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April 8, 2014

The Honorable Kathleen Kane
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Pennsylvania Office of the Attorney General
16th Floor, Strawberry Square
Harrisburg, PA 17120

E. Christopher Abruzzo, Secretary
Pennsylvania Department of Environmental Protection
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101

Marcia Mulkey, Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency, Region 3
1650 Arch St.
Philadelphia, PA 19103-2029

Re: EQT Phoenix Resources Site in Duncan Township, Tioga County, Pennsylvania

Dear Attorney General Kane, Secretary Abruzzo and Ms. Mulkey:

On behalf of PennEnvironment, the Responsible Drilling Alliance, the Delaware Riverkeeper Network, Clean Water Action, the Lower Susquehanna Riverkeeper, and PennFuture, this letter is written to respectfully request that you initiate enforcement against EQT Production Company (EQT) regarding its well development operations in Duncan Township, Tioga County.¹ Specifically, a leaking and overflowing pit, containing over 5 million gallons of flowback wastewater, caused significant amounts of pollution, including high levels of volatile organic chemicals (VOCs), metals, and chlorides, to be discharged directly and through groundwater in the form of seeps, springs and wetlands to Rock Run and unnamed tributaries of Rock Run, all

¹ EQT Production Company is a subsidiary business unit of EQT Company, which is headquartered in Pittsburgh, PA. According to its website, EQT operates more than 14,000 productive natural gas wells in the Marcellus Shale Formation. EQT operates a site known as Phoenix Resources Lease in Duncan Township, Tioga County, PA, owned by Phoenix Resources, a subsidiary of Waste Management, Inc.

of which are High Quality surface waters of the Commonwealth of Pennsylvania. Discharges from this pit and other discharges, described below, violate the Pennsylvania Clean Streams Law (CSL) and the Clean Water Act (CWA). In addition, pursuant to the Resource Conservation and Recovery Act (RCRA), site conditions violate the Open Dumping prohibition and present an Imminent and Substantial Endangerment (ISE) to health or the environment.

Because PA DEP has not issued an order, assessed a penalty, or entered into any enforceable agreement with EQT regarding these serious violations, we urge you to:

1. Commence a comprehensive, site-wide compliance investigation;
2. Require EQT to develop a site-wide cleanup/corrective action plan that assesses the extent of contamination, identifies and stops ongoing seeps, and restores all affected surface waters and groundwater to state and federal health-based or environmental standards;
3. Assess an appropriate penalty and natural resource damages, which may include requiring EQT to fund restoration of the watershed; and
4. Ensure that EQT does not expand its well operations in Duncan Township until cleanup is complete and compliance with all state and federal environmental laws is demonstrated.²

EIP obtained the information contained in this letter from Pennsylvania Department of the Environment (PA DEP) files made publicly available through Pennsylvania's Right-To-Know Law. We would welcome the opportunity to meet with you regarding our findings and look forward to hearing your responses.

Summary of Violations Described in this Letter

EQT filled a 5.2 million gallon pit, identified in its ESCGP-1³ application as a "freshwater impoundment", with wastewater (mostly flowback from well fracturing operations) from multiple well pads on site. EQT did not have a permit under the CSL or authorization under the Chapter 78 regulations to use this pit as a centralized impoundment. Because the liner was torn and punctured, the pit leaked and overflowed, causing tens of thousands of gallons of flowback to leach into groundwater and spill onto unprotected soils where pollutants discharged to High Quality surface waters as well as numerous seeps, springs and wetlands.

The categories of violations identified through our investigation include: 1) dumping multiple well-pad waste into a pit not permitted as a centralized impoundment, in violation of Chapter 78 regulations and the CSL; 2) discharges of pollutants to Rock Run and unnamed tributaries of Rock Run (UNT) in violation of the CSL and the CWA; 3) discharges of pollutants to groundwater

² EQT, which already holds a substantial amount of well permits in Tioga County, may be seeking to expand its pad and well development within the headwater reaches of Rock Run, Nickel Run and Sand Run, all of which are included on PFBC's Wild Trout List (letter from the Pennsylvania Fish and Boat Commission (PFBC) dated October 2, 2012 to PA DEP – Attachment 1).

³ Erosion and Sediment Control General Permit or "E&S Permit".

in violation of the CSL; 4) failure to maintain the integrity of the impoundment liner, in violation of Chapter 78; 5) disposal of solid waste that constitutes a prohibited Open Dump and that also constitutes an imminent and substantial endangerment to human health or the environment, both pursuant to RCRA; and 6) other spills and discharges unrelated to the unpermitted impoundment, in violation of the CSL and Section 301(a) of the CWA.

PA DEP's enforcement response to date has been limited to the issuance of two Notices of Violation. Although voluntary cleanup⁴ operations are underway regarding the illegal centralized impoundment, which appear to address at least a portion of the contamination, there is no enforceable agreement or order in place to ensure timely and proper remediation. We believe the seriousness of the violations described in this letter warrant a stronger enforcement response, including mandated site-wide remediation/corrective action and the assessment of penalties and natural resource damages. Voluntary cleanup programs are not enforceable and they do not provide the kind of public transparency needed to inform and safeguard communities impacted by significant pollution events.

Description of the Site & Impacted Waterbodies

The EQT site is bordered on the east by a stream known as Rock Run, which is a tributary of Babb Creek, and on the north and south⁵ by UNTs to Rock Run.⁶ After receiving Rock Run, Babb Creek flows into Pine Creek, the second largest tributary of the West Branch of the Susquehanna River. Both Rock Run and its UNTs are designated "High Quality Cold Water Fishery and Migratory Fishery Waters" because they are designated as "Class A Wild Trout Waters" by the Pennsylvania Fish and Boat Commission (PFBC).⁷ The main surface water drainage area of Rock Run relative to the site is the portion of the stream that lies

⁴ EQT is proceeding under the Pennsylvania Land Recycling and Environmental Remediation Standards Act of 1995 (known as "Act 2"), 35 P.S. § 6026.101 *et seq.* Act 2 is a voluntary program designed to encourage redevelopment. It sets forth specific procedures that remediators follow to meet certain cleanup standards in exchange for the possibility of a limited release of liability under Pennsylvania law. EQT has already sent multiple signals to PA DEP that it intends to stop intercepting and collecting contaminated groundwater, despite sampling results that indicate ongoing, and in some instances, increasing levels of, contamination. See Memorandum dated August 21, 2013 from Lawrence Roach, Groundwater Sciences Corporation, to PA DEP personnel (Attachment 7). See also, "Evaluation of Fish and Benthic Macroinvertebrate Communities in Rock Run, Tioga County, Pennsylvania," Normandeau Environmental Consultants, January 2014 (Attachment 24).

⁵ What EIP refers to as an UNT running south of the S-Pit may be Small Pox Creek (Attachment 24, Figure 1).

⁶ Note also that the Babb Creek Watershed Association, the recipient of substantial PA DEP watershed restoration grants, is working to restore water quality degraded by past mining operations. It is concerning that PA DEP would award grant money to restore a watershed degraded by poor environmental practices in the past yet at the same time, fail to take enforcement against EQT, a company that is having a direct and current negative impact on the same watershed.

⁷

[http://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Existing%20Use/Co59\(Tioga\).pdf](http://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Existing%20Use/Co59(Tioga).pdf). See also, PA Code § 93.91. For a water to be eligible for "High Quality" designation, water quality must be more pristine than Pennsylvania's water quality criteria and the water must also support a high quality aquatic community. PA Code § 93.4b. See also, <http://fishandboat.com/classa.pdf>.

approximately 200 feet below and 2,000 feet east of the S-Pit.⁸ Rock Run and its UNTs are waters of the Commonwealth and the United States.⁹

Facts Related to the S-Pit Failure and Chronology

Areas of Contamination

This letter focuses on EQT's history of discharges and spills surrounding operations at a multi-well pad known as Phoenix Pad S (the S-Pad).¹⁰ As part of these operations, EQT constructed and operated a 5,241,000 gallon "pit" known as the S-Pit, which is located approximately 175 yards north of the S-Pad.¹¹ Although EQT identified the S-Pit for freshwater storage in its E&S permit application,¹² EQT used the S-Pit to store flowback from the S-Pad and from other EQT well sites in the area, rendering the pit an unpermitted centralized impoundment.¹³ Despite being warned by PA DEP that a permit was required, EQT used the S-Pit as an unpermitted centralized impoundment from at least December 20, 2011.¹⁴

⁸ EQT's June 22, 2012 Site Characterization Plan, p. 11 (Attachment 2). Note also that the wetlands on site that contribute to Rock Run or its tributaries are also considered High Quality waters. *Id.* See Inspection Report dated June 4, 2012 (Attachment 13).

⁹ 33 C.F.R. § 328.3(a). See also, *Parker v. Scrap Metal Processors, Inc.*, 386 F.3d 993, 1008 (11th Cir. 2004) (runoff entering a stream, which is a tributary to the Yellow River, is a discharge into a water of the United States; also, ditches and canals, as well as streams and creeks are navigable waters if they are tributaries of a larger body of water).

¹⁰ As indicated throughout this letter, we believe there may be significant compliance issues at EQT's other pads, including the R-Pad and the C-Pad.

¹¹ EQT's June 22, 2012 Site Characterization Plan, p. 1 (Attachment 2).

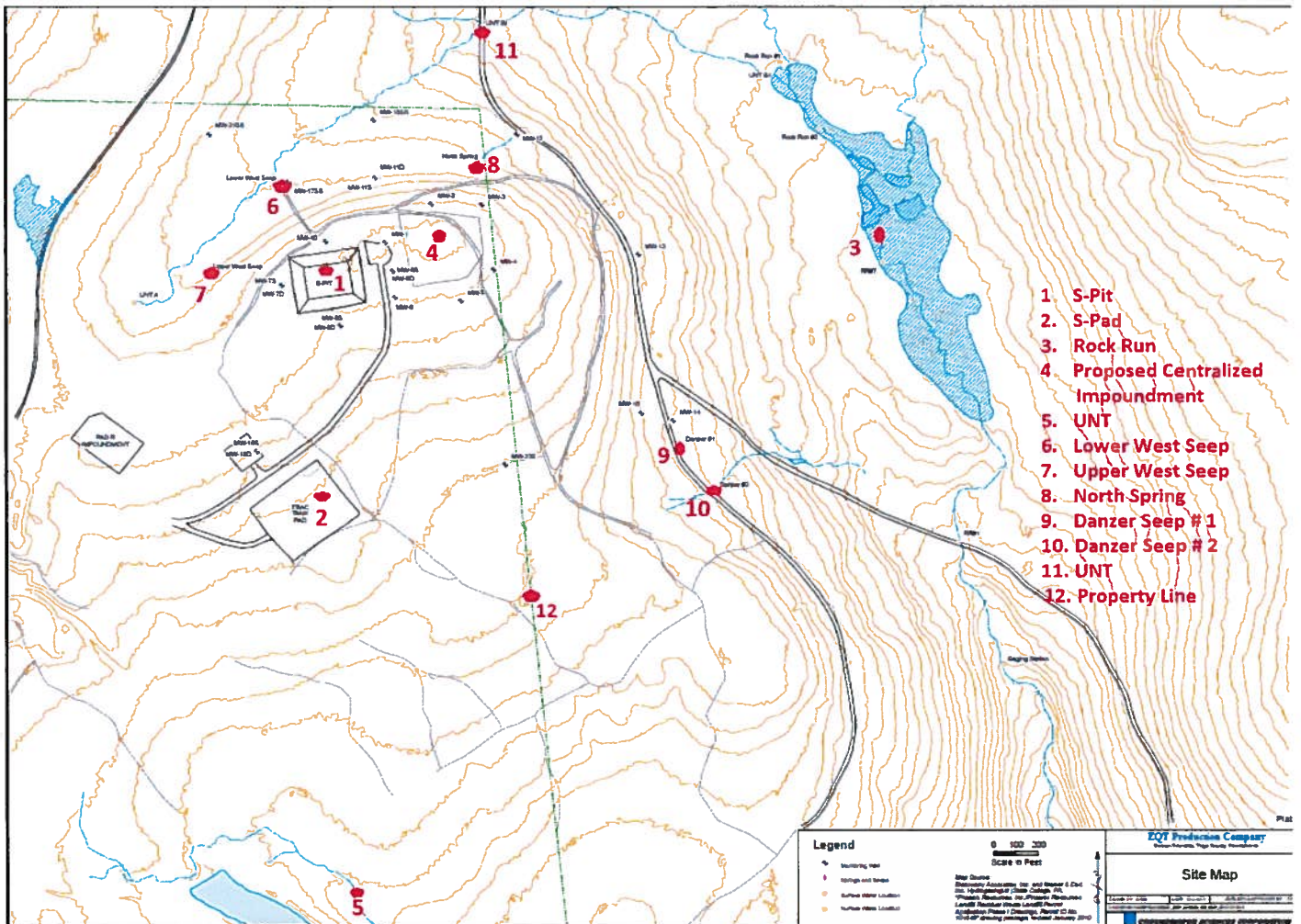
¹² The Notice of Intent for Coverage under the Erosion and Sediment Control General Permit, dated October 18, 2010, listed only a freshwater impoundment associated with the S-Pad (Attachment 4). A PA DEP inspection report dated December 12, 2011 documented the presence of flowback in the S-Pit despite the fact that it was identified as a freshwater storage pit (Attachment 5). See also, NOV dated Jan 23, 2012 (Attachment 6).

¹³ Most wastes generated by oil and gas operations are considered "residual waste" under the Pennsylvania Solid Waste Management Act. See 25 Pa. Code § 287.1 (defining "residual waste"). When pits and impoundments used to store residual wastes are located on well sites, they are regulated under 25 Pa. Code Chapter 78. See 25 Pa. Code § 287.2(g). When a pit or impoundment on a well site is used to store flowback from other well sites, and to facilitate the transfer of this waste for re-use at other well sites, it constitutes a residual waste "transfer facility" within the meaning of 25 Pa. Code § 287.1 and is also subject to regulation under 25 Pa. Code Chapter 279 (Transfer Facilities) and 25 Pa. Code Chapter 299 (Residual Waste Storage Impoundments) as a "centralized" impoundment. The DEP has developed a special permit for centralized impoundments used in oil and gas operations. See PA DEP Document No. 5500-PM-OG0084 ("Application Instructions for a Dam Permit for Centralized Impoundment Dam for Oil and Gas Wells"), available at <http://www.eibrary.dep.state.pa.us/dsweb/Get/Document-97918/01%208000-PM-OOGM0084%20Instructions.pdf>.

¹⁴ A PA DEP inspection report dated May 31, 2012 notes that the flowback in the S-Pit was generated from multiple pads, including the S-Pad and C-Pad (Attachment 11). See also, PA DEP's inspection report dated December 20, 2011, where the inspector noted flowback from the C-Pad was being transferred to and stored in the "freshwater" S-Pit (Attachment 5). EQT was notified on December 20, 2011 that transfer and dumping of waste materials from other pads rendered the pit an unpermitted centralized impoundment. See Inspection Report dated Dec. 20, 2011. *Id.*

Although there have been numerous seeps discovered on-site, two main seeps located southeast of the S-Pit, Danzer #1 and Danzer #2, flow to Rock Run at the surface and in the subsurface. There are a number of small springs around the immediate areas of both Danzer seeps that assist in the movement of flow to the stream. In addition, a more substantial spring (North Spring) located northeast of the S-Pit, also flows directly to Rock Run via surface and subsurface routes (Attachment 7). Seeps known as the Upper West Seep and Lower West Seep, located northwest of the S-Pit, intercept groundwater and enter a wetland associated with an UNT of Rock Run. Id. at p. 3. As discussed more fully below, water and soil sampling conducted at the S-Pit, as well as water sampling conducted at the Danzer seeps, the Upper and Lower West Seeps, and the North Spring indicate past and present discharges from the S-Pit to Rock Run, nearby wetlands, and the UNTs to Rock Run.

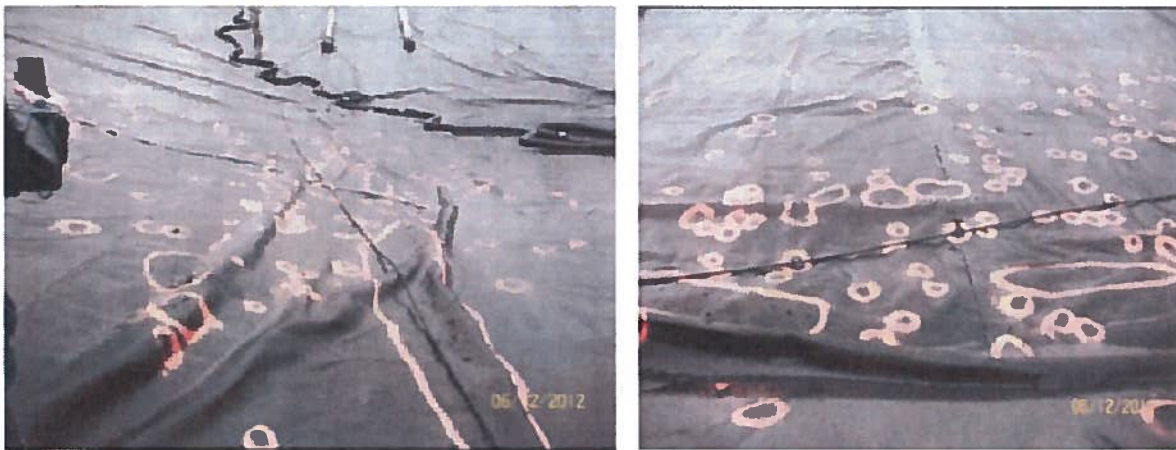
Map 1



* Map prepared by EIP based on EQT site map. This map shows the approximate location of the S-Pit, the S-Pad, the proposed centralized impoundment (see below), the North Spring, the two Danzer seeps, the Upper and Lower West Seeps, the UNTs, Rock Run, and the location of monitoring wells as of November 8, 2013 (red text added)(EQT Quarterly Report, Attachment 3). These are the areas where most of the contamination from the S-Pit is concentrated.

Chronology

In early 2012,¹⁵ EQT applied to PA DEP for a permit to construct a centralized impoundment located adjacent to the S-Pit so that it could legally transport and store flowback and other waste from multiple well pads at the site. Groundwater monitoring conducted in April 2012 as part of the application process revealed high conductivity in recently drilled monitoring wells (MW1 and MW5) that were drilled east of the S-Pit.¹⁶ On May 7, 2012, EQT notified PA DEP that further sampling revealed high chloride concentrations in MW1 (996 mg/L) and MW5 (6,640 mg/L).¹⁷ The next day, EQT reported a 300–500 gallon spill of flowback to a channel that hugs the access road to the S-Pit. This spill occurred while pumping flowback from the S-Pit impoundment to the S-Pad for a well frack.¹⁸ On May 18, 2012, EQT informed PA DEP that the S-Pit liner “might be compromised”.



Photos with S-Pit liner holes circled, taken during the June 12, 2012 PA DEP Inspection (Attachment 10).

On May 30, 2012, EQT’s consultant, Casselberry and Associates, Inc. (C&A), conducted field reconnaissance - after noting high conductivity results from a second round of groundwater monitoring - and discovered the North Seep. Field conductivity at the North Seep was 32,000 uS/cm and it was observed flowing offsite at approximately 15 gallons per minute.¹⁹

Casselberry and Associates discovered the North Spring when drilling a monitoring well associated with the centralized impoundment permit process. The well was drilled in March

¹⁵ The chronology of events is taken primarily from PA DEP inspection reports and a PA DEP list entitled “EQT Phoenix Pad S Timeline”, set forth in a PA DEP email dated August 30, 2013 (Attachment 8).

¹⁶ Conductivity measures the ability of water to pass an electric current and offers a quick method to assess the potential for a pollutorial discharge because it indicates the presence of elevated inorganic dissolved solids such as chloride, nitrate, magnesium, sodium, and aluminum. See <http://water.epa.gov/type/rs/monitoring/vms59.cfm>.

¹⁷ MW1 is located on the NE corner of the S-Pit, approximately 150 feet away, and MW5 is located approximately 400 feet due east of the S-Pit. See Proposed Centralized Impoundment Site Map, dated November 15, 2012, Attachment 9. Note that the Secondary MCL for Chloride is 250 mg/L (Chapter 250 regulations).

¹⁸ PA DEP Inspection Report dated May 9, 2012 and NOV dated May 14, 2012 (Attachment 12).

¹⁹ EQT Site Characterization Plan, p. 2 (Attachment 2).

2012 and field testing indicated a specific conductance in the North Spring of 36 us/cm.²⁰ Sometime between March and the end of May 2012, the specific conductance of the North Spring, as measured by Casselberry and Associates, soared to >30,000 us/cm.²¹ On May 31, 2012, thirteen days after EQT notified EPA that the liner was compromised, PA DEP field inspectors verified elevated conductivity in: 1) Rock Run (ranging from 260 us/cm to 400 us/cm); 2) one of the UNTs to Rock Run (2.7 mS/cm); 3) the North Spring (>19,999 mS/cm, or “over limits” of the field meter); and 4) a wetland complex at the confluence of the UNTs that discharges to Rock Run (750 us/cm). *Id.* At the time of the inspection, discharge at the North Spring was flowing at approximately 3-4 gpm. *Id.* Following the discharge flow path from the North Spring to the UNTs and to Rock Run, the PA DEP inspector observed stressed trees and shrubs (as evidenced by yellowing/browning leaves and/or defoliation). *Id.* Subsequent sampling indicated the presence of flowback pollutants in the groundwater and the receiving surface waters, confirming the discharges to waters of the Commonwealth as initially documented by PA DEP through conductivity readings in the May 31, 2012 inspection report.²²

Although EQT first indicated that the liner was torn in 6 or 7 places, subsequent drainage of the pit revealed up to 100 holes and tears in the bottom and sidewalls of the liner. In a Site Characterization Plan submitted to PA DEP on June 22, 2012, EQT estimated that 1,362 barrels (or approximately 57,000 gallons) of flowback were discharged from the S-Pit between April 1, 2012 and June 1, 2012 (Attachment 2, p.3). EIP could not locate a PA DEP document estimating or discussing the volume of the release.²³ Whether 57,000 gallons or substantially more, these discharges were to groundwater, surface water, and unprotected soils. Following aerial inspection, PA DEP and EQT met on site on August 14, 2012 to discuss and view areas of distressed vegetation. Four multi-acre, distinct areas of distress were noted, as depicted in Map 2, below: 1) an area west of the S-Pit surrounding the Upper and Lower West Seeps, along and including an UNT to Rock Run; 2) an area northeast of the S-Pit surrounding the North Spring; 3) an area southeast of the S-Pit and due east of the S-Pad; and 4) an area further southeast of area # 3, above, that surrounds Danzer Seep #1 and Danzer Seep # 2 (both of which discharge to Rock Run).

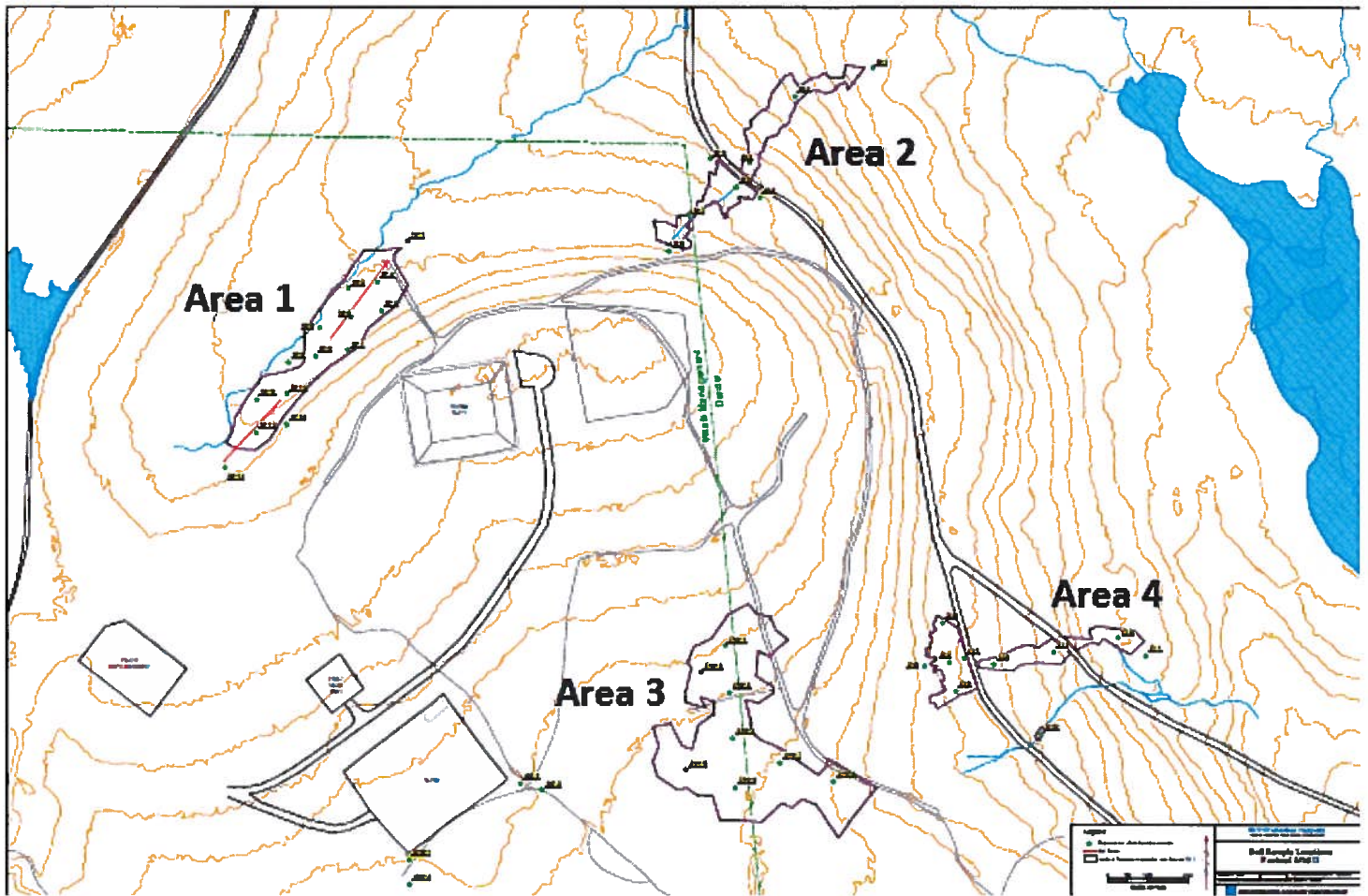
²⁰ 1 ms/cm = 1000 us/cm.

²¹ PA DEP Inspection Report dated May 31, 2013 (Attachment 11).

²² PA DEP was onsite almost daily after it documented discharges to Commonwealth waters on May 31, 2012. Conductivity readings at the locations of most concern fluctuated during this time – some readings were significantly higher than those measured on May 31st and others remained above meter detection limits. *See e.g.*, PA DEP Inspection Report dated June 4, 2012 (Attachment 13).

²³ However, PA DEP estimated the S-Pit to be two-thirds to three-quarters full at the time of the May 31, 2012 inspection (Attachment 11) yet it was “near capacity” three weeks earlier at the May 9, 2012 inspection (Attachment 12). In addition, although EQT stated in its Site Characterization Plan that the S-Pit has a 5.2 million gallon capacity (Attachment 2), EQT stated that it had a 6 million gallon capacity in its E&S Plan (Attachment 12). Either way, inspection evidence suggests the S-Pit leaked and spilled more than 57,000 gallons, as EQT estimates.

Map 2*



*August 14, 2013 Groundwater Sciences Corporation Map Indicating Revised Soil Sampling Locations (prepared on behalf of EQT) (Text denoting Areas 1-4 added by EIP)



Photo on left shows distressed and dying vegetation in Distressed Area # 1 (West Seeps), taken during the June 4, 2012 PA DEP Inspection (Attachment 13). The photo on the right shows distressed and dying vegetation in Distressed Area # 2 (North Spring), taken during the June 5, 2012 PA DEP Inspection (Attachment 14).



Photo of the S-Pit, showing flowback level, taken during the May 31, 2012 Inspection (Attachment 11).

Sampling of the S-Pit contents on May 10, 2012 indicated the presence of multiple volatile organic chemicals (VOCs) including: acetone (46.6 ug/l), bromoform (139 ug/l), bromomethane (6.1 ug/l), chlorodibromomethane (7.6 ug/l), chloroform (1.3 ug/l), and chloromethane (2.5 ug/l). Metals present in the samples included barium (2860 mg/l), calcium (4310 mg/l), copper (.13 mg/l), iron (6.2 mg/l), lithium (48.8 mg/l), magnesium (314 mg/l), manganese (.75 mg/l), sodium (12,600 mg/l), and strontium (983 mg/l). In addition, chlorides were present at a concentration of 35,100 mg/l and conductivity was approximately 100,000 us/cm. As acknowledged by EQT, conductivity is a useful screen for the presence of certain pollutants in flowback, including chloride, sulfate, sodium, magnesium, calcium, and iron. (Site

Characterization Plan, Attachment 2, p. 4 and Appendix A).²⁴ According to PA DEP, the S-Pit flowback concentrations were likely underreported because EQT sampled from the surface instead of near the bottom, which would have captured stratified contaminants of concern.²⁵

In addition, a list of stimulant fluid additives supplied to EQT by Haliburton for use in well-fracking indicates the use of hydrochloric acid, methanol, ammonium chloride, sodium persulfate, naphtha, potassium carbonate, propargyl alcohol, tributyl tetradecyl phosphonium chloride, and other chemicals (Attachment 15). These fluids, along with formation fluids, are recovered by EQT as “flowback” when they are returned to the surface after the fracking process is completed.



Photo on the left shows view of North Spring discharge looking downgradient (toward Rock Run), and also indicates where the spring surfaces (at the bottom of the photo), taken from the May 31, 2012 PA DEP inspection (Attachment 11). The photo on the right shows distressed vegetation and the flowpath of the S-Pit contents from the North Spring, taken during the June 12, 2012 PA DEP Inspection (Attachment 10).

The flowback pollutants in the S-Pit flowed to both groundwater and unprotected soils via the estimated 100+ tears and holes in the liner bottom and sidewall. The groundwater flowed to the surface through seeps, wetlands and springs (Attachment 7). Distressed vegetation is evidence of surface discharges.²⁶ One of the four main areas of distressed vegetation (Area 1 on Map 2, above) runs directly along, and even crosses to the other side of, an UNT to Rock Creek.²⁷ Another is located in and around the North Spring, which was still not completely contained as of summer 2013 - and which discharges directly to Rock Run.²⁸

²⁴ In a DEP email dated June 6, 2012, Jennifer Means states that “the number of seeps being identified with extremely elevated conductivity and areas of recently stressed vegetation indicate a significant release with broad impacts.” (Attachment 16).

²⁵ July 10, 2012 letter to Kimberly A Walker, EQT, from Jessica Ritenour, PA DEP (Attachment 17).

²⁶ See June 6, 2012 email (Attachment 16).

²⁷ See PBFC letter dated October 2, 2012 (Attachment 1).

²⁸ See Aug. 28, 2013 PA DEP inspection report, Attachment 18). See also, an email dated June 12, 2013 from Randy Farmerie (PA DEP) to multiple PA DEP addresses (Attachment 19).

PA DEP confirmed that the S-Pit was emptied on June 11, 2012 (Attachment 8). Soon after the discovery of the S-Pit discharges, PA DEP voiced concern regarding potential impact to properties of neighboring businesses and the public water supply wells of Duncan Township and the borough of Wellsboro. EQT notified a nearby lumber company and a Waste Management facility of the discharges sometime around June 1, 2012.²⁹ On June 14, 2012, PA DEP stated that “[t]here is significant concern in regards to some of the public water supply wells in the vicinity of the Pad S pit. Specifically, Wellsboro’s Pump House and Wooden Shanty wells and Duncan Township’s Well #1 and Well #2.”³⁰ Subsequent sampling conducted by EQT, nearly one month after the 100+ tears in the liner were discovered, indicated exceedances of water quality and health-based standards in all of the at-risk PWS wells, including barium, chloride, sodium, lead, iron, manganese, and pH.³¹

Continuing Concern under Both the CSL and the CWA

Although the contamination from the S-Pit is being reclaimed pursuant to Pennsylvania’s voluntary cleanup program, the problem is far from solved. As of May, 2013, PA DEP noted that groundwater monitoring indicated that concentrations of barium and chloride still exceeded Pennsylvania’s Statewide Health Standards (SHS),³² a year after the problem was discovered. On June 12, 2013, PA DEP noted in an email that the North Spring was still discharging “a significant amount of water down the channel” despite EQT’s efforts to collect it. Water from the North Spring discharges – via surface and subsurface conveyance – directly to Rock Run.³³ Furthermore, September 24, 2013 groundwater and surface water monitoring results submitted to PA DEP by EQT indicate continuing exceedances of arsenic, barium, chloride, iron, manganese, lead, lithium, and strontium (Attachment 3). *See also*, Tables, below.

Despite EQT’s voluntary cleanup efforts, which have been monitored by PA DEP, the site continues to pose substantial risk. In addition to the vast contamination caused by placement of unpermitted flowback in the S-Pit, as well as mismanagement, poor housekeeping, and in some instances, deliberate effort to conceal evidence of spills,³⁴ other areas of concern exist at

²⁹ Email dated June 1, 2012 from John Centofanti (EQT) to Scott Perry (PA DEP) (Attachment 20). Note that two of the areas of distressed vegetation extend off-site (*see* Maps 1 & 2, above, for property lines (in green)).

³⁰ Email dated June 14, 2012 from Jennifer Means (PA DEP) to multiple PA DEP addressees (Attachment 21).

³¹ June 25, 2012 sampling results of PWS wells (Attachment 22). EIP has no way to evaluate the extent of this problem or whether any of these elevations are attributable to other sources; regardless, the concern over the safety of the public water supply is valid.

³² Email dated May 10, 2013 from Jessica Ritenour (PA DEP) to Larry Roach, Groundwater Sciences (Attachment 23). *See* Monitoring Well tables, below, for MW5, MW 11, MW 12, and MW 20, re SHS exceedances of barium and chloride, among others, as of August 15, 2013.

³³ Attachment 2.

³⁴ In a telephone log dated Sept. 26, 2012, from Larry Roach, GWS to Randy Farmerie (PA DEP) regarding stained soils discovered during an inspection two days earlier, Mr. Roach relayed that in the future, EQT would relay to employees “that covering stained areas to hide them was not acceptable.” (Attachment 25). In addition, use of a pit not designed or permitted to hold multi well-pad flowback and other waste, which continued even after PA DEP warned that such use was illegal, may constitute “knowing” conduct.

the site. These concerns fall into two broad categories: 1) compliance concerns beyond the S-Pad and S-Pit footprint; and 2) continuing concerns regarding the S-Pad and S-Pit.

Other Multi-Well Pads

During the investigation of the S-Pit contamination, EIP came across multiple documents indicating compliance issues with EQT's operation of two other multi-pad wells, the R-Pad and the C-Pad. For example, in a PA DEP Telephone Log dated January 1, 2013, J. Ritenour documented a call with Larry Roach (EQT) wherein he indicated that even though a year had passed, EQT still had not responded to a NOV sent to EQT regarding the C-Pad (Attachment 26). In an email dated September 24, 2012 from Jeremy Daniel (PA DEP) to Dave Allison (EQT), Mr. Daniel encouraged EQT "to conduct site audits of all four of [its] locations in Tioga County" due to PA DEP inspectors discovering multiple instances at multiple pads of "odorous", unexplained discharges with high conductivity readings (Attachment 27). Finally, in meeting notes dated October 11, 2012, PADEP states that one of EQT's consultants, Civil Environmental Consultants (CEC), continues to perform its ecological assessment and stream survey and is "conducting assessment off of [the] northeast corner of Pad C, Pad R and Pad S." In that same document, PA DEP further explains that GSC, another EQT consultant, "is not involved with the cleanup at Pad R." *Id.*³⁵

Continuing Concerns regarding the S-Pit and S-Pad

The soils beneath the S-Pit and other contaminated soils on site continue to leach into the groundwater and then discharge to Rock Run and its UNTs from seeps, wetlands, and springs. On the last inspection for which EIP currently has documentation (Fall 2013), field conductivity indicated continuing discharges of pollutants. Surface water conductivity was 1,856 us/cm at Danzer Seep #1(#2 was dry), 1,472 us/cm at the North Spring, and 153.us/cm at Stream Station W (located in a segment of the UNT due north of the S-Pit).³⁶ *Id.* Since the S-Pit failure was discovered, EQT has continued to demonstrate sloppy operation of the site that has resulted in multiple violations, including recent discharges to waters of the Commonwealth and the United States.

A summary of continuing and/or additional concerns, all identified in PA DEP inspection reports, follows:

1. A PA DEP inspection report dated August 9, 2012 revealed a row of tanks stored on an unbermed liner containing numerous patches. Field conductivity in puddles on the liner ranged from 14,920 us/cm to "beyond limits". A small wetland off the east corner of the S-Pad had a field conductivity of 6,110 us/cm. PA DEP sampling results showed the presence of chloride (1,982 mg/L), barium (3,960 ug/L), manganese (29,300 ug/l), pH (3.9), strontium

³⁵ Although EIP has requested but not yet received publicly available information regarding the status of the other pads at this multi-pad site, review of documents related to the S-Pad and S-Pit clearly indicate that significant problems exist elsewhere.

³⁶ Note that a June 6, 2012 PA DEP inspection report indicated field conductivity of 35.7 us/cm on a clean portion of the same UNT just north of Stream Station W (Attachment 28).

(33,300 ug/L), TDS (4,656 mg/L), iron (5,353 ug/L), and lithium (1,317 ug/L). In addition, a corner of the liner used to store tanks of recovered flowback from the S-Pit was torn. Violations were noted, including discharge to waters of the Commonwealth (Attachment 29).

2. On September 26, 2012, a PA DEP inspector noted that a sump pipe discharging fluid with high conductivity (2,100 us/cm) at a rate of 2 gpm, first observed two days earlier, was still discharging fluid with roughly the same conductivity. Standing water in the adjacent wetland had a field conductivity of 1,297 us/cm. Garbage around the perimeter of the S-Pad was also observed (Attachment 30). Despite no formal citation, the discharge from the sump pipe to the wetland violates both the CSL and the CWA.

3. A PA DEP inspection report dated April 4, 2013 noted that the S-Pit contained standing water and that large portions of the liner covering the embankment on the north and east sides had come off, exposing the earthen walls. Moreover, fluid from the sumps installed at Danzer Seep #2 was observed flowing down gradient into the woods. Field conductivity was 859 us/cm. In addition to topsoil stabilization concerns, the inspector noted that large scraps of waste liner were observed in various locations, including *in* a wetland off the northeast S-Pad corner. Garbage was visible throughout the site (Attachment 31). Despite no formal citation, the discharge of liner waste into the wetland and the discharge from Danzer Seep # 2 constitute violations of both the CSL and the CWA.³⁷

4. On April 5, 2013, EQT notified PA DEP of an estimated 90 barrel release from a small tank farm staged across from the S-Pad. EQT estimated that 20 of the 90 barrels were uncontained. According to the inspector, PA DEP was notified late - more than two hours after the spill was discovered - as required by Pennsylvania law. A faulty hose and a breach in the containment caused the discharge (with conductivity ranging from 1,100 us/cm to 1,500 us/cm) to unprotected soils. It's unclear whether the discharge was to waters of the Commonwealth or United States (Attachment 32).

5. On May 25, 2013, a PA DEP inspector noted that the repairs to the liner, documented in the April 4, 2013 inspection report, above, had not been made and that the S-Pit still contained standing water. Topsoil stabilization concerns also were noted (Attachment 33).³⁸

6. An internal DEP email dated June 12, 2013 noted that an inspector, just the day before, had observed "a significant amount of water coming down the channel from the North Spring" (Attachment 19).

³⁷ See U.S. v. West Indies Transport, 127 F. 3d 299 (3rd Cir. 1997) (disposal of rebar into a waterway from a permanently moored barge constitutes "an addition of any pollutant from a point source").

³⁸ Note that standing water in the previously drained S-Pit constitutes continued discharge from a point source. See, e.g., Washington Wilderness Coalition v. Hecla Mining Company, 870 F. Supp. 983 (E.D. Wa 1994) (discharge from a pond or refuse pile, even where caused by rainfall or snow melt percolating through it, constitutes discharge from a point source because the pond or pile acts to collect and channel contaminated water).

7. On August 14 and 28, 2013, PA DEP inspectors noted that the violations associated with the S-Pit and S-Pad on May 31, 2012, June 11, 2012, August 9, 2012, and September 26, 2012³⁹, were still outstanding (Attachment 34).

In addition, EIP has examined the groundwater data submitted by EQT to PA DEP. Based upon unsafe and increasing trends in some of the monitoring wells near the S-Pit, particularly wells 7, 9, and 10, we are concerned that the S-Pit continues to actively leach pollutants into groundwater. See Map 4 and Monitoring Well tables, below.

CSL and CWA Violations

As described above, EQT's operation of the S-Pit and other areas onsite have resulted in and continue to result in the illegal discharge of pollutants to waters of the Commonwealth and the United States in violation of 35 P.S. § 691.301 of the CSL and Section 301(a) of the CWA. In addition, these discharges constitute a nuisance in violation of 35 P.S. §§ 691.307(c) and 691.402(b) of the CSL and they also violate Pennsylvania's narrative water quality standard (35 P.S. § 691.401).⁴⁰

Section 301(a) of the CWA prohibits the discharge of pollutants from a point source to waters of the United States except in compliance with, among other conditions, a NPDES permit issued pursuant to section 402 of the CWA or an authorized state program.⁴¹ Under the CWA, civil penalties of up to \$37,500 per day per violation can be imposed for unpermitted discharges to waters of the United States.⁴²

As early as April 30, 2012, field conductivity and other sampling indicated discharges from the S-Pit to groundwater, from the S-Pit to surface channels and conduits discharging eventually to Rock Run and its UNTs, and from seeps, wetlands and springs to Rock Run and its UNTs. To the best of our knowledge, the violations associated with the failure of the S-Pit, in whole or part,

³⁹ The PA DEP inspector in September 2012 did not cite EQT for violations but the inspectors from both August 2013 inspections referenced the issues identified as "Outstanding Violations" (Attachment 34).

⁴⁰ 35 P.S. §§ 691.301 (no person or municipality shall place or permit to be placed, or discharged or permit to flow, or continue to discharge or permit to flow, into any of the waters of the Commonwealth any industrial wastes, except as hereinafter provided in this act); § 691.307(c) (a discharge of industrial wastes without a permit or contrary to the terms and conditions of a permit or contrary to the rules and regulations of the department is hereby declared to be a nuisance); § 691.402(b) (whenever a permit is required by rules and regulations issued pursuant to this section, it shall be unlawful for a person or municipality to conduct the activity regulated except pursuant to a permit issued by the department. Conducting such activity without a permit, or contrary to the terms or conditions of a permit or conducting an activity contrary to the rules and regulations of the department or conducting an activity contrary to an order issued by the department, is hereby declared to be a nuisance); and § 691.401 (it shall be unlawful for any person or municipality to put or place into any of the waters of the Commonwealth, or allow or permit to be discharged from property owned or occupied by such person or municipality into any of the waters of the Commonwealth... any substance of any kind or character resulting in pollution as herein defined [by 35 P.S. § 691.1]).

⁴¹ 33 U.S.C. §§ 1311(a). Rock Run is a High Quality waterway protected under multiple classifications and is both a water of the Commonwealth and a water of the United States. The UNTs to Rock Run are also waters of both the Commonwealth and the United States. See FN 7.

⁴² 33 U.S.C. § 1319(d); 40 C.F.R. § 19.4 (Civil Monetary Penalty Inflation Adjustment Rule).

remain ongoing.⁴³ At a minimum, they were ongoing as of August 28, 2013 (inspection report, Attachment 34).

The S-Pit, the two Danzer seeps, the Lower and Upper West Seeps, and the North Spring are all “point source[s]” as that term is defined in Section 502 (14) of the CWA because they all act to collect and channel contaminated water.⁴⁴ Specifically, they bring contaminated groundwater caused by the S-Pit leak and subsequent soil contamination to the surface and then to Rock Run and its UNTs.⁴⁵ In the case of the seeps and North Spring, it does not matter whether they were the source of the pollutants but rather, whether they discharge pollutants to navigable waters.⁴⁶ Sampling results, discussed below, clearly establish that the seeps and North Spring contain pollutants which are conveyed to Rock Run and its UNTs via surface and subsurface routes (Attachment 2, p. 2).

Pursuant to Section 309(d) of the CWA, each separate violation of the CWA subjects EQT to a civil penalty of up to \$37,500 per day and such other relief permitted by law. Per day, per violation fines up to \$10,000 can be assessed for violations of the CSL and imprisonment and fines up to \$25,000 can be imposed under the CSL for negligent violations and up to \$50,000 for intentional or knowing violations.⁴⁷

In addition, we are concerned that evidence uncovered in our investigation indicates that EQT made intentional and knowing choices about the use and contents of the S-Pit and that these decisions resulted in the substantial contamination described herein. For instance, on December 16, 2011, EQT requested permission from PA DEP to allow storage of flowback instead of freshwater in the impoundment (Attachment 35). Just four days later, on December 20, 2011, a PA DEP inspector determined that the S-Pit had one observed hole in the liner, contained flowback rather than freshwater, and was operating as a centralized impoundment (Attachment 5).⁴⁸ Weeks later, on January 23, 2012, PA DEP issued EQT a Notice of Violation

⁴³ See Map 4 and sampling tables, below. The sampling data indicates there is a high likelihood that the S-Pit is continuing to leach contaminants into the groundwater and that voluntary interception of contaminated groundwater at the North Spring and seeps has not been fully successful.

⁴⁴ See Parker v. Scrap Metal Processors, Inc., 386 F.3d at 1008 (debris and construction equipment that served to funnel storm water runoff into a stream constituted a point source, noting that the term “point source” should be interpreted “broadly”). See also U.S. v. Earth Sciences, Inc., 599 F.2d 368, 373 (10th Cir. 1979), *cert. denied*, 522 U.S. 1052 (1998) (“it contravenes the intent of the [CWA] and the structure of the statute to exempt from regulation any activity that emits pollution from an identifiable point”); South Florida Water Management District v. Miccosukee Tribe of Indians of Florida, 124 S. Ct. 1537 (2004) (“discharge of a pollutant”, for which a NPDES permit is required under the CWA, includes within its reach point sources that do not themselves generate pollutants; a point source need only convey the pollutant to navigable waters); Aiello v. Town of Brookhaven, 136 F. Supp. 2d 81 (E.D.N.Y. 2001) (culverts from which groundwater leachate entered ponded is a point source under the CWA).

⁴⁵ EQT’s consultants acknowledge that all of these point sources convey water, both via the surface and subsurface, to Rock Run and the UNTs to Rock Run. See August 21, 2013 Memo (Attachment 7).

⁴⁶ See FN 44.

⁴⁷ 35 P.S. § 602.

⁴⁸ Specifically, the inspectors noted that “we observed Impoundment 2 [the S-Pit], which is shown as a 6 million gallon freshwater impoundment in the E&S plan. The impoundment contained what appeared to be flowback.”

(NOV) for placing mud drillings and pieces of a liner from a discharge at the C-Pad in what the inspector noted was supposed to be a *freshwater* impoundment [the S-Pit] (Attachment 6). Apparently EQT never used the S-Pit for freshwater or exclusively for S-Pad flowback. Instead, EQT knowingly operated the pit, from at least December 20, 2011, as an unpermitted centralized impoundment for storage and disposal of multi-pad waste.⁴⁹

To the extent knowing (or even negligent) violations occurred, EQT may be subject to criminal sanctions pursuant to either the CSL, the CWA, or both.

FACTS RELATED TO RCRA CLAIMS

Open Dumping Prohibition

Section 4005(a) of RCRA prohibits the open dumping of solid waste. EPA regulations that implement this provision further state that “a facility or practice shall not contaminate underground drinking water sources beyond the solid waste boundary.” See 40 C.F.R. § 257.3-4. Intended to ensure that groundwater is protected over the long-term, these statutory and regulatory provisions are known as EPA’s Open Dumping prohibition.

The maximum contaminant levels (MCLs) developed under the Safe Drink Water Act (SDWA), 42 U.S.C. § 300 *et seq.*, are the standard used to determine whether waste disposal practices are considered open dumping. EPA has determined that exceedance of an MCL caused by the disposal of a solid or hazardous waste is the equivalent of a determination that the level of contamination constitutes “a reasonable probability of adverse effects on health or the environment under RCRA.” 40 C.F.R. § 257.1.⁵⁰

The groundwater beneath and surrounding the EQT site is an “underground drinking water source” within the meaning of the open dumping regulations because it has total dissolved solids (TDS) at levels less than 10,000 mg/L. 40 C.F.R. § 257.3-4(c)(4)(ii). See, Monitoring Well tables for TDS concentrations, below. Groundwater sampling results indicate a number of MCL exceedances, including barium, cadmium, selenium, and lead. Further, these exceedances extend beyond the “solid waste boundary” – in other words, beyond the footprint of the disposal location, which in this case is the S-Pit. See Monitoring Well tables, below, as well as Map 2 (Distressed Vegetation). There are a number of other monitoring wells not highlighted in this letter that also provide additional evidence of movement beyond the solid waste boundary. Finally, EQT acknowledged in its Site Characterization Plan that groundwater beneath the S-Pit flows directly into Rock Run and the UNTs (Attachment 2).

Id. at p. 2. Sampling results from the inspection later confirmed the presence of flowback in the S-Pit. See Attachments 2, 5, 7, 11.

⁴⁹ Recall that EQT was put on notice in the Dec. 20, 2011 inspection report that use of the pit for storing and transporting waste from multiple wells required a centralized impoundment permit (Attachment 5).

⁵⁰ *Disposal* means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters. 40 C.F.R. § 257.2.

Imminent and Substantial Endangerment

Section 7003(a) of RCRA permits the EPA Administrator or an authorized state⁵¹ to restrain any person from past or present solid or hazardous waste handling, storage, treatment, transportation or disposal activities that may present an imminent and substantial endangerment to the health or the environment, or take such other action as may be necessary. EQT's actions on this site have caused reasonable concern that consumption of public drinking water and fish caught from the impacted segments of Rock Run, as well as use and enjoyment of Rock Run and surrounding lands, presents a risk of injury sufficient to create an imminent and substantial endangerment. The amount of standing, contaminated water found at the site on any given day may be consumed and is thus endangering local wildlife. PA DEP ordered the sampling of PWS wells as a result of these events. Due to concern for trout stock and other potential ecological and water quality degradation, PBFC is conducting its own investigation, which includes assessing the impact to Rock Run.⁵² In fact, in a letter dated October 2, 2012 from PBFC to PA DEP, the Commission complains that: 1) EQT hasn't taken "much action to remove contaminated soils in the leaking pond area"; 2) recent conductivity readings downslope of the S-Pit still exceed 5000 us/cm; and 3) "all of the downstream areas still [show] various levels of contamination." (Attachment 1).

As outlined above, there is substantial evidence that the events of the last 20 months may constitute an imminent and substantial endangerment pursuant to Section 7003(a) of RCRA.⁵³



The photo on the left shows waste liner and "containment material" in the wetland beyond the NE corner of the well pad and the photo on the right shows stressed hemlocks adjacent to the "west trench area", both taken during the April 1, 2013 PA DEP Inspection (Attachment 31)

⁵¹ The Commonwealth of Pennsylvania is authorized to implement both the RCRA base program and the 1984 Hazardous and Solid Waste Amendments (HSWA) thereto. See 51 FR 1791 and 65 FR 57734.

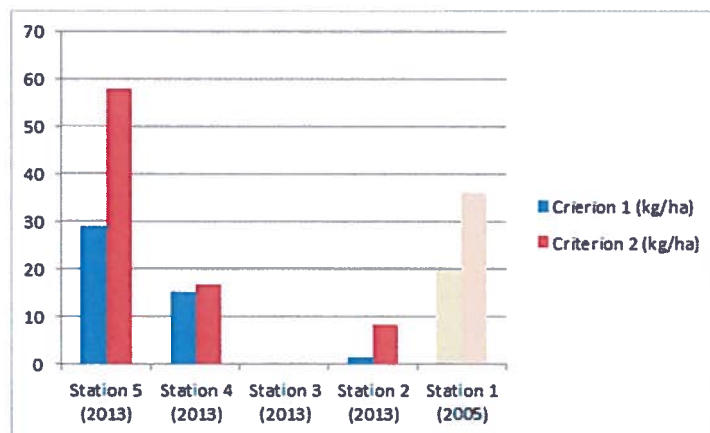
⁵² See May 6, 2013 Petition to EPA to promulgate a conductivity water quality standard, filed by a coalition including Earthjustice, Sierra Club, and NRDC, which cites numerous studies linking elevated conductivity and stream impairment in Appalachian streams. Available at: <http://earthjustice.org/sites/default/files/FinalPetitiontoEPAforconductivityWQS5713.pdf>.

⁵³ Section 601(b) of the CSL also provides for the abatement of nuisances through preliminary or special injunction where "circumstances require" or where "public health is endangered".

Evaluation of EQT's 2014 Ecological Study

Although PFBC is undertaking an investigation and possible study related to EQT's operations impacting Rock Run, the results have not yet been released. However, EQT recently submitted its own ecological study to PA DEP, dated January 2014. The study, undertaken by Normandeau Environmental Consultants, is entitled "Evaluation of Fish and Benthic Macroinvertebrate Communities in Rock Run, Tioga County, Pennsylvania" (Attachment 24). One of the primary reasons for undertaking the study was "predicting impacts (if any) to the stream's biological health if collection of groundwater is discontinued at this time." *Id.* at iv.

The fact that EQT is contemplating the cessation of voluntary control measures is concerning because its own data establishes the decline of aquatic health attributable to discharges to ground and surface water from its operations. For instance, with regard to the trout population, the data in the report establishes that although the sampling station (station 5) upstream of the tributary that carried EQT pollutants to Rock Run still qualifies, the four monitoring stations downstream no longer qualify for classification as a Class A Wild Trout Water based on PA DEP's criteria.⁵⁴ The chart below, created by EIP from data contained in the Normandeau report, demonstrates the decline in trout population from upstream to downstream of EQT's contamination.



⁵⁴ Note that the sampling Normandeau used for station 1 was obtained from PFBC data and pre-dates the EQT contamination. Note also that the criteria for Class A Wild Brook Trout Stream are: 1) total biomass of less than 15 cm in total length of at least 0.1 kg/ha; and 2) total biomass of at least 30 kg/ha (Attachment 24). See also, http://www.fish.state.pa.us/pafish/trout/trout_plan/troutplan2010.pdf.

In addition, benthic macroinvertebrate sampling undertaken pursuant to Normandeau's evaluation establishes that the index of biological integrity scores declined from station 5 (upstream of EQT's contamination) to station 4 and then improved again at stations 3, 2, and 1. Station 4, immediately downstream of the tributary that carried EQT pollutants to Rock Run, currently qualifies as impaired. Id. at 11.

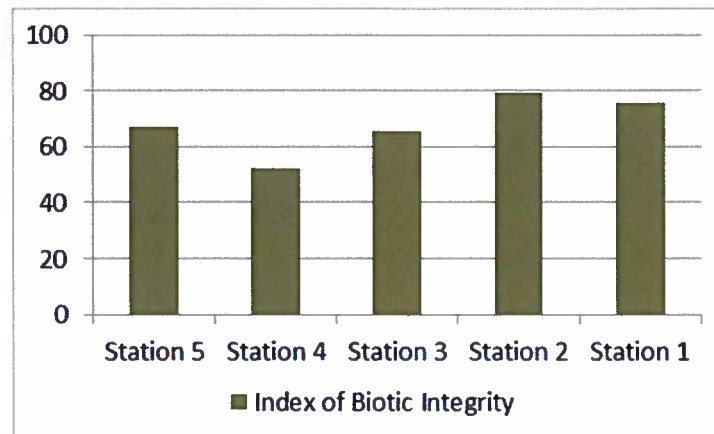


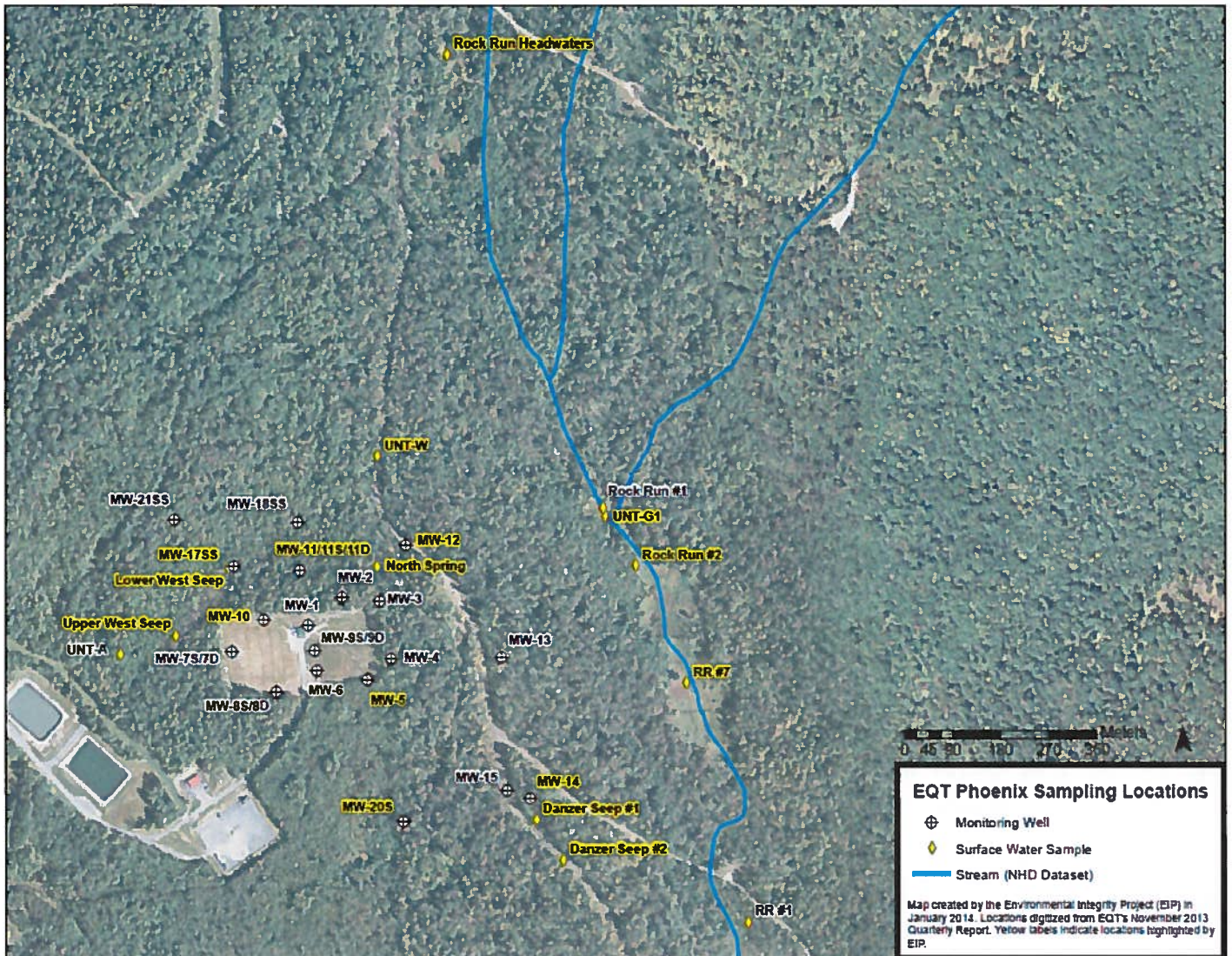
Chart created by EIP from data presented in the Normandeau report.

Despite Normandeau's conclusions to the contrary, the data presented in its January 2014 report indicates ongoing impairment of Rock Run as a direct result of EQT's unlawful operations.

Data

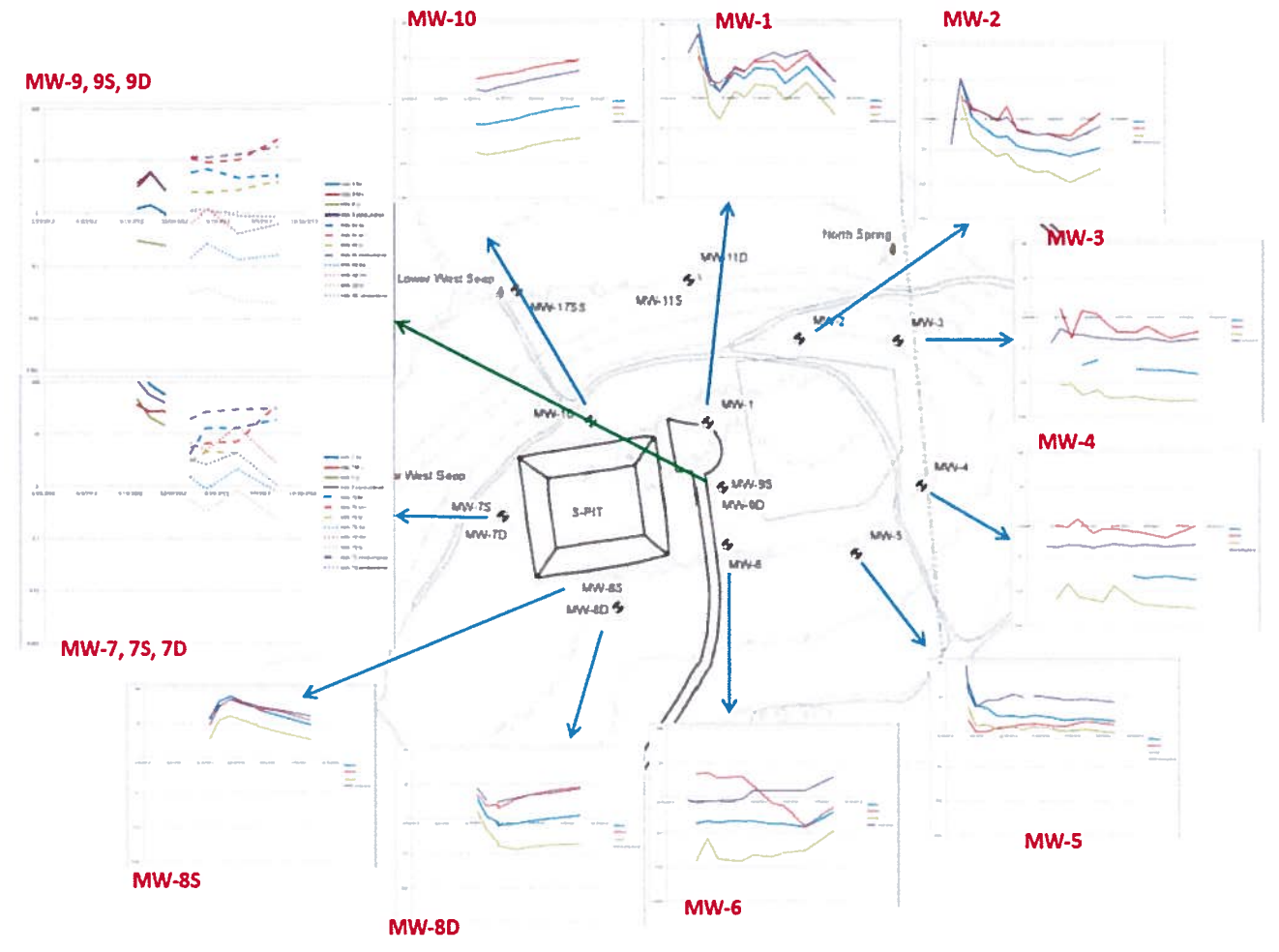
Surface water and groundwater data are presented to: 1) provide empirical evidence of the discharges to waters of the United States and the Commonwealth (including discharges to groundwater) described in this letter; 2) document the extent of contamination; 3) highlight the ongoing concerns regarding ground and surface water quality; and 4) emphasize the lack of adequate measures to eliminate seeps and other sources of discharge. The primary areas of focus are Rock Run, the UNTs to Rock Run, the North Spring, Danzer Seep # 1, Danzer Seep # 2, the Lower West Seep, the Upper West Seep, and the 4 areas of distressed vegetation.

Map 3 (Sampling Locations)*



* Map generated using Google Earth and sampling location coordinates obtained from sampling data and PA DEP inspection reports

Map 4 (Contaminate Trends)*



* This map was prepared by EIP using EQT’s sampling data. See Monitoring Well tables, below. The four pollutants shown – barium, manganese, strontium, and conductance - were chosen due to their significance and correlation with each other. The trends were compared against groundwater standards for all pollutants except conductance (which was compared against a control concentration of 200 umhos/cm). The individual monitoring well maps were plotted using a log scale. As these trends indicate, reasonable concern exists regarding whether and to what extent the S-Pit continues to leach.

Tables

Results highlighted in yellow exceed the applicable water quality standard and results highlighted in gray indicate instances where the reporting limits exceed the standard. Tables with the applicable water quality standard (both for surface and groundwater) are included for reference. Note that there are many more monitoring wells and surface water sampling points at the EQT site than are highlighted in this letter.

Monitoring Well # 10

Analyte	Units	Standard	09/25/12	10/24/12	11/29/12	01/29/13	03/05/13	05/16/13	08/14/13
Arsenic	mg/l	0.01	< 0.02	< 0.02	< 0.02	< 0.004	< 0.004	< 0.004	< 0.004
Barium	mg/l	2	0.274	0.269	0.311	0.389	0.5	0.659	0.869
Cadmium	mg/l	0.005	< 0.01	< 0.01	< 0.01	< 0.002	< 0.002	< 0.002	< 0.002
Calcium	mg/l		21	23.5	35.4	38.1	49.9	67.8	98.9
Chromium	mg/l	0.1	< 0.005	0.0065	< 0.005	< 0.001	< 0.001	< 0.001	0.00115
Iron	mg/l	0.3	2.73	11.8	2.91	6.95	9.8	13.8	19.6
Lead	mg/l	0.005	< 0.01	0.066	< 0.01	< 0.002	< 0.002	< 0.002	< 0.002
Lithium	mg/l	0.2	< 0.05	< 0.05	< 0.05	< 0.01	0.0107	0.0147	0.0146
Magnesium	mg/l		5.5	6.13	7.97	9.5	12.5	16.6	21.6
Manganese	mg/l	0.05	0.8	0.895	1.03	1.22	1.59	2.1	2.7
Potassium	mg/l		2.61	1.65	0.837	0.895	1.01	1.31	1.31
Selenium	mg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01
Silver	mg/l	0.1	< 0.02	< 0.02	< 0.02	< 0.004	< 0.004	0.00503	< 0.004
Sodium	mg/l		14.3	4.14	1.05	1.72	1.59	2.33	1.82
Strontium	mg/l	4	0.0859	0.0735	0.0807	0.0984	0.126	0.171	0.215
Mercury	mg/l	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Bromide	mg/l		< 1	< 1	0.553	0.755	0.997	1.37	2.1
Chloride	mg/l	250	42.8	37.2	70.1	88.7	120	170	240
Nitrate as N	mg/l	10	< 5	< 5	< 1	< 1	< 1	< 2.5	< 1
Sulfate as SO4	mg/l	250	< 5	< 5	2.11	1.9	1.97	< 2.5	1.78
Hardness (Calc)	mg/l		75.2	84	124	136	169	260	331
Specific Conductance (EC)	umhos/cm		264	228	298	383	479	637	909
Total Dissolved Solids	mg/l		126	188	212	204	270	464	696
Total Suspended Solids	mg/l		66	52	19	6	15	28	32
pH	pH Units		6.39	6.4	6.57	6.57	6.55	6.34	6.37

Monitoring Well # 11-11D-11S⁵⁷

Analyte	Units	Standard	MW-11 (Recompleted as MW-11D)				MW-11D				MW-11S			
			9/24/2012	10/24/12	11/29/12	11/29/12	01/29/13	03/06/13	05/16/13	08/15/13	01/29/13	03/06/13	05/16/13	08/15/13
Arsenic	mg/l	0.01	0.0301	0.0243	< 0.02	< 0.02	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	0.0048	< 0.004	0.011
Barium	mg/l	2	146	94.4	50.1	50	17.3	2.92	1.02	0.206	9.99	18.7	2.27	7.67
Cadmium	mg/l	0.005	0.0229	0.0185	< 0.01	< 0.01	0.00688	0.00287	< 0.002	< 0.002	0.00378	0.00564	< 0.002	0.00454
Calcium	mg/l		397	297	175	165	130	75.8	36.2	26.5	47.9	96.9	16.2	83.7
Chromium	mg/l	0.1	0.0133	< 0.005	< 0.005	< 0.005	0.00167	0.00142	0.00176	0.0014	< 0.001	0.00134	< 0.001	0.0015
Iron	mg/l	0.3	31.2	7.19	2.7	< 0.1	0.0731	0.282	3.92	7.73	0.0604	0.251	0.215	0.536
Lead	mg/l	0.005	0.0493	< 0.01	< 0.01	< 0.01	0.0374	< 0.002	< 0.002	< 0.002	0.0328	0.0182	< 0.002	0.013
Lithium	mg/l	0.2	3.2	2.2	1.35	1.29	0.922	0.613	0.306	0.293	0.447	0.73	0.147	0.525
Magnesium	mg/l		65.7	62.1	36.5	34.7	31.4	22	11.8	10.4	10.6	21.7	3.87	25.7
Manganese	mg/l	0.05	5.68	4.33	2.78	2.63	4.14	4.34	3.13	3.03	0.977	1.96	0.358	1.7
Potassium	mg/l		21.1	16.4	10.4	9.96	8.91	5.89	3.73	2.79	4.42	5.88	2.24	7.49
Selenium	mg/l	0.05	< 0.05	< 0.05	0.0811	0.0833	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver	mg/l	0.1	< 0.02	< 0.02	< 0.02	< 0.02	0.0108	0.0061	0.00417	< 0.004	< 0.004	0.00627	< 0.004	< 0.004
Sodium	mg/l		1340	964	551	545	473	313	182	130	159	301	55.9	263
Strontium	mg/l	4	80.3	55.3	29.7	29.9	20.3	10.3	4.16	2.29	8.24	16.4	2.48	10.8
Mercury	mg/l	0.002	< 0.002	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Bromide	mg/l		30.5	22.2		11.9	10.7	6.62	2.75	2	3.75	6.75	0.858	5.5
Chloride	mg/l	250	3500	3020		1470	1390	697	312	232	430	718	123	658
Nitrate as N	mg/l	10	1.724	3.109		< 1	< 1	< 1	< 2.5	< 1	< 1	< 1	< 1	< 1
Sulfate as SO4	mg/l	250	< 1	6.99		1.43	11.7	6.85	25.7	73.7	21.6	27.6	18.5	22
Hardness (Calc)	mg/l		1260	998		587	484	275	142	102	180	314	56.6	322
Specific Conductance (EC)	umhos/cm		10800	8040		4500	3740	2420	1190	997	1430	2470	441	2220
Total Dissolved Solids	mg/l		7880	5290		2820	1870	1340	630	486	726	1130	260	1240
Total Suspended Solids	mg/l		204	66		30	122	59	552	103	151	684	76	832
pH	pH Units		4.45	4.47		4.67	4.45	5.3	5.39	5.79	4.6	4.1	4.57	3.77

⁵⁷ Monitoring Well # 11 was re-drilled and so some results are reported as being from MW11D and MW11S, in addition to MW11. Similarly, results for Monitoring Well # 12 are reported as being from both MW12 and MW12R.

Monitoring Well # 12-12R

Analyte	Units	Standard	MW-12						MW-12R			
			09/25/12	10/25/12	11/29/12	11/29/12	01/29/13	03/06/13	05/15/13	08/15/13	8/15/13 Dup	
Arsenic	mg/l	0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.004	< 0.004	< 0.004	< 0.004	0.0169	0.0148
Barium	mg/l	2	6.18	4.54	7.69	8.15	3.92	4.15	16.5	9.6	9.38	
Cadmium	mg/l	0.005	0.0134	0.0125	0.0146	0.0167	0.00886	0.00913	0.036	0.0273	0.0267	
Calcium	mg/l		155	124	199	202	124	129	399	248	244	
Chromium	mg/l	0.1	0.00594	0.00523	< 0.005	< 0.005	0.00133	< 0.001	0.0043	0.00305	0.003	
Iron	mg/l	0.3	3.88	1.91	0.359	< 0.1	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	
Lead	mg/l	0.005	0.0504	< 0.01	< 0.01	< 0.01	0.00798	0.0042	0.0277	0.00892	0.00835	
Lithium	mg/l	0.2	0.233	0.177	0.201	0.211	0.113	0.111	0.302	0.227	0.221	
Magnesium	mg/l		70.5	57	90.1	94.7	58	60.6	188	103	102	
Manganese	mg/l	0.05	2.33	3.27	3.23	3.37	3.55	3.59	4.74	4.25	4.15	
Potassium	mg/l		7.14	5.81	6.17	6.52	4.03	3.96	9.28	8.12	7.94	
Selenium	mg/l	0.05	< 0.05	< 0.05	0.0851	0.0885	< 0.01	< 0.01	0.0201	0.0241	0.0247	
Silver	mg/l	0.1	< 0.02	< 0.02	< 0.02	< 0.02	0.00833	0.00906	0.0173	< 0.004	< 0.004	
Sodium	mg/l		248	186	266	280	166	175	729	492	485	
Strontium	mg/l	4	4.94	3.75	6.59	6.99	3.34	3.68	15.3	10.3	11.3	
Mercury	mg/l	0.002	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	
Bromide	mg/l		8.14	6.61		10.5	7.15	10.5	21	14.3	14.3	
Chloride	mg/l	250	839	725		1240	756	1100	2630	1750	1700	
Nitrate as N	mg/l	10	< 5	< 5		< 1	< 1	< 1	< 1	< 1	< 1	
Sulfate as SO4	mg/l	250	< 5	5.16		3.15	8.27	14.7	7.78	5.49	5.85	
Hardness (Calc)	mg/l		677	545		869	593	974	1800	1120	1080	
Specific Conductance (EC)	umhos/cm		2960	2410		3640	2380	3800	7230	5270	5280	
Total Dissolved Solids	mg/l		2120	1650		2470	1320	1960	5330	3320	3530	
Total Suspended Solids	mg/l		63	58		24	19	11	256	20	18	
pH	pH Units		4.95	4.87		4.88	5.08	4.92	4.6	4.51	4.61	

Monitoring Well # 17SS

Analyte	Units	Standard	01/29/13	03/05/13	05/15/13	08/14/13
Arsenic	mg/l	0.01	< 0.004	< 0.004	< 0.004	< 0.004
Barium	mg/l	2	0.021	0.0183	0.0224	0.0143
Cadmium	mg/l	0.005	< 0.002	< 0.002	< 0.002	< 0.002
Calcium	mg/l		7.12	9.12	10.4	8.53
Chromium	mg/l	0.1	< 0.001	< 0.001	< 0.001	< 0.001
Iron	mg/l	0.3	0.0364	< 0.02	0.28	0.0651
Lead	mg/l	0.005	0.00343	< 0.002	< 0.002	< 0.002
Lithium	mg/l	0.2	< 0.01	< 0.01	< 0.01	< 0.01
Magnesium	mg/l		2.82	3.83	4.23	3.44
Manganese	mg/l	0.05	0.864	1.13	1.41	0.86
Potassium	mg/l		1.18	1.2	1.3	1.16
Selenium	mg/l	0.05	< 0.01	< 0.01	< 0.01	< 0.01
Silver	mg/l	0.1	< 0.004	< 0.004	< 0.004	< 0.004
Sodium	mg/l		3.47	3.74	4.06	3.98
Strontium	mg/l	4	0.0271	0.0337	0.0401	0.0336
Mercury	mg/l	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Bromide	mg/l		< 0.2	< 0.2	< 0.2	< 0.2
Chloride	mg/l	250	7.21	13.1	17.9	10.1
Nitrate as N	mg/l	10	< 1	< 1	< 1	< 1
Sulfate as SO4	mg/l	250	6.88	5.15	3.71	4.85
Hardness (Calc)	mg/l		34.1	37.7	42.1	33.1
Specific Conductance (EC)	umhos/cm		94.5	118	120	97.3
Total Dissolved Solids	mg/l		148	62	68	48
Total Suspended Solids	mg/l		30	14	37	26
pH	pH Units		6.51	6.68	6.38	6.11

Monitoring Well # 20S

Analyte	Units	Standard	01/29/13	03/06/13	05/15/13	08/15/13
Arsenic	mg/l	0.01	< 0.004	< 0.004	< 0.004	0.00443
Barium	mg/l	2	11.2	9.87	6.17	7.01
Cadmium	mg/l	0.005	0.00491	0.00452	0.00237	0.0048
Calcium	mg/l		53	46.4	30	39.5
Chromium	mg/l	0.1	0.00107	0.00116	< 0.001	0.00106
Iron	mg/l	0.3	1.28	0.951	0.0466	0.0778
Lead	mg/l	0.005	0.0298	0.0249	0.016	0.0153
Lithium	mg/l	0.2	0.316	0.302	0.196	0.259
Magnesium	mg/l		13.1	13.4	8	13
Manganese	mg/l	0.05	1.8	1.72	1.1	1.91
Potassium	mg/l		3.55	3.52	3.17	3.75
Selenium	mg/l	0.05	< 0.01	< 0.01	< 0.01	< 0.01
Silver	mg/l	0.1	< 0.004	< 0.004	< 0.004	< 0.004
Sodium	mg/l		177	155	108	113
Strontium	mg/l	4	8.19	6.97	4.18	4.32
Mercury	mg/l	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Bromide	mg/l		4.44	3.49	2.09	2.74
Chloride	mg/l	250	506	400	209	305
Nitrate as N	mg/l	10	1.222	< 1	1.262	< 1
Sulfate as SO4	mg/l	250	4.92	5.15	9.86	4.86
Hardness (Calc)	mg/l		194	167	113	167
Specific Conductance (EC)	umhos/cm		1600	1390	898	1100
Total Dissolved Solids	mg/l		772	578	616	656
Total Suspended Solids	mg/l		< 4	< 4	44	74
pH	pH Units		4.52	4.6	4.68	4.44

Surface Water Standards

Contaminant	Unit	Standard	Standard Type
Arsenic	mg/l	0.00014	EPA-Human Health O Only
Barium	mg/l	4.1	PA-CCC
Cadmium	mg/l	0.00025	PA and EPA CCC
Chloride	mg/l	230	EPA-CCC
Chromium (III)	mg/l	0.074	PA and EPA CCC
Iron	mg/l	1.5	PA specific criteria: 1.5 (30 day total average) or 0.3 (dissolved max)
Lead	mg/l	0.0025	PA and EPA CCC
Manganese	mg/l	0.1	EPA Human Health O Only
Mercury	mg/l	0.00077	PA and EPA CCC
pH	pH	6	6-9 PA Specific Criteria
Selenium	mg/l	0.0046	PA-CCC
Silver	mg/l	0.0032	PA and EPA CMC

Groundwater Standards

Contaminant	Unit	Standard	Standard Type
Arsenic	mg/l	0.01	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Barium	mg/l	2	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Cadmium	mg/l	0.005	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Chromium	mg/l	0.1	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Iron	mg/l	0.3	Secondary MCL in Table 2 of Chapter 250 regulations
Lead	mg/l	0.005	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Lithium	mg/l	0.2	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Manganese	mg/l	0.3/0.05	Secondary MCL in Table 2 of Chapter 250 regulations
Selenium	mg/l	0.05	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Silver	mg/l	0.1	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Strontium	mg/l	4	EPA lifetime health advisory level
Mercury	mg/l	0.002	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Chloride	mg/l	250	Secondary MCL in Table 2 of Chapter 250 regulations
Nitrate as N	mg/l	10	PADEP Statewide Health Standard Medium Specific Concentration for a Non-residential, used aquifer, (TDS<=2500)
Sulfate as SO4	mg/l	250	Secondary MCL in Table 2 of Chapter 250 regulations

Conclusion

EQT's operations at this site have caused and continue to cause significant harm to High Quality surface waters and groundwater, as well as widespread ecological damage. Although the facts described in this letter have been well-known to PA DEP since at least May 2012, EQT is still not operating under an enforceable order or agreement and no penalties have been assessed. As the Marcellus Shale region continues to experience ever-increasing production pressure, a strong enforcement presence is vital if the health and welfare of Pennsylvanians and the environment are to be protected.

If you have any questions concerning this letter or the violations described herein, please contact me at (202) 263-4449.

Thank you for your prompt attention to this matter.

Sincerely,



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