Skylar Rosenberg
7874	Jon Rosenblatt
7875	Mindy Rosengarten
7876	Catherine Rosenkrans

ID	Name
7877	Ann Rosenthal
7878	Jutta Rosenthal
7879	Donna Rosh
7880	Cheri Ross
7881	David Ross
7882	Jennifer Ross
7883	Linda Rost
7884	Jonna Roth
7885	Tracey Roth
7886	Sherry Rotolo
7887	Kristen Rotondo
7888	Jill Rouke
7889	Elizabeth Rowland
7890	Katherine Rubel
7891	Kathryn Ruberti
7892	Mira Rubin
7893	Evan Rudge
7894	Christine Rudy
7895	Rosanne Rumbaugh
7896	Maeve Rupp
7897	Janice Rush
7898	John Rush
7899	Wendy Rushatz
7900	Jan Rushforth
7901	Franklin Russell
7902	Kimberley Russell
7903	Krista Russell
7904	Marilyn Russell
7905	Joanie Rutkoski
7906	Rex Rutkoski
7907	Nell Rutledge-Leverenz
7908	Brenna Ryan

ID	Name
7909	John Ryan
7910	Sharon Ryan
7911	Terrence Ryan
7912	Jeanlu Ryersbach
7913	S. S.
7914	Kelly Sabajo
7915	John Sabo
7916	Mary Sabol
7917	Olivia Sachsenmaier
7918	Lisa Sadowski
7919	Tiani Salcedo
7920	Stephen Salgaller
7921	Connie Salomone
7922	Scott Salsi
7923	Micheline Saluga
7924	Rick Salvi
7925	Ed Sam
7926	Hope Samler
7927	Danilo Sanchez
7928	Charles SanClementi
7929	Milan Sandhu
7930	Alison Sandler
7931	Laurie Sanford
7932	Judith Sanger
7933	David Santa
7934	Beth Santana
7935	Sharon Santia
7936	Moraima Santiago
7937	Susan Sapos
7938	Iva Saraceni
7939	Victor Sardone
7940	Charles Sarrica
7941	Dolores Sasso

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ID	Name
7942	Julia Satriano
7943	Jeanne Saulnier
7944	Barbara Sauter
7945	Tammy Sauter
7946	Frieda Savacool
7947	Brandy Savage
7948	Barbara Sayer
7949	Joshua Saylor
7950	Paul Scanlon
7951	Harry Scarpa
7952	Marilyn Scelzo
7953	Deborah Schaaf
7954	Matthew Schaeffer
7955	Jeanne Scheerbaum
7956	Carolyn Schellhorn
7957	Pauline Schepperd
7958	Barbara Schick
7959	Mary Schiele
7960	Lisa Schildhorn
7961	Jeanne Schlatter
7962	Doug Schlitte
7963	Bev Schlosberg
7964	Nadalyn Schlossman
7965	Ava-marie Schmergel
7966	Elaine Schmid
7967	Andrea Schmitt
7968	Dellarika Schmitt
7969	Heather Schmitz
7970	Nancy Schnarr
7971	Amy Schneck
7972	Edward Schneider
7973	Lisa Schnell

ID	Name
7974	Bonita Schoen
7975	Michelle Schoen
7976	Christina Schoenhard
7977	Suzanne Scholz
7978	Jackie Schon
7979	Joan Schooley
7980	B. Schorle
7981	William Schoy
7982	Karen Schrader
7983	Debee Schraff
7984	Catherine Schratt
7985	Paula Schuetrum
7986	Lenore Schultheis
7987	Maureen Schupsky
7988	Barbara Schutte
7989	Brian Schwab
7990	Yale Schwartrz
7991	Donald Schwartz
7992	Mertot Schwartz
7993	Meredith Schwarz
7994	Susan Schwarz
7995	Donna Schwebel
7996	Judy Schweingruber
7997	Lori Schwemmer
7998	Melinda Schwenk- Borrell
7999	Andrea Sciolla
8000	Susan Sciullo
8001	Trudy Sclar
8002	Karen Scotese
8003	David Scott
8004	Georgine Scott
8005	Kendra Scott

ID	Name
8006	Leslie Scott
8007	Marcy Scott
8008	Mary Scott
8009	Nathan Scott
8010	Pamela Scott
8011	S.J. Scott
8012	Susan Scott
8013	Vera Scroggins
8014	Jane Seaberg
8015	Harry Searfoss
8016	Katie Sebak
8017	Stacie Sebastian
8018	Denise Sedor
8019	Katharine Seed
8020	Vicki Sees
8021	Nancy Segal
8022	Patricia Segal
8023	Paul SegraveDaly
8024	Barbara Seidel
8025	Emily Seitz
8026	Paul Seitz
8027	Greg Sells
8028	Deborah Selznick
8029	Karen Senior
8030	Anne Sensenig
8031	Scott Seraydarian
8032	Mary Serene
8033	Audrey Serniak
8034	Mark Serra
8035	Matthew Serra
8036	Donna Servidio
8037	Dr. Sestito
8038	Don Seyler

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ID	Name
8039	Janice Shaffer
8040	Keath Shaffer
8041	Kristine Shalkowski
8042	Amalia Shaltiel
8043	Anna Shambaugh
8044	Gayle Shank
8045	Laura Shannonn
8046	Elaine Shaw
8047	Mary Shaw
8048	Barbara Sheads-Smith
8049	Susan Sheaffer
8050	Jim Shearer
8051	Marian Shearer
8052	Jessica Sheehan
8053	John Sheerin
8054	Carol Shelton
8055	Tiffany Shepherd
8056	Barb Sherf
8057	Kathleen Sheridan
8058	Michelle Sheridan
8059	Mark Sherk
8060	Aryeh Sherman
8061	Nina Sherman
8062	Renny Sherrow
8063	Pat Sherwood
8064	Nataliya Shevchenko
8065	Nikki Shifren
8066	Ton Shin
8067	Cydnie Shindledecker
8068	Rhiannon Shingler
8069	Judy Shipman

ID	Name
8070	Josephine Shirey
8071	Charlotte Shoemaker
8072	Lynn Shoemaker
8073	Tina Shoeman
8074	Sarah Sholl
8075	Elizabeth Shook
8076	Kim Shope
8077	Sharon Shovelin
8078	Pauline Shuck
8079	Judith Shugarts
8080	Holly Shull
8081	Gayle Sicchitano
8082	Carol Sicinski
8083	Eric Sick
8084	Eli Sickler
8085	Erica Sidorowicz
8086	Althea Siefert
8087	Frances Siegel
8088	Debbie Sierchio
8089	Glenn Sierchio
8090	Caroline Silla
8091	Adele Silz
8092	Robert Siman
8093	Jessica Simcisko
8094	Vernon Simonet
8095	Cara Simonetta
8096	Anna Simons
8097	Judy Simonson
8098	Jack Simpson
8099	Sylvia Sims-Linkish
8100	Debra Singer
8101	Donna Singer
8102	Laura Singo

ID	Name
8103	Barbara Sirianni
8104	Karen Sisson
8105	Lois Sites
8106	Shirley Sites
8107	Yvette Sivels
8108	Lenore Sivulich
8109	Alison Sizemore
8110	Eileen Sizer
8111	Ken Skibinski
8112	Tina Skinner
8113	Sarah Slater
8114	Heywood Sloane
8115	Janet Slovak
8116	Susan Slupe
8117	Georgia Smickley
8118	Wendy Smiley
8119	Annette Smith
8120	Bailey Smith
8121	Barbara Smith
8122	Brenda Smith
8123	Carol Smith
8124	Cheri Smith
8125	Corinne Smith
8126	David Smith
8127	Diane Smith
8128	Gail Smith
8129	Jeannette Smith
8130	Jennifer Smith
8131	Joy Smith
8132	Julie Smith
8133	Kelly Smith
8134	Kerry Smith
8135	Kurt Smith

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ID	Name
8136	Lori Smith
8137	Naomi Smith
8138	Sandra Smith
8139	Wendy Smith
8140	Amanda Smock
8141	Elaine Smollin
8142	Helen Snader
8143	Debra Snell
8144	Ronda Snider
8145	Amery Snyder
8146	Ann Snyder
8147	Cindy Snyder
8148	Linda Snyder
8149	Mary Snyder
8150	Maureen Snyder
8151	Nathan Snyder
8152	Wendy Snyder
8153	Krista Soder
8154	Damon Soeiro
8155	Susie Sokolas
8156	Deborah Sokolove
8157	Gene Sokolowski
8158	Joy Soliday-Arend
8159	Justin Sollenne
8160	Debra Solomon
8161	Edward Solomon
8162	B. Soltis
8163	Jim Sommers
8164	John Sonin
8165	Donna Sonnenberg
8166	Jo Sorrell
8167	Julia Spaft
8168	Sharon Spangenburg

ID	Name
8169	Henrietta Spanitz
8170	Karen Spanton
8171	Larkin Spas
8172	Barbara Spell
8173	Mallory Spencer
8174	Terence Sperringer
8175	ELsie spivak
8176	Nico Spribille
8177	Anthony Spurlino
8178	Diana Squicciarini
8179	Peter, Sr.
8180	Scott, Sr.
8181	Jeanne SSCM
8182	Cherie Stagg
8183	Scott Staley
8184	Helen Stamatacos
8185	James Stamm
8186	Karen Stamm
8187	Karin Standifer
8188	David Stanek
8189	Melody Stanley
8190	Ivy Stark
8191	Meta Starr
8192	Joanne Stauffer
8193	Christine Stavrinos
8194	Greg Stawinoga
8195	Kathleen Stayton
8196	Marilyn Steele
8197	Joanne Stefano
8198	Linda Steffey
8199	Diane Steichel
8200	Lorenz Steininger
8201	Cynthia Stence

ID	Name
8202	Eileen Stephan
8203	Frederick Stephans
8204	Becky Stephens
8205	Danny Stephens
8206	James Stephens
8207	Margaret Sterling
8208	Jim Stetor
8209	Nancy Stevens
8210	Shannon Stevens
8211	Susan Stevenson
8212	Martina Steves
8213	Gregory Stewart
8214	Mary Stewart
8215	Susan Stewary
8216	Lorelei Stierlen
8217	Spring Stiles
8218	Ann Stine
8219	Dianna Stirpe
8220	Marcia Stober
8221	Eric Stockhoff
8222	Mark Stoehr
8223	Heather Stoffel
8224	Merrisa Stoll
8225	Ellen Stolpe
8226	Daniel Stoltz
8227	Joyce Stoltzfus
8228	Bonnie Stolz
8229	Kathryn Stone
8230	Barry Stoner
8231	Clarence Stonesifer
8232	Andzia Stout
8233	Jesse Stout
8234	W. Stover

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ID	Name
8235	Darren Strain
8236	Stephanie Stranix
8237	Ann Strauss
8238	Sharon Strauss
8239	Marie Strausser
8240	Monica Strawbridge
8241	Patricia Strawbridge
8242	Aleta Streett-Leavy
8243	Janice Stricek
8244	Paul Strikwerda
8245	Shirley Strine
8246	Jeff Stromgren
8247	Ezekiel Stroupe
8248	Joan Strzelecki
8249	Jen Stubbs
8250	Lucinda Stude
8251	Rebecca Studer
8252	Jonathan Stull
8253	Linda Stulz
8254	Hayley Sturgis
8255	Georgann Sturm
8256	Matthew Sudak
8257	Nathan Sullenberger
8258	Gordy Sullivan
8259	Amy Summerville
8260	Lois Surry
8261	Michele Susko
8262	Joan Susski
8263	Winnetta Svenungsen
8264	Isabel Swanson
8265	Bill Swartz
8266	Ruth Swartz

ID	Name
8267	Elaine Swavely
8268	Marcia Sweely
8269	Edythe Sweeney
8270	Samantha Sweeney
8271	Sally Swegan
8272	Ria Swift
8273	Charles Swigart
8274	Bill Swope
8275	Samantha Sword
8276	Donna Symons
8277	Tracey Syreika
8278	Kimberly Szewczyk
8279	Daniel Szyld
8280	Helen Tai
8281	Kathie Takush
8282	Lois Tallon
8283	Carmela Tamburri
8284	Yen Tan
8285	Peter Taney
8286	Sandy Tanner
8287	Carol Taras
8288	Alana Tartaro
8289	Suzanne Tate
8290	Alyce Taylor
8291	Donald Taylor
8292	Eileen Taylor
8293	Katie Taylor
8294	Steven Taylor
8295	Erin Teeple
8296	Gabriel Tenaglia
8297	Joyce Tervo
8298	Mary Thakar
8299	Jason Theakston

ID	Name
8300	Laurie Thibault
8301	Bonnie Thol
8302	Laura Thomae
8303	Alexandria Thomas
8304	Barbara Thomas
8305	Brian Thomas
8306	Christopher Thomas
8307	Denise Thomas
8308	Diane Thomas
8309	Jennifer Thomas
8310	Stephanie Thomas
8311	Wanda Thomas
8312	Cutiss Thompson
8313	Deb Thompson
8314	Denise Thompson
8315	Hannah Thompson
8316	Richard Thompson
8317	S. Thompson
8318	Kelly Thomson
8319	Kathryn Thorne
8320	Anna Tiano
8321	Dalton Tice
8322	Kathie Tietze
8323	Dori Tighe
8324	Mary Tillger
8325	Deborah Tillman
8326	Clarence Timberlake
8327	Tina Tine'
8328	Susan Tischler
8329	Marilyn Tjaden
8330	Tammy Tobac
8331	Maureen Tobin
8332	Loretta Tocci

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ID	Name
8333	Sandahl Tolbert
8334	Patricia Tomes
8335	Claire Tomlinson
8336	Linda Tonner
8337	Marilyn Tontoni
8338	Leigh Tooley
8339	Don Torok
8340	Nancy Torres
8341	Ben Tost
8342	Sandra Touw
8343	John Tovar
8344	Daniel Tracy
8345	Mai Tran
8346	Elise Transue
8347	Wendy Traver
8348	Mike Treng
8349	Roberta Tretiak
8350	Theodore Tretiak
8351	Michal Trexler
8352	Jeanann Tribett
8353	Julie Triboletti
8354	Judie Tripp
8355	Mimi Troisi
8356	Donna Troll
8357	Kyle Trostle
8358	Marianne Troy
8359	George Trudeau
8360	Olga Trushina
8361	Mary-jo Tucker
8362	Diana Turin
8363	Katherine Turner
8364	Pat Turner
8365	Phoebe Turner

ID	Name
8366	Sherri Turner
8367	Randy Tusone
8368	Diane Tuttle
8369	Maryanne Uglow
8370	Rob Ulsh
8371	James Umbs
8372	Heather Unger
8373	Chanda Unmack
8374	Barbara Urban
8375	Dana Urban
8376	Lynn Urban
8377	Catherine Vaccaro
8378	Sheila Vaccaro
8379	Michelle Valentine
8380	Jonathan Valentino
8381	Joseph Valu
8382	Will Vanderbilt
8383	Nancy Vanderlin
8384	Toni Vanderpool
8385	Rise VanFleet
8386	Joanne Vanhorn
8387	Karen Vanlangeveld
8388	Susan VanMeter
8389	Joseph Varsanyi
8390	Glenna Vasoli
8391	Nancy Vasquez
8392	Melissa Vassell
8393	Elizabeth Vaughn
8394	Jean-guy Vauzanges
8395	Geoff Veith
8396	Ruth Velazquez-Torres
8397	Angela Vendetti

ID	Name
8398	Elaine Venditti
8399	Gina Vensel
8400	Jennifer Ventresca
8401	Doug Vest
8402	Wesley Vesterby
8403	Anne Vezina
8404	Linda Vicaro
8405	Mary Victa
8406	Nancy Vignau
8407	Pamela Vigne
8408	Charlene Villinger
8409	Olga Vinogradova
8410	Lauren Viozzi
8411	Mary Vital
8412	Sonya Vitello
8413	Florence Vocatura
8414	Susan Vogt
8415	Cyan Vollmer
8416	Sharon VonBlohn
8417	Michael VonPlato
8418	Chris Vores
8419	Connie Voris
8420	Thomas Vosburg
8421	Lisa W.
8422	Maya W.
8423	James Wagaman
8424	Janr Wagner
8425	Kathrin Wagner
8426	Nancy Wagner
8427	Vicki Wagner
8428	Anne Wain
8429	Courtney Wakefield
8430	Diane Waksmunski

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ID	Name
8431	Paul Waldeier
8432	Karen Walden
8433	Juliet Waldron
8434	Cheryl Walenta
8435	Rosemary Walkenhorst
8436	Constance Walker
8437	Debra Walker
8438	John Walker
8439	Michele Walker
8440	Sherry Walker
8441	Teresa Wall
8442	Debbie Wallace
8443	Frank Wallace
8444	Marie Wallace
8445	Lorraine Wallett
8446	Diana Walls
8447	Jennifer Walrath
8448	Annie Walsh
8449	Deb Walsh
8450	Mary Walsh
8451	Monica Walsh
8452	Patricia Walter
8453	Carol Waltermeyer
8454	Lee Walters
8455	Sean Walters
8456	Suzann Walters
8457	Anita Walton
8458	Betty Wanderer
8459	Angela Wang
8460	Christine Ware
8461	Nina Wareham
8462	Cindy Warnecke

ID	Name
8463	Eileen Warner
8464	Joann Warner
8465	Kat Warner
8466	Laura Warner
8467	Danielle Warren
8468	Debra Warrens
8469	Lauren Warwick
8470	Jared Washburn
8471	Mary Wassermann
8472	Colleen Watkinson
8473	Eric Watt
8474	Elizabeth Watts
8475	Valweie Watts
8476	Sharon Wayman
8477	Sara Weaner
8478	E. Weaver
8479	Joan Weaver
8480	Lori Weaver
8481	D. Webb
8482	Marilyn Webb
8483	Bonnie Weber
8484	Brenda Webster
8485	Karon Webster
8486	Judy Weglarz
8487	James Weible
8488	Jenny Weikert
8489	Sylvia Weilacher
8490	Helen Weiler
8491	Steven Weinberg
8492	Erin Weinoffer
8493	Edith Weinstein
8494	Michael Welding
8495	Janet Welk

ID	Name
8496	Dixie Weller
8497	John Welliver
8498	Amy Wells
8499	Joshua Wells
8500	Kathryn Wells
8501	Leslie Wells
8502	Kevin Wells-Knecht
8503	Ann Wenger
8504	David Wenger
8505	Abdrew Wenrich
8506	Rhonda Wenrich
8507	Jeanne Wentzel
8508	Paula Weoner
8509	Katharine Werley
8510	Sharyn Werley
8511	Robert Werner
8512	Bernadette Werntges
8513	Michelle Wessant
8514	Carina West
8515	Robin Westcott
8516	Jacob West-Roberts
8517	Charlotte Wetzel
8518	David Wexler
8519	Gail Whalen
8520	Wayne Whitaker
8521	Beth White
8522	Doris White
8523	Joan White
8524	JoAnn White
8525	Joe White
8526	Lewis White
8527	Matthew White
8528	Sharon Whitehead

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ID	Name
8529	Victoria Whitmoyer
8530	Joel Whitson
8531	Regginette Whitson
8532	Nancy Whittle
8533	Linda Wichmann
8534	Eric Wickenheiser
8535	Janet Wickenheiser
8536	Robin Wieder
8537	Jean Wien
8538	Gail Wiener
8539	Shannon Wiersbitzky
8540	Lorraine Wierzbicki
8541	Donna Wilcox
8542	Kimberly Wilders
8543	Kimberly Wiley
8544	Amanda Wilhelm
8545	Rita Wilhelm
8546	Joyce Wilkinson
8547	Sandra Wilkinson
8548	Linda Willey- Impagliazzo
8549	Alice Williams
8550	Amber Williams
8551	Carolyn Williams
8552	Donald Williams
8553	Elizabeth Williams
8554	Heather Williams
8555	Jack Williams
8556	Janet Williams
8557	Jesse Williams
8558	John Williams
8559	Joy Williams
8560	Lisa Williams

ID	Name
8561	Pat Williams
8562	Penny Williams
8563	Trudi Williams
8564	Vanessa Williams
8565	Wendy Williams- Brinks
8566	Gay Williamson
8567	Rosemary Williamson
8568	Kathryn Willoretta
8569	Robert Wills
8570	Jane Wilshusen
8571	Carol Wilson
8572	Ellen Wilson
8573	Gerald Wilson
8574	Harriet Wilson
8575	Maryanne Wilson
8576	Meghan Wilson
8577	Trudy Wilson
8578	Cynthia Wingate
8579	S.R. Wingert
8580	Lauren Winkler
8581	Rosemarie Winkler
8582	Brianna Winograd
8583	Mark Winslow
8584	Carol Winter
8585	Melanie Winzer
8586	John Wires
8587	Jennifer Wismer
8588	Kathy Wisnom
8589	Dennis Wissinger
8590	Ginger Witmer
8591	Tiffany Witmer

ID	Name
8592	Deborah Witte
8593	Cindy Wlazelek
8594	Brandon Woelkers
8595	Stacy Woeppel
8596	Ali Wogan
8597	Alison Wojtkowiak
8598	Pamela Woldow
8599	Rev. Wolfinger
8600	Robin Wolfson
8601	Nigel Wollaston
8602	Joane Wood
8603	Lisa Wooditch
8604	Rosemary Woodring
8605	Brooke Woodside
8606	Carol Wooler
8607	Virginia Woolridge
8608	Kathy Woolston
8609	Andrew Worley
8610	Diane Wormsley
8611	Nancy Worrilow
8612	Susan Worth- LaManna
8613	Laura Woyach
8614	Edmond Woychowsky
8615	Betty Wozniak
8616	Judy Wright
8617	Kenneth Wright
8618	Lysa Wright
8619	Rhonda Wright
8620	Susan Wright
8621	Huron Wright- Campbell

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ID	Name
8622	Fawn Wright-McLaughlin
8623	Janet Wunder
8624	Sarah Wurst
8625	Dee Wylie
8626	Christine Xander
8627	Richard Xu
8628	Carolyn Yablon
8629	Frank Yaccino
8630	Adam Yacono
8631	Deborah Yacovella
8632	Michele Yamrick
8633	Judith Yanowitz
8634	Susan Yatsky
8635	Michael Yeaney
8636	Mary Yee
8637	Brian Yelk
8638	Sherry Yerger
8639	Adriene Yingling
8640	Debbie Yocca
8641	Gary Yocca

ID	Name
8642	Mindy Yocom
8643	Amy Yoder
8644	Elisabeth Yoder
8645	April Yorkonis
8646	Krista Youella
8647	Charlene Young
8648	Judith Young
8649	Julia Young
8650	LaDawn Young
8651	R. Young
8652	Ray Young
8653	Ind. Zach
8654	Jeanette Zahn
8655	John Zahos
8656	Sally Zaino
8657	Michael Zajac
8658	Virginia Zajac
8659	Virginia Zalakar
8660	C.B. Zales
8661	Mary Zarenski
8662	Cortney Zaret

ID	Name
8663	Joni Zarnick
8664	Thoreau Zehr
8665	Joshua Zeiters
8666	Janet Zella
8667	Br. Zeller
8668	Fred Zeller
8669	Tara Zendrosky
8670	Barbara Zenno
8671	Catherine Zerfoss
8672	Sherry Zhao
8673	John Zhu
8674	Monica Ziccardi
8675	April Ziegler
8676	Carla Zielinski
8677	Lynn Zikoski
8678	Danny Ziolkowski
8679	Enrica Zummo
8680	Mary Zvaigzne
8681	Teresa Zygalá
8682	Angel
8683	Will

Affiliated with Thank You for Moving Forward to Control Pollution from New Gas Operations Form Letter:

ID	Name
8684	Kat Alden
8685	Patricia Amburgy
8686	Patrick Applegate
8687	Micah Barbash
8688	Robin Broderick
8689	Matt Bugaj
8690	Bruce Christianson
8691	Bruce Clash

8692	Kimberly Clash
8693	Miranda Clash
8694	Janis Copenhayer
8695	Emily Cox
8696	Rylie Cryz
8697	Tami Davis Biddle
8698	Denise DeGeorge
8699	Kathleen Domeniez

8700	Elizabeth Dougherty
8701	John Dziak
8702	Jonathan Eckert
8703	Deborah Escalet
8704	Marie Fedon
8705	Ellen Foreman
8706	Amy Fox
8707	Henry Gebhardt

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8708	Rich Gordon
8709	Ronald Gruici
8710	Leah Haslam
8711	Brian Henry
8712	Kristine Hoy
8713	Mari Hoy
8714	Steve Hoy
8715	Jenny Hwozdele
8716	Craig Jurgensen
8717	Don Kaufman
8718	Derek Lee
8719	Barbara Lenda
8720	Jill Linta
8721	Jenny Lisak
8722	Laurie Lynch
8723	Douglas Mason

8724	Holly Mayer
8725	Patti McNalley
8726	Wendy Moffat
8727	Camille Payne
8728	James Payne
8729	George Polycranos
8730	Dorothy Poulsen
8731	Melissa Poulsen
8732	Caroline Price
8733	David Roberts
8734	Henry Ruthun
8735	Christine Senecal
8736	James Serene
8737	Richard Shreve
8738	Ellen Siddons
8739	Deborah Smith

8740	Laura Stephenson
8741	Bill Tonette
8742	Lynne Torretti
8743	Mark Torretti
8744	Jeanette Trusky
8745	Deb Tulham Winston
8746	JoAnn Vautour
8747	Raymond Vautour
8748	Carol Williams
8749	J. Phillip Yanak
8750	Andy Yench
8751	Kathy Yorkievtz
8752	Anthony Zarzychi
8753	Michelle Zeiders

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Affiliated with Please Quickly Adopt the Strongest Possible Rules to Control Methane Form Letter:

ID	Name
8754	Emily Ackerman
8755	Jennifer Adam
8756	Suzanne Adams
8757	Niki Adler
8758	Daniel Aherne
8759	David Albert
8760	Jack Albert
8761	Richard Aldrete
8762	Bob Alexander
8763	Mike Anderson
8764	Richard Andrulis
8765	Richard Ankney
8766	Danelle Ardell
8767	Nancy Aronson
8768	Lesley Ashmore
8769	Melanie Austin
8770	Betty Jo Baca
8771	Anne Backlund
8772	Mike Baker
8773	Poras Bali
8774	David Banas
8775	Alana Banaszak
8776	Adam Banks
8777	Sarah Barr
8778	Cindy Barriman
8779	Amy Bates
8780	Karen Bauer
8781	Ryan Baxter
8782	Karen Bechtloff
8783	Erin Beddall

ID	Name
8784	Dan Beeton
8785	Kathy Bein
8786	Joseph Belcastro
8787	Peg Belcastro
8788	Sheila Bell
8789	Susan Bender
8790	Craig Benedict
8791	Caleb Benjamin
8792	Jodi Benjamin
8793	Jane Benning
8794	Garrett Bergman
8795	Nancy Bernstein
8796	James Berry
8797	Jason Berteotti
8798	Aida Berzins
8799	Gaurang Bhatt
8800	Edie Bickart
8801	Dan Bidwa
8802	Robert Biela
8803	Richard Bierregaard
8804	Celeste Bish
8805	Elizabeth Lea Black
8806	Gail Black
8807	Anita Bloovman
8808	Joe Bonidie
8809	Daniel Borchardt
8810	Traci Borsch
8811	Gerra Bosco

ID	Name
8812	Carol Bradley
8813	Sheryl Bradshaw
8814	Alice Bright
8815	Mary Jo Brinker
8816	Keith Britton
8817	Todd Brownfield
8818	Dennis Brunn
8819	Trevor Bublitz
8820	Roger Buchanan
8821	Thomas Buckley
8822	John Burke
8823	Brett Byers
8824	Patricia Calhoun
8825	David Callahan
8826	Benita Campbell
8827	Donald Campbell
8828	Malarie Campbell
8829	Bob Campoli
8830	David Carpenter
8831	Lorraine carroll
8832	Christian Cashman
8833	Sara Castillo
8834	Catherine Cavagnaro
8835	Robert Celaschi
8836	Shannon Cerra
8837	Isabelle Chartier
8838	Linda Christman
8839	Just Cimareli
8840	Stephen Cipolla

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ID	Name
8841	Brooks Clark
8842	J. Stephen Cleghorn
8843	Matt Cleveland
8844	Thomas Cochran
8845	Marilyn Cochren
8846	Andrew Cohen
8847	Ellen Cohen
8848	Ed Colerich
8849	Carol Collier
8850	Linda Collinson
8851	Kenneth Condel
8852	Marilyn O' Connell
8853	Joseph Consiglio
8854	Doris Corkery
8855	Kevin Costello
8856	David Cowey
8857	Kathlene Cowill
8858	Carl Cranmer
8859	Carolyn Cristofolo
8860	Matthew Cross
8861	Mark Croxford
8862	Katie Cubeta
8863	Valerie Cutler
8864	Frank Daley
8865	Jason Dalling
8866	Sandy Darin
8867	Rachelle Das
8868	Megan Deely
8869	Ann DeForest
8870	Ronna Delitto
8871	Christina DeMatteo
8872	Alan Dench

ID	Name
8873	Joanne Dhody
8874	Camille DiBenedetto
8875	Jean DiBenedetto
8876	Mike Dickey
8877	Julie DiDonato
8878	Garrett Dietz
8879	Janet Dilts
8880	Gwen DiPietro
8881	Kate Ditzio
8882	Frank Dominek
8883	Renee Donahey
8884	Mary Donohue
8885	A.M. Doordan
8886	Chad Dougherty
8887	Roseanna Downey
8888	Jack Doyle
8889	Jessica Dragonetti
8890	Elise Drake
8891	Jake Druga
8892	Robert Drummey
8893	Joe Dryburgh
8894	Marilyn Dunn
8895	James Durko
8896	Patricia Earnest
8897	Molly Ebert
8898	Kathleen Edwards
8899	Elaine Eggermann-Allen
8900	Craig Ehrhardt
8901	Brian Eisenschmied
8902	Nancy Elfant
8903	Martha Ellenberger

ID	Name
8904	Colleen Ellis
8905	Gerry Erwine
8906	Louise Evans
8907	Laura Fallon
8908	Julie Farese
8909	Alla Farina
8910	Sandy Faulk
8911	Lisa Feeley
8912	Anat Feingold
8913	Ruthanne Ferguson
8914	Jim Ferrigno
8915	Mary Ann Fiebert
8916	Scott Fillery
8917	Jeffrey Fine
8918	Matt Fink
8919	Paul Finkelston
8920	Linde Fiore
8921	Sandra Fiori
8922	Donald Firth
8923	Diane Fitch
8924	Adrienne Fitzgerald
8925	Jack Fitzgerald
8926	Barbara Fleming
8927	Beth Flick
8928	Valerie Flitter
8929	Linda Flower
8930	Lauren Foltz
8931	Gabriela Fonseca
8932	Robert Ford
8933	Brian Foreacre
8934	Tuomi Forrest
8935	Walter Fox
8936	David Freedman

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ID	Name
8937	Kate Froeschl
8938	Kathleen Gaberson
8939	Dean Gaertner
8940	Nanci Gaglio
8941	Sheila Gallagher
8942	Cash Gallo
8943	Catherine Gammon
8944	Lillian Garfinkel
8945	Noreen Garman
8946	Dona Gartrell
8947	Mark Garvin
8948	Mavis Gee
8949	Mike Geeter
8950	Eniko Gellai
8951	Alex Gershanok
8952	Mary Rose Giambrone
8953	Keri Gilbert
8954	Peter Gillespie
8955	Marie Gilliam
8956	Larry Gladney
8957	Becky Gloninger
8958	Samantha Goerlich
8959	Laura Goldman
8960	Aleesandria Gonzalez
8961	Sandra Goodwin
8962	Joel Gottfried
8963	Sean Graf
8964	Susan Graff
8965	Tom Gramey
8966	David Green
8967	Shana Griffin

ID	Name
8968	Kristine Grimes
8969	Arlene Grubbs
8970	Karmyn Guthrie
8971	Marta Guttenberg
8972	Laurent Guy
8973	Richard Haessler
8974	Vikki Hanchin
8975	Molly Handal
8976	Jen Haran
8977	Susan Hare
8978	Barbara Harkness
8979	Iris Harlan
8980	John Harr
8981	Edward Harris
8982	J Harris
8983	Marian Harvey
8984	David Hathazy
8985	Judith Haupt
8986	Christina Haviland
8987	Delite Hawk
8988	Michele Hawk
8989	Bonita Hay
8990	John Hayburn
8991	Olga Heben
8992	Martin Heimann
8993	Gary Heinz
8994	Wes Hemmings
8995	Marci Henzi
8996	Thelma Herlich
8997	Jane Heumann
8998	Victor Hevmosille
8999	Dave Hill
9000	Clinton Hillegras

ID	Name
9001	John Hillman
9002	David Hills
9003	Charles Hinson
9004	Ryan Hizer
9005	Robert Hoffmann
9006	Judy Hollinger
9007	Jennifer Holmes
9008	Gavin Hontz
9009	Christine Hormuth
9010	Francisco Huerta
9011	Walt Hug
9012	Mary Huhn
9013	Dieter Hunt
9014	Steve Hvozdoovich
9015	Shannon Imhof- Clark
9016	Bogdan Ion
9017	Olivia Isil
9018	Sara Ito
9019	Robert Janczuk
9020	Doris Jeanette
9021	Bradford Johnson
9022	Gail Johnson
9023	Jenny Johnson
9024	Elizabeth Joke
9025	Deborah Jolley
9026	Chris Jordan
9027	Stephen Kalkbrenner
9028	Bryan Kan
9029	Joanne Karaczun
9030	Carol Karl
9031	Marica Karuba

Appendix A - List of Commentators

ID	Name
9032	Karen Katrinak
9033	Leslie Kaufman
9034	Tim Kearney
9035	Eric Kedell
9036	Bridget Kelly
9037	John Kelly
9038	Carole Kennelly
9039	Tina Kichline
9040	Robert Kiefer
9041	Maria Kiernan
9042	Bruce Kiesel
9043	Dennis Kirby
9044	Shawn Knight
9045	Marie Knup
9046	Karen Kolkka
9047	Jason Kopanic
9048	Rachel Kosoff
9049	Nancy Krehling
9050	Jordan Krimsky
9051	Ramaswamy Kuppuswamy
9052	Colleen Kutz
9053	Daniel Lamb
9054	Leslie Lancaster
9055	Robin Langenhahn
9056	Brent Larson
9057	Wendy Lau
9058	Alicia Lazur
9059	Ronald David Lebel
9060	Nancy LeClair
9061	Lawrence Leech
9062	Aaron Lefebvre

ID	Name
9063	Barbara Lettiere
9064	Kai Lin
9065	Billy Linstead- Goldsmith
9066	Emily Liska
9067	Dave Lloyd
9068	Larry Logan
9069	Lori Lojak
9070	Justin Longstreth Ave
9071	Lynne Lucchino
9072	Betty Luff
9073	Joe Lukens
9074	Kathleen Lukomski
9075	Ronald Lutz
9076	Patrick Lynch
9077	Connie MacMinn
9078	David Maher
9079	jad mahsoob
9080	Megan Moidal
9081	A Mambu
9082	Laura Manz
9083	Anna Marano
9084	Katherine Marcopul
9085	Denise Marino
9086	Jonathan Marsella
9087	Ann Martin
9088	Dana Martin
9089	Cheryl Masterman
9090	Samuel Mastroianni
9091	Alicia Mathers

ID	Name
9092	Colin May
9093	Angela Mazza
9094	Mike McBryar
9095	Sheila McCall
9096	Allyson McCarron
9097	Lindsay McCarthey
9098	Diane McDermott
9099	Patricia McElligott
9100	Abby McGillivray
9101	Dana McKee
9102	Hannelore McKenna
9103	Bonnie McKeown
9104	Philip McLean
9105	Jordon McMichael
9106	Robert McMillen
9107	Elizabeth McQuade
9108	Daniel McSwiggan
9109	Jean McWilliams
9110	Laurel Mecca
9111	Anthony Mendicino
9112	Justin Mikach
9113	Caitlin Miller
9114	Ted Millspaugh
9115	Beatrice Mitchell
9116	William Moore
9117	Carol Moulder
9118	Chris Mullery
9119	Mary Mullins
9120	Lorna Murray
9121	Alice Nadin
9122	Noor Nahar

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ID	Name
9123	Alisa Nash
9124	William Nelson
9125	Edwin Ng
9126	Christian Nicolini
9127	Kevin Nigh
9128	Rebecca Noble
9129	Marilyn Noll
9130	Teri Noone
9131	Delane Norris
9132	Gillian Norris-Szanto
9133	Lana Novak
9134	Florence Manson Nye
9135	Eden Odhner
9136	Virginia O'Donnell
9137	Kris Ohlinger
9138	Tim Olczak
9139	Evan O'Neill
9140	Patrick O'Neill
9141	Stephen Orosz
9142	Brian Orr
9143	Joann Ott
9144	Christopher Owens
9145	Steve Pagliaro
9146	Derek Palladine
9147	William Palmer
9148	Kathleen Palombaro
9149	Leigh Panaro
9150	Mary Pantzis
9151	Paul Parker

ID	Name
9152	Karen Parker-Masarone
9153	Caroline Parkes
9154	Jennifer Parlin
9155	Michael Pasternak
9156	Linda Pastorik
9157	Barbara Paull
9158	Nathan Pearce
9159	Alan Peck
9160	Kim Peckerelli
9161	Michael Pedemonti
9162	Yi Pei
9163	Robin Pelley
9164	Patty Pergaments
9165	Robert Peterson
9166	Tuan Pham
9167	Gregg Phares
9168	Natalie Picard
9169	Bonnie Piestrak
9170	Diane Pilch
9171	Scott Pinhiero
9172	Cheryl Pinto
9173	Eric Podietz
9174	Laura Pokras
9175	Brian Polilli
9176	Jen Porter
9177	Tiffany Powley
9178	Veronica Pratt
9179	Richard Pressman
9180	Michelle Price
9181	Daniel Prima
9182	Jennifer Prince
9183	Trish Prusch

ID	Name
9184	Hope Punnet
9185	Virginia Pusey
9186	Julieann Putt
9187	William Quinn
9188	Jenny R.
9189	Ann Rafferty
9190	Meenal Raval
9191	Christine Razler
9192	Roberta Recht
9193	Maximilian Regan
9194	William Regar
9195	Evelyn Reitz
9196	Kathleen Repella
9197	Samuel Ressin
9198	Gordon Richards
9199	Emma Richmond
9200	Carlos Richter
9201	Simon Richter
9202	Sophi Riedel
9203	Ronald Rietsma
9204	Layra Rihn
9205	Paul Rippy
9206	Robert Rivera
9207	Marilyn Roberts
9208	Deborah Robinson
9209	Priscilla Rocco
9210	Hillary Roebach
9211	Leslie Roessler
9212	Janet Rogers
9213	Jordan Romanus
9214	Carey Roseman
9215	Christine Del Rossi
9216	John Rotchford

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ID	Name
9217	Gary Rothera
9218	Frank Rowan
9219	Anthony Rufo
9220	Christopher Rumer
9221	Joseph Salata
9222	Frances Salvacion
9223	Danielle Salvedeo
9224	Barbara Sambroak
9225	Barbara Sams
9226	Shirley Sanders
9227	Jim Sandoe
9228	Raymond Santek
9229	George Sarapa
9230	Chris Sarnowski
9231	John Schick
9232	Charles Schindel
9233	James Schray
9234	Neil Schuetz
9235	Ed Seiler
9236	Eric Selvage
9237	Amber Shaffer
9238	Daniel Shapiro
9239	Julie Shaw
9240	Ling Shen
9241	Kevin Sherman
9242	Jennifer Sherwood
9243	Chris Shuster
9244	Blaine Siegel
9245	Dave Silberstein
9246	Leon Silver
9247	Chris Siren
9248	Nathan Sivin
9249	Victoria Skelly

ID	Name
9250	Andrea Sklenar
9251	Phyllis Skok
9252	Deidre Slattery
9253	Brian Smith
9254	Johanna Smith
9255	Samantha Smith
9256	Steven Snippert
9257	Nora Solecki
9258	Teresa Soufas
9259	Kati Sowiak
9260	Alex Sponza
9261	Krista Spradlin
9262	Staci Steinbrecker
9263	Darnell Stewart
9264	Judith Steyn
9265	Harriet Stone
9266	Ray Strutt
9267	Maria Sturm
9268	Alex Stypula
9269	John Suierveld
9270	Betty Surbeck
9271	Irene Surmik
9272	Deborah Swirsky-Sacchetti
9273	Ann Sywensky
9274	Nicholas Tallos
9275	Angelo Taranto
9276	Eric Tars
9277	Jerry Taylor
9278	Carol Tenneriello
9279	Sara thompson
9280	Elizabeth Thornton
9281	Barbara Tilley

ID	Name
9282	Richard Timm
9283	Nadia Todorova
9284	Jill Tressel
9285	Philip Tribe
9286	Catherine Trover
9287	Erika Troxell
9288	Florence Tumasz
9289	Dorothy Turley
9290	Zara Tyler
9291	Ojesh Udadhyay
9292	Frank Valley
9293	Jon Vandergrift
9294	Vincent Vernacchio
9295	Caroline Voigtsberger
9296	Jeff Volpe
9297	Jerry Voss
9298	Peter Vuong
9299	Trina Waddell
9300	Maureen Waldt
9301	Donna Walter
9302	Layla Ware
9303	Brendan Warren
9304	Stephen Weathers
9305	David Weaver
9306	Joyce Webber
9307	Margot Weening
9308	Lynn Weihaus
9309	Richard Weinberg
9310	Dave Weirick
9311	Rachel Weiss
9312	Nick Welko
9313	Robert Wendelgass

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ID	Name
9314	Abby Werner
9315	Kathryn Westman
9316	Jake Wetmiller
9317	Richard Wheland
9318	Barbara White
9319	Judith White
9320	Ryan Whittington
9321	Jay Wiesner
9322	Kathleen Willetts
9323	Courtney Williams
9324	Kevin Williams
9325	Jill Williamson
9326	Kerry Wilson
9327	Ann Winkelstein

ID	Name
9328	Nick Winter
9329	Brent Wise
9330	Jay Witkowski
9331	Sophie Wodzak
9332	Alan Wolf
9333	Eric Wolfe
9334	Jill Wood
9335	Laura Woods
9336	Curt Woolford
9337	Karen Work
9338	Ellen Wright
9339	Sara Wulff
9340	Yu Xia
9341	Charles E Yankel

ID	Name
9342	Sonya Yohn
9343	Eric Young
9344	Jamie Young
9345	Marybeth Young
9346	Barb Youngerman
9347	Harry Zabetakis
9348	Alex Zesch
9349	Kevin Zhukas
9350	Janice Zollars
9351-9355	7 Anonymous Commentators Using Formed letters