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August 9, 2010

Submitted Via Email
Honorable John Hanger, Chairperson
Environmental Quality Board
Rachel Carson State Office Building
16th Floor, 400 Market Street
Harrisburg, PA 17101

RE: Proposed Amendments to 25 Pa. Code Chapter 78, as published in 40 Pa. Bulletin 3845, July 10, 2010

Dear Chairman Hanger:

Pennsylvania General Energy is a Pennsylvania based company and has been operating in Pennsylvania for over 25 years. We have been working with the Marcellus Shale Coalition, POGAM and with your agency to modernize well construction and associated activities so that Pennsylvania's regulations reflect the industry's current practices and technical advances. To that end, we are submitting additional comments on the proposal to amend 25 Pa. Code Chapter 78 to help make these rules even more workable and effective.

PGE is committed to the responsible development of natural gas from the Marcellus Shale geological formation and the enhancement of the region's economy that can be realized by this clean-burning energy source. We see our contributions to the development of these Chapter 78 rules as one of many ways we are moving this industry forward for the benefit of all Pennsylvanians.

Very truly yours,

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The Marcellus Shale Coalition submits the following detailed comments to 25 Pa. Code Chapter 78, as published in 40 Pa. Bulletin 3845, July 10, 2010.

§78.1 Definitions: "Casing seat" definition	The amended definition provides in part as follows: "In wells without surface casing, the surface casing seat shall be considered to be equal to 50 ft below the deepest fresh groundwater." The assumption that the surface casing is 50 feet below deepest groundwater is arbitrary. We recommend that the existing language ("the depth of casing which is normal for wells in the area") be retained.

Definitions: Request for comment regarding definition of "Deepest fresh groundwater"	Request for comment regarding definition of "Deepest fresh groundwater": The reference to "deepest fresh groundwater" is problematic. There are no water well construction standards for the Commonwealth, and the operators have no reliable way of determining the "deepest fresh groundwater" in many areas. We also understand that records of approximately 300,000 water wells drilled from 1990-2004 are missing. These missing data include the surface elevation, water well depth, and geographical location coordinates of water wells. The few other states which have a requirement similar to this have established regional water boards that aggregate data and develop maps to assist operators and landowners in determining the base of fresh groundwater. If Pennsylvania is going to link the standards of Chapter 78 to deepest fresh groundwater, then regional water boards and water well construction standards should first be established and reliable data regarding depth of groundwater should be available. It seems more prudent to go back to the earlier verbiage of setting casing below the base of known fresh groundwater or the depth of casing which is normal for the area.
§78.1 Definitions: "Surface casing" definition	The proposed definition reads: "Casing used to isolate the wellbore from fresh groundwater and to prevent the escape or migration of gas, oil and other fluids from the wellbore into fresh groundwater. The surface casing is also commonly referred to as the water string or water casing." This definition is problematic because it conflicts with other sections. It appears that the new definition is trying to re-define surface casing as a water string, as opposed to a pressure containing casing string. Under existing regulations, the surface casing string could isolate the water intervals and serve as the first pressure containing casing string. See §78.83(b) (proposed as §78.83(c) amended), which states that the "operator shall drill 50 feet below the deepest fresh groundwater or at least 50 feet into consolidated rock, whichever is deeper, and immediately set a string of surface casing to that depth."
§78.51(d)(3)(i)(A) and (B) Protection of water supplies	The determination of adequate quantity of restored or replaced water supply should depend upon documented prior uses, not "any reasonably foreseeable uses." The phrase "reasonably foreseeable uses" is arbitrary and very subjective. A replacement water supply should be based on documented prior uses (e.g., based on size of residence or family).
§78.51(d)(3)(ii) Protection	The provision is ambiguous and subjective. Operators should be

of water supplies	obligated to restore and replace water based on historic use, not based on someone's prediction of "foreseeable" future use.
§78.52(d) Pre-drilling or pre-alteration survey.	We suggest that the requirement to provide survey results within 10 days be extended to 30 days. This is a more reasonable timeframe. Additionally, the provision should be clarified to confirm that a requirement to provide the results within specified days "of receipt of the results" applies to the "receipt of the final results." Receipt of preliminary, interim or partial results, often without QA/QC, should not be subject to this requirement.
§78.72(a) Use of safety devices–blowout-prevention equipment.	The statement as written does not clarify if blowout prevention equipment is required to be used from spud of the well. It is not prudent to use blowout prevention equipment when drilling weak, shallow formations. In a shallow formation, it is better to be able to divert flow away from the rig and not shut in flow. Many small air rigs do not have adequate substructure height to be able to install a blowout preventer. A Marcellus Shale well has extremely low formation permeability and will not produce commercially until the well has been fracture stimulated. Other formations appear to be somewhat exempted from this requirement and DEP should be clear in its intent.
§78.72(h) Use of safety devices–blowout-prevention equipment.	The reference to "Independent Association of Drilling Contractors" instead should refer to "International Association of Drilling Contractors" (IADC). In addition, the regulation should require the IADC WellCAP well control accreditation certification at the Supervisory Level, as there are various levels of training based on the job description and responsibility. Supervisory Level is the highest level of well control training.
§78.73(b) General provision for well construction and operation.	This provision could be read to require an operator to prevent events unrelated to its drilling operations. We suggest replacing the term "prevent" with "not cause" in both locations in the paragraph.
§78.73(c) & (d) General provision for well construction and operation.	In an effort to clarify this section we propose the following: (c) After a well has been completed, recompleted, reconditioned or altered the operator shall prevent the annular surface shut-in pressure and annular surface producing back pressure inside each and every surface casing, coal protective casing and intermediate casing (when the intermediate casing is used in conjunction with the surface, or coal protective, casing to isolate fresh groundwater) from exceeding the following pressure: Eighty percent (80%) multiplied by 0.433 psi per foot multiplied by the casing length (in feet) of the applicable casing. (d) After a well has been completed, recompleted, reconditioned or altered, if the annular surface shut-in pressure and annular

	surface producing back pressure exceeds the pressure as calculated in subsection (c), the operator shall take action to prevent the migration of gas and other fluids from lower formations into fresh groundwater. *(The rest of subsection (d) to remain as proposed.)* We also suggest adding a provision whereby an operator could conduct a Formation Integrity Test (FIT) shoe test of the casing seat while drilling. In addition to verifying that the casing shoe did not have a cement channel, the FIT test would also establish the formation strength at the casing seat. It is recommended that the operator be allowed to maintain 80% of the FIT test gradient. For example, if the FIT was successful at 0.8 psi/ft, then the maximum allowable pressure would be (0.80 x 0.80 psi/ft) multiplied by the casing length (in feet) of the applicable casing.
§78.83(a) Surface and coal protective casing and cementing procedures.	This section should allow for situations where (i) venting is required for safety reasons and (ii) pockets of naturally occurring gas from nonproducing zones are released through a casing and vented to the surface. This section needs clarification on whether casing or borehole diameter is being referred to "diameter of the wellbore" in Section 78.83(a)(2).
§78.83(c) Surface and coal protective casing and cementing procedures.	Existing section (c) should be retained. Where no fresh groundwater is being used as drinking water source within 1000 foot radius of the well, a single string of surface casing is adequate.
§78.83(f) Surface and coal protective casing and cementing procedures.	The language utilized in new section 78.83(c) regarding installation of centralizers should be added to this section as well (i.e., when the intermediate casing string is being utilized to protect fresh groundwater).
§78.83a(a)(1) Casing and cementing plan.	See our comments above regarding the definition of "deepest fresh groundwater zones." The same uncertainties apply with respect to "anticipated fresh groundwater zones" as used in this section.
§78.83a(d) Casing and cementing plan.	Clarification should be provided as to what constitutes a revision to the Casing and Cementing Plan and what format is acceptable for making changes.
§78.83b(a)(1-4) Casing and cementing–lost circulation.	Existing rules and experience dictate that additional alternatives to address situations in which cement is not circulated to the surface during the drilling of wells should be added to the proposed §78.83b. §78.83(j) already provides that "if it is anticipated that cement used to permanently cement the surface casing cannot be circulated to the surface, a cement basket may be installed immediately above the depth of the last anticipated lost circulation zone." The existing regulation further provides that "The casing should be permanently cemented by the displacement method. Additional cement may be added above the cement basket, if

	necessary, by pumping through a pour string from the surface to fill the annular space." The method described in §78.83(j) is the most effective method of filling voids in the event that cement is not permanently circulated to the surface and should be added as an option under §78.83(b). The four alternative methods in proposed §78.83b will not as effectively address a situation where there is an issue with cementing at a location somewhere other than the casing shoe. That situation can only be addressed by running baskets and cementing down the backside or venting as contemplated by §78.83(j). Additionally, to address the circumstance of lost circulation occurring while cementing the surface or coal protective string there should be a provision for the operator to run an additional string and cement it back to surface as provided for production casing in §78.83b(a)(2-4).
§78.83c(b) Intermediate and production casing.	The reference to "...500 feet above the casing seat" should be specified as true vertical depth.
§78.84(b) Casing standards.	The words "a pressure rating" should be replaced with "an internal pressure rating".
§78.84(d)(3) Casing standards.	DEP should confirm that API has a welder certification program; typically, this certification is provided by American Society of Mechanical Engineers (ASME) or American Welding Society (AWS), which would be better references in this section.
§78.84(f) Casing standards.	This section needs to be revised to reflect pressure requirements aligned with well conditions. The casing should never be tested to more than 100% of rated internal yield pressure. The operator should be able to operate the casing at pressures up to 100% of the rated pressure. Standard practice is to test to 80-85% of rated internal yield pressure (or higher, up to 100% of rated internal yield pressure if well conditions dictate).
§78.85(c)(1) Cement standards.	Holding full pressure on the casing for 8 hours if the floats do not hold can create a micro-annulus in the cement. We recommend re-wording this provision to state that the pressure should be gradually released after 2-4 hours, once the floats are holding.
§78.85(c)(1) Cement standards.	The word "float" throughout the sentence should be replaced with the word "casing".
§78.85(c)(4) Cement standards.	This provision precludes running a wireline temperature log, which is a common diagnostic tool to determine top of cement. The temperature log is typically run within the first 8 hours after conclusion of the cement job, if there is a question about the location of the top of cement. We recommend that "wireline" be deleted.
§78.88(a) Mechanical integrity of operating wells.	Quarterly inspection of each well exceeds standard procedures in other gas producing states. The proposed requirement would

	make operators perform bradenhead tests on every well on a quarterly basis. We suggest yearly inspections unless there is a problem identified that needs corrective action. If a problem is identified during an annual inspection, then semi-annual inspections could be required after corrective action is implemented until no problems are identified with that well for one year.
§78.89(a) Gas migration response.	The phrase "natural gas migration incident" should be defined. Also, the phrase "after drilling the well" should be added immediately after "migration incident". An operator should not be responsible for investigation of a migration incident unless it has drilled a nearby well.
§78.89 Gas migration response.	We propose the following: (a)When an operator or owner is notified of, or otherwise made aware of a potential natural gas migration incident after drilling the well, which is confirmed by the results of an initial response action and is unrelated to background conditions, the operator shall notify the Department, and if so directed by the Department, conduct further investigation of the incident. The purpose of the initial response action and subsequent investigation is to determine the nature of the incident, assess the potential for hazards to public health and safety, and mitigate any hazard posed by the concentration of stray natural gas in the environment and/or structures. (b)The initial response action undertaken pursuant to subsection (a) shall include, but not be limited to an initial site visit and interview with the complainant to obtain information about the complaint and to assess the reported natural gas migration incident. If combustible gas is detected inside a building or structure at concentrations equal to or greater than 10% of the lower explosive limit (L.E.L.), at the earliest practicable moment following discovery, the operator shall: (1) Notify the Department, local emergency response agency, utility companies, police and fire departments and, in conjunction with the Department and local emergency response agencies, shall take measures necessary to ensure public health and safety. (2) Initiate mitigation measures necessary to control and prevent further migration. (3) Implement additional investigation and mitigation measures as defined below in subsection (c). (c) If sustained concentrations of stray natural gas are detected inside a building or structure, water well head space or soils above

	a background level, or if dissolved methane is detected in water above a background level, the operator shall notify the Department and utility companies and, in conjunction with the Department, shall take measures necessary to ensure public health and safety, define the extent and migration pathway, and identify source(s). Such measures may include: (1) A field survey to assess the presence and concentrations of natural gas and the areal extent of the stray natural gas in the soils, surface water bodies, water wells, and other potential migration pathways; (2) Collection of gas and/or water samples for molecular and stable carbon and hydrogen isotope analyses from the impacted locations (e.g., water wells, soil gas), and from potential sources of the migration (e.g., gas wells); (3) A field survey of the operator's adjacent oil or gas wells to assess the wells for pressures of all casing intervals, defective casing or cement, and mechanical integrity. Additional investigative methods of well cement and casing integrity including, but not limited to cement bond logs, ultrasonic imaging tools, mechanical integrity tests, and geophysical logs, may be appropriate to determine the mechanism of migration. The initial area of assessment shall include wells within 2,500 feet and be expanded to a greater distance if necessary as determined by the Department; (4) Establishment of monitoring locations and monitoring frequency at potential sources, in potentially impacted structures, and the subsurface. (5) Action to correct any defect in the oil and gas wells to mitigate the stray gas incident. (d) If conditions described in (b) and (c) above are not discovered, then the operator shall notify the Department and, in consultation with the Department, document findings and submit a final report. (e) Reporting Requirements – If concentrations of stray natural gas are detected inside a building or structure at concentrations equal to or greater than 10% of the L.E.L., the operator and owner shall file a report with the Department by phone and e-mail within 24 hours after the interview with the complainant and field survey of the extent of stray natural gas. Depending on the dynamics and severity of the incident, daily or weekly reports submitted by e-mail may also be required at the Department's request. (f) For all natural gas migration incidents, a final written Report shall be submitted to the Department for approval within 30 days of the close of the incident, documenting the results of the

	investigation, or in a timeframe otherwise approved by the Department. The Final Report shall include but not be limited to, documentation of all results of the investigation, including analytical data, monitoring results, operational changes at area oil and gas wells, and measures taken by the operator to repair any defects at any of the investigated oil and gas wells.
§78.89(e) Gas migration response.	We recommend substituting the word "progress" for "follow-up report" throughout this section. It needs to be clear that the investigation could still be ongoing. Also, three days should be changed to seven days and "initial field investigation" should be added in front of "monitoring results." (It is difficult to get a 3-day turnaround on sampling and analysis.)
§78.122(b)(7&8) Well record and completion report.	The word "reservoir" should be replaced with "shut-in surface".
General Comment	The Summary of Comments and Responses states: "It is the Department's experience that poorly cemented casing is the reason for many gas migration issues." We are concerned that the technical justification for an additional casing string is lacking in the proposed rule. The preamble to the proposed amendments discusses the incremental cost of setting an additional casing string if cement is not returned to the surface or when excessive pressure is placed on the surface casing seat. "The construction cost for the additional string is about $10,000 per well." (*Pa. Bulletin at 3848*) The cost of an additional casing string is much more than $10,000 per well, and is more likely on the order of $300,000 to $500,000 per well, depending on depth and area. If the additional string of casing is justified from a technical standpoint, then it is the correct course of action. But nowhere do the proposed regulations provide a technical justification for an additional casing string.
General Comment	It would be very helpful if DEP were to provide forms when any new reporting requirements are promulgated, and to clarify that any new forms should only be applied to newly gathered data.

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From: Jim P. Ashbaugh [jimashbaugh@penngeneralenergy.com]
Sent: Monday, August 09, 2010 5:27 PM
To: EP, RegComments
Subject: Chapter 78 Revisions
Attachments: Comments on Chapter 78 8 9 10.doc

Please see attached comments.

Regards,
Jim

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