CITIZENS COAL COUNCIL

Broken Streams, Broken System, Broken Trust

PA DEP's Failure To Protect Southwestern Pennsylvania From Widespread Longwall Coal Mining Damage

Photo Credit: Mark Hersh

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July 2026

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EXECUTIVE SUMMARY

In accordance with the 1994 Act 54 amendments to the 1966 Bituminous Mine Subsidence and Land Conservation Act (BMSLCA), the Pennsylvania Department of Environmental Protection (DEP) is required to compile and analyze underground mining data and report on its effects every 5 years. The original intent of the five-year assessment reports was to determine whether surface structures and water supplies, which were allowed for the first time under Act 54 to be damaged by subsidence from a newer underground coal mining method, were being consistently and adequately repaired or replaced.

This 6th such Act 54 Report fails to address that fundamental concern, continuing a now 30-year history of impeding lawmakers from taking any action to prevent or reduce underground mining damages and DEP itself from making even minimal improvements to its oversight to effectively implement the law.

The first Act 54 Report covered the period 1993 to 1998. It was prepared in-house by Department staff (like this 6th Report) but with changes made by political appointees and was released in June 1999, with a supplement released in February 2001 following adverse comments from the public.

The 2nd, 3rd, 4th, and 5th five-year Act 54 Reports were prepared by researchers from local universities under contract to the DEP. The differences between those four and the 1st and the 6th are striking. The two reports prepared internally by the Department are notable for the paucity of data presented and the lack of meaningful analyses of the effects of underground coal mining on impacts and trends.

By law, the 5-year Act 54 Reports must be provided to the Governor, the Pennsylvania General Assembly, and the DEP's Citizens Advisory Council (CAC). The CAC has taken its role in the Act 54 process seriously and has provided the Department with commentary on each of the 5-year assessments. In its review of the first 5-year Act 54 Report, the CAC identified several problems and concerns. In particular, the CAC (2000)[1]:

> *"... raised a number of concerns, including the Department's commitment to performing its obligations under the Act and the credibility of its 5-year report. Council was concerned about the quality and statistical validity of the data, the inability of the data to support some of the report's conclusions and the report's lack of a comprehensive evaluation of deep mining's impact upon water resources and their associated social costs."*

Indeed, the 2nd through 5th Act 54 Reports were prepared with the expertise of local university researchers due to the negative public reaction and the adverse reaction from the Pennsylvania

[1] Citizens Advisory Council (CAC). 2000. Citizens Advisory Council 1999-2000 annual report. Harrisburg, PA. 31 p. https://files.dep.state.pa.us/publicparticipation/Citizens%20Advisory%20Council/lib/cac/reports/1999-2000_anual_report.pdf

General Assembly to the first one regarding its objectivity, thoroughness, and overall credibility.

This 6th Report, prepared in-house by the Department, is unfortunately similar to the first. It represents a major step backward from the 2nd through 5th Act 54 reports.

This 6th Report is so compromised by errors and so limited in scope and depth of analysis that it fails to achieve the objectives of the analysis specified by the General Assembly in the Act 54 amendments.

Consequently, it fails to comply with the law.

INTRODUCTION

On 14 February 2025,[2] the Bureau of Mining Programs and the California District Mining Office in the Pennsylvania Department of Environmental Protection quietly posted an undated report (PADEP [2025]) on its website entitled *"Effects of Underground Mining in Pennsylvania 6th Report 2018-2022"*. This report was ostensibly prepared with assistance from the federal Office of Surface Mining Reclamation and Enforcement (OSMRE) in the Department of the Interior.

The Report claims to have been prepared in accordance with the Act 54 amendments to the Bituminous Mine Subsidence and Land Conservation Act (BMSLCA) of 1966. Section 18.1 of BMSLCA, as amended by Act 54 of 1994 (see box below), directs the Department to compile relevant data on an ongoing basis, to analyze the effects of underground mine subsidence, and to prepare an assessment report regarding those effects every five years. This latest report represents the sixth such five-year assessment produced either by or for the Department.

> **Section 18.1. Compilation and analysis of data.**
> (a) The department shall compile, on an ongoing basis, the information contained in deep mine permit applications, in monitoring reports and other data submitted by operators, from enforcement actions and from any other appropriate source for the purposes set forth below.
>
> (b) Such data shall be analyzed by the department, utilizing the services of professionals or institutions recognized in the field, for the purpose of determining, to the extent possible, the effects of deep mining on subsidence of surface structures and features and on water resources, including sources of public and private water supplies.
>
> (c) The analysis of such data and any relevant findings shall be presented in report form to the Governor, the General Assembly and to the Citizens Advisory Council of the department at five-year intervals commencing in 1993.
>
> (d) Nothing contained herein shall be construed as authorizing the department to require a mine operator to submit additional information or data, except that it shall require reporting of all water loss incidents or claims of water loss.

Pennsylvania Act 54 was adopted on 22 June 1994. For nearly 30 years prior, Pennsylvania's 1966 Mining Law specifically **prohibited** damage from coal mine surface subsidence to most structures, including homes built before April 27, 1966, public and quasi-public buildings (churches, hospitals, schools), and cemeteries.

(Environmental features like streams, wetlands, and groundwater were not included in the BMSLCA prohibition.)

[2] In the PADEP's March 2025 report to the Citizens Advisory Council (page 3 of 30).

The 1966 prohibition on damage to structures was upheld throughout protracted legal challenges by coal mine operators that went all the way to the US Supreme Court *[Keystone Bituminous v. DeBenedictis, 480 U.S. 470 (1987)]*.[3]

When Pennsylvania's Clean Streams Law was originally passed to prevent pollution of Pennsylvania's streams and rivers ("waters of the Commonwealth") it contained an exemption for coal mines. Coal companies were not required to treat mine drainage because the technology to treat this pollution did not exist.

This exemption was eliminated in the 1960s, when technology for treating mine drainage and preventing it from polluting Pennsylvania waterways became available. Coal companies could either treat their mine drainage or shut down their mine. The industry had polluted about 5,700 miles of waters of the Commonwealth before the law was changed to prevent coal mining from polluting more waters of the Commonwealth.

It was clear that acid mine drainage and surface runoff from coal mines was pollution. Litigation resulted in various court rulings (including from the Supreme Court of the United States) that pollution also included water temperature increases (as occurs when mine subsidence causes pooling of a stream), sedimentation deposits in a stream (as occurs when mine subsidence causes pooling of stream), and stream flow loss (as occurs when mine subsidence fractures the surface beneath a stream and the stream channel cannot hold water).

As time went on, it became clear that the damage prohibition of BMSLCA, which prohibited subsidence damage to structures built before April 27, 1966, was successful. At the same time a newer underground mining technology (longwall), which causes widespread intentional subsidence (or as the industry calls it, "planned and controlled subsidence"), was beginning to be used in Pennsylvania.

Due to BMSLCA, longwall mining could not be used in areas with pre-1966 homes. Homeowners did not want their homes damaged or destroyed. BMSLCA's prohibition of subsidence damage to homes built before April 27, 1966, limited where highly profitable longwall mining could be used (longwall mining uses far fewer people to mine the coal than are employed in room and pillar mines). Consequently, in 1986 a workgroup was formed to draft revised language for the BMSLCA (the state regulators of underground coal mining were excluded from the workgroup even though they were the most knowledgeable about the adverse impacts of subsidence).

Ostensibly, the workgroup was supposed to address subsidence damage from underground coal mining, but an unspoken goal was to find a way to allow the emerging, but much more damaging,

[3] During the 1980s, representatives of the coal industry challenged the 1966 Law, arguing that the requirement to leave coal in place for surface support constituted a "taking" of their property without compensation. After losing at every lower level and on every appeal, the case eventually was brought before the US Supreme Court, where industry lost once again in a 5-4 decision. The Supreme Court found (a) that the 1966 Law's requirement to keep a certain amount of coal in underground mines sufficient to support structures on the surface served a valid public purpose and (b) that the requirements of the Act did not make it impossible for operators to profitably conduct business, and thus did not amount to a "taking" of private property by the public.

longwall technology. Another goal was to require coal companies to restore or replace water supplies damaged by underground coal mining, as added to the federal Surface Mining Control and Reclamation Act in 1992.

Arthur A. Davis, then a professor of Forestry and Environmental Resources at Pennsylvania State University, led the Deep Mine Mediation Project (DMMP) workgroup. Its participants represented coal operators (including 3 of the 4 plaintiffs in the *Keystone Bituminous* case), farmers, sportsmen, and environmental and civic organizations.

The DMMP met periodically over a three-year period. Some of the environmentalists withdrew when they saw that the draft legislation was likely to cause environmental destruction. The group's final draft was completed in March 1990 (Beauduy 1990) and formed the basis (almost *verbatim*) for the adopted amendments to the 1966 mining law, known as Act 54 (of 1994).

Political appointees prevented PADEP career staff from pointing out that the Act 54 amendments did not comply with the minimum federal standards established by the 1992 amendments to federal SMCRA and eliminated provisions in state law that provided more protection to people and the environment than federal law (federal SMCRA provides that state laws must be as effective as the minimum federal standards created by federal SMCRA but can also be more protective than the federal law).

Act 54 fundamentally changed the 1966 BMSLCA prohibition by eliminating the requirement to prohibit damage to homes built before April 27, 1966. Under Act 54, mine-related damage was permitted, with the expectation that mine operators would be responsible for repairing or compensating for subsidence damage to structures and, for the first time, that underground coal mining companies would be required to restore or replace water supplies.

With no incentive to avoid impacts, longwall mining technology thereafter focused on increasing the scale and profitability of coal extraction. Rather than repairing homes and water supplies damaged by mine subsidence, mine operators most often settled claims through private agreements (with non-disclosure clauses) and either purchased damaged properties or provided limited financial compensation to affected private landowners.

Importantly, the 1966 mining law did not address environmental damages, and Act 54 did not either, presumably because other state (the Pennsylvania Clean Streams Law) and federal laws were in place by 1994 to address environmental protection. The Pennsylvania Clean Streams Law prohibits pollution of streams --- flow loss and pooling are "pollution".

Nevertheless, the widespread, ongoing longwall-mine subsidence damage to streams, wetlands, groundwater, and other natural resources has generally been ignored by the Pennsylvania DEP (Schmid & Company, Inc., 2000, 2010b, 2011, 2015).

The workgroup that drafted the 1994 Act 54 amendments explained the proposed reporting and analysis requirements thus:

> *It was also felt that additional knowledge about the long-term impact of full extraction mining on water resources is desirable* ***to make public policy choices*** *with confidence. Therefore, to enhance our state of knowledge and* ***better assess the long term impacts*** *of underground mining on the Commonwealth's water resources (as well as on the subsidence of surface features and structures), obligations are imposed on the Department of Environmental Resources to more* ***comprehensively compile and analyze data*** *being generated by mining activity in Pennsylvania.*[4] *[bold added]*

As noted, Act 54 of 1994 directed the General Assembly to have the Department record and analyze the impacts of the intentionally destructive longwall mining technology previously prohibited in the Commonwealth.

The Department's six reports, produced to date at five-year intervals, have many limitations and shortcomings that have repeatedly been pointed out to the Department by the public and the Citizens Advisory Council. The reports have resulted in virtually no legislative or regulatory changes over the past three decades and have made minimal efforts to predict, avoid, or minimize damage caused by immense longwall mines. Nevertheless, with the possible exception of the 1st and 6th five-year reports, the Act 54 reports and the literature critically reviewing them provide an extraordinarily detailed and informative documentation of the ongoing longwall mining damage to landowners and to resources in Washington and Greene Counties --- documentation without equal elsewhere in the United States where longwall coal mining is conducted.

Meanwhile, the Department and the mining industry have significantly reduced surface impacts from the relatively small room-and-pillar mines in Pennsylvania (at least through the 6th Report period) and from mines that use pillar removal to increase coal extraction. The wastewater discharged from current coal mines no longer destroys miles of streams because the acid is treated continuously, as required by the Clean Streams Law. But the Department has never come to grips with regulating the surface impacts of longwall mining, and the industry has had no incentive to avoid or minimize the resulting damage.

The Mining Program, however, did take steps to address subsidence impacts on streams when it issued its Technical Guidance Document (TGD) 563-2000-655 (PADEP 2005), titled "Surface Water Protection --- Underground Bituminous Coal Mining Operations."

The intent was to provide mine operators and the DEP California District Mining Office with guidance on how to take action to prevent subsidence-caused stream pooling and stream flow loss from polluting carefully inventoried streams in violation of the Clean Streams Law. Because longwall mining results in "planned and controlled subsidence," mine operators claim to have sufficient advance notice to know where stream pooling will occur and the time needed to take necessary action to prevent damage (typically by obtaining access over the land surface and a

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[4] Beauduy, Thomas W., Esq. 1990. Deep mine mediation project, consensus proposal, March 18, 1990. 22 p.

Dam Safety and Encroachment Permit from the Department so the mining company can promptly cut the gate impoundment to alleviate the stream pooling that otherwise will result in sediment accumulation and temperature increases that kill the aquatic community living in the stream and constitute pollution prohibited by the Clean Streams Law).

The same goes for stream flow loss. Over the past decades, the Department and the industry have learned to more accurately predict where stream flow loss is likely. If predictions of pooling or flow loss are not used to prevent stream damage, longwall mining should be prohibited beneath or near waterways. There is plenty of coal that can be mined using methods other than longwall mining to meet America's energy needs without destroying its water resources.

Unfortunately, impacts to structures, streams, and wetlands in Pennsylvania continue unimpeded by regulatory constraints. Repairs to coalfield structures and water supplies are rare; documented restoration of streams and wetlands is scarce. Longwall mining is expected to continue in the Pittsburgh coal seam for the next 40 years, despite the dwindling use of coal, a trend that has already led to the closure of many room-and-pillar mines in Pennsylvania.

Act 54 established a detailed process for surface landowners to seek and obtain restoration for damage to their structures and water supplies caused by underground coal mining. However, surface landowners too often cannot rely on that process to protect their interests. The wording of Act 54 may sound protective, but coal operators (who largely drafted the legislation) understand its limitations and know how to evade responsibility. Act 54 allowed for "voluntary agreements" between landowners and mine operators, and these agreements were intended to be open, reviewable by DEP or others, and recordable on the property deed.

A non-disclosure agreement (NDA), although not illegal per se, establishes a confidential relationship between two or more parties, specifies which information must remain confidential, and restricts how that information can be used or disclosed.

NDAs were neither envisioned nor incorporated into the language or intent of Act 54, yet they remain the most common method used to "address" longwall mining damages. A fundamental objective of Act 54 was to ensure that subsidence damages were repaired, and the Department has an obligation to determine over time whether Act 54 is working as intended.

Without compromising confidentiality, the Department should be able to track the outcomes of all mine damage settlements to determine how many ultimately resulted in the repair of the damage and how many did not. The widespread use of NDAs provides no way to know whether a damaged home, property, or water supply was ever repaired. In that way, NDAs circumvent, or one might say *undermine*, the basic protections afforded by Act 54.

REVIEW OF THE 6TH ACT 54 REPORT

This review follows the basic outline of the DEP's 6th Act 54 Report, with specific section headings from the 6th Report shown in red. General comments that pertain to more than one section then follow the specific comments.

Executive Summary *and* ***Introduction***

The timeframe for the 6th Act 54 period is calendar years 2018 through 2022. This is a major change from all previous 5-year Act 54 reports. Report periods had begun on August 21st of the first year and ended on August 20th of the fifth year (August 21st, the date in 1994 when the Act 54 amendments became effective). As a result of this change, there is an overlap of nearly eight months between the data identified and reviewed for the 5th and 6th reporting periods. The discussions in the 6th Act 54 Report and the comparisons it makes between the 5th and 6th assessment periods do not acknowledge or take into account that overlap.

The overlap spans 235 days in 2018 (1 January through 20 August) and is included in both the 5th and 6th reporting periods. That 7.65-month overlap accounts for almost 13% of the time in each 5-year period. In some instances, this overlap can be significant: for example, the Department reportedly received 93 structure damage claims during the overlapping period, which were counted and evaluated in both the 5th and 6th periods. Those 93 structure claims (all characterized the same in both periods in terms of the type of damage) represent 20% of all structure claims listed for the 6th period and 24% of the structure claims reported for the 5th period.

All of the maps in Appendix A of the 6th Report identify the "mined extent during the 6th period" as well as (collectively) the "mined extents prior to the 6th period". However, none of the maps identify where the overlap between the 6th and 5th periods occurs, which could easily have been shown on the maps and would have graphically identified the extent of damages in the overlap area. This is a major omission for understanding the location and extent of damages in either period.

Another problem with the new timeframe used for the 6th Act 54 Report is that impacts that occurred near the end of 2017 but were not *reported* to DEP until early 2018 are included. In fact, those impacts occurred before the start of the 6th period, but because of how DEP assembles the data, they are counted in the 6th Report. Likewise, on the back end of the period, impacts that occurred in late 2022 but were *not reported* to DEP until early 2023 are not included in the 6th Report, even though they occurred within the stated 6th (2018-2022) period.

The Department could have allocated data accurately to its report time frames, but instead chose to provide overlapping data, undermining any accurate interpretation of trends.

One reason offered for the new Act 54 Report format was that the previous 5-year reports did not provide up-to-date information. The data in this 6th Act 54 Report terminate at the end of December 2022, yet the report itself was not made available until more than 2 years later (on 14 February 2025). It is unclear how the "new" format provides more timely information than the prior August-to-August timeframe. DEP had ample time to correct such errors before the 6th Report's release.

Another reason offered for the new Act 54 Report format was to follow Act 54's directives more closely. *"After five reports, the Department's Bureau of Mining Programs decided to focus the sixth report on the data and conclusions related to the effects of deep mining and subsidence on surface structures and features, as well as water resources."* [page 8] While that sounds good (inasmuch as it simply repeats part of a directive of Act 54), the result falls far short and largely ignores another important legislative directive: "analysis." [5] Aside from some raw data, the 6th Report provides little information and no meaningful analysis regarding the effects of underground mining on the communities and resources of southwestern Pennsylvania. This is discussed more fully in the "General Comments" section below.

Another major difference between the 6th Act 54 Report and the four preceding ones is that the Department chose not to use independent outside expertise in preparing the 6th Report. The 1st Act 54 Report had been prepared internally by the Department, but it was widely viewed as providing a paucity of actual data and conducting no meaningful analyses of impacts, even after the Department issued a supplement.

Presumably seeking to do a more thorough job the next time and to comply with the explicit Act 54 directive to use "*the services of professionals or institutions recognized in the field*," the Department contracted with researchers at the California University of Pennsylvania to prepare the 2nd Act 54 Report. That second report provided much more relevant data and more robust analyses than the 1st report. The 3rd through 5th Act 54 reports were likewise prepared for the Department by University researchers, this time at the University of Pittsburgh, and again, those Reports were informative and analytical.

The 6th Report was prepared internally by Department staff from the California District Mining Office and the Bureau of Mining Programs.

Reportedly, staff from the federal Office of Surface Mining Reclamation and Enforcement provided *"assistance with data review."* However, unlike prior Act 54 Reports, the 6th Report does not identify any of its primary authors (whether DEP or OSMRE), nor does it disclose their areas of expertise or qualifications. The 6th Report (page 7) states only that *"[t]his review*

[5] Section 18.1. of Act 54 states, in part: "(b) Such **data shall be analyzed** by the department, utilizing the services of professionals or institutions recognized in the field, for the purpose of determining, to the extent possible, the effects of deep mining on subsidence of surface structures and features and on water resources, including sources of public and private water supplies." [boldface added]

is done with assistance from professionals with appropriate expertise." That lack of transparency obscures a serious lack of professionalism in this report's presentation.

OSMRE has long provided oversight and financial support to the Department for its programs regulating the surface impacts of coal mining in the Commonwealth. Traditionally, OSMRE paid **half** the cost of producing the DEP's five-year Act 54 Reports. For the 6th Report, OSMRE provided technical review rather than financial support for outside professionals. As stated on page 9 of the 6th Report, OSMRE attended *"regular meetings"* with the Department *"to discuss data collection, analysis, and various aspects of the scope"* of the report. OSMRE is also said to have provided *"peer review"* of the draft.

The substance of the assistance provided by OSMRE is not stated in the 6th Report, so Schmid & Company, Inc., submitted a Right-to-Know Law (RTKL) request for copies of any meeting records or correspondence between DEP and OSMRE. Based on the RTKL response, we now know that a draft of the 6th Report, dated March 2023, was emailed by Sharon Hill (DEP) to Rock Martin (OSMRE) and to DEP Mining Program staff (Greg Shuler, Dan Sammarco, and Nathan Houtz) on 3/29/23 for review and editing.

Comments and edits were made over the subsequent four months by Arielle Avishai (Physical Scientist/GIS, OSMRE) on 5/24, 6/6, 6/7, and 6/8; by Rock Martin (Branch Chief of Water, Geological and Geospatial Branch, Technical Support Division, OSMRE) on 5/23, 5/24, 5/30, 6/13, 6/14, 6/20, 6/21, 6/22, 6/26, and 6/29); and by Brian Dailey (Ecologist, OSMRE) on 5/30, 6/27, and 6/28.

Comments and edits were also provided by the following at DEP: Alexandra Eberly (Mining Programs) on 7/7, 7/10, 7/11, 7/12, and 7/14; Greg Shuler on 6/23 and 6/26; and Sharon Hill on 6/27. By mid-July 2023, it appears that all comments and edits by DEP and OSMRE had been made.

By July 2023, only the Findings (6 pages ultimately) and Recommendations (2 pages ultimately) sections remained to be drafted. OSMRE (Rock Martin) offered numerous thoughtful edits and comments on the draft report in May and June 2023. One notable comment, which appears to have been ignored altogether, was made on June 22, 2023, alongside the as-yet unwritten "Findings" section near the end of the report:

> *I think there are 3 primary ways to analyze the data in this report: 1. A comparison of data from previous reporting periods. This could identify any trends or changing patterns, which could lead to further analysis. 2. A discussion of what PADEP's expectations are, and if the data in this report meets those expectations. This also could then lead to further analysis of why or why not. This would essentially be a discussion of what PADEP feels would constitute a successful regulatory program function. 3. Focusing on analyzing specific details of each dataset. For example, for stream flow loss, looking at the location and timing of flow loss vs. the location and timing of mining. This could also include an analysis of how the remedial actions identified in previous reports are faring. Additionally, there could be a discussion regarding how PADEP interprets the first 5 Act 54 Reports and has this resulted in any programmatic changes. Along those lines, what gaps can be identified from reviewing the data in this report that can be addressed for future reporting.*

As the final report shows, none of these suggestions for analysis were implemented. These comments overlap with those in the CAC review of the 5th five-year Act 54 Report. The writers of the 6th Report simply chose to forgo meaningful analysis.

Active Mining

Table 1 in the 6th Report (page 11) identifies 31 active mines in Pennsylvania, primarily located in the Commonwealth (28) or in West Virginia (3). The Report's Executive Summary (page 5) also states that 31 mines were active during the 2018-2022 period and notes that this represents a decrease from the 49 mines active during the 5th period. Table 2a (incorrectly labeled Table 1a) in the 6th Report (page 13) also lists 31 mines that reportedly were active during the 6th period.

However, Table 3 on page 18 (incorrectly labeled Table 2) lists 33 mines and the acreage mined for each during the 6th period. Table 3 also refers to Appendix A, which provides a series of maps for each of the 33 mines.

The discrepancy in the number of active mines (31 or 33) is not addressed in the Report. The Appendix A maps of 33 active mines include one room-and-pillar mine (Cass No. 1), which is listed in Table 2b as *inactive*; yet according to Table 3, Cass No. 1 Mine undermined 92 acres during the period. Another room-and-pillar mine (Polaris), mapped in Appendix A and listed in Table 3, reportedly mined 2 acres during the 6th period. It is not listed among the active mines (Table 2a) or the inactive mines (Table 2b), nor is it mentioned elsewhere in the 6th Report. Such careless reporting errors and calculations should have been avoided or removed from the final Report.

Of the 31 (or 33) underground bituminous coal mines active at some point during the 6th Act 54 period, 7 were longwall mines, 23 (or 25) were traditional room-and-pillar (R&P) mines, and 1 was a room-and-pillar mine with pillar recovery (PR).[6] The 31 (or 33) active mines during the 6th period represent a sharp reduction (37%, or 33%) from the 49 mines active during the 5th Act 54 period (August 2013 to August 2018), driven by declines in the number of room-and-pillar mines (from 37 to 23 [or 25]) and pillar recovery mines (from 5 to 1). The number of longwall mines (7) remained unchanged from the 5th to the 6th period.

The total land surface acreage undermined during the 6th period did not change as much as the total number of mines, decreasing by 12%, from 28,854 acres in the 5th period to 25,366 acres in the 6th period. The acreage undermined by pillar recovery mining declined dramatically, from 2,494 acres to 26 acres.

[6] Pillar recovery and longwall are both regarded as “high-extraction” or “full-extraction” underground mining methods.

The acreage undermined by longwall mines declined slightly, from 17,873 acres to 16,493 acres. The acreage undermined by room-and-pillar mines *increased* slightly (from 8,487 acres to 8,847 acres), despite a significant *decrease* in the number of room-and-pillar mines.

TABLE 1. Number of mines and acreage undermined, by type, during each of the last four 5-year assessment periods (20 years). Data presented below for the 3rd through 5th periods were not mentioned in the 6th Report, except for the number of mines in the 5th. (3rd = 2003-2008, 4th = 2008-2013, 5th = 2013-2018, 6th = 2018-2022)

NUMBER OF MINES Active During Period
ACT 54 FIVE-YEAR ASSESSMENT PERIOD

Mine Type	3rd	4th	5th	6th
Longwall	8	5	7	**7**
R&P*	36	34	37	**23**
PR**	6	7	5	**1**
Total	50	46	49	**31**

SURFACE ACRES Undermined During Period
ACT 54 FIVE-YEAR ASSESSMENT PERIOD

Mine Type	3rd	4th	5th	6th
Longwall	24,607	17,005	17,873	**16,493**
R&P*	11,582	12,353	8,487	**8,847**
PR**	2,067	1,985	2,494	**26**
Total	38,256	31,343	28,854	**25,366**

* R&P = traditional room-and-pillar mine
** PR = room-and-pillar mine with pillar removal ("full retreat" mining)

Totals for the number of mines and the acreage undermined are compared in our **Table 1** for the 3rd through 6th Act 54 periods. Table 1 uses data provided by DEP in the 6th Act 54 Report and does not correct for duplication between the 5th and 6th periods or resolve ambiguous numbers.

The Department's 6th Report sometimes provides comparisons with data from the 5th Report, but it does not provide any information from or comparisons with any earlier Act 54 reports.[7]

[7] Any data for Act 54 periods prior to the 5th discussed herein is information we are providing (based on DEP's previous Act 54 Reports) in order to better illustrate trends over time and compare the most recent 5-year period with prior periods, something the Department failed to do in the 6th Report. We largely incorporate data from the 3rd and 4th Act 54 periods (and also the 5th where the Department chose not to) because the 3rd through 5th Act 54 Reports were prepared for the Department by researchers at the University of Pittsburgh and tend to include similar data in comparable formats. The 2nd Act 54 Report was prepared for the Department by researchers at a different institution (California University of Pennsylvania).

Bituminous Underground Mine Information System (BUMIS) Data Reporting

BUMIS is an antiquated system built in Java in the 1990s and has not been updated since. It continues to be used by the PADEP Bureau of Mining Programs to track limited information on underground coal mining impacts and their resolutions. The primary underground mine impacts tracked in BUMIS are those affecting land, structures, and water supplies (divided between water loss and water contamination). BUMIS also tracks mining-related impacts to utilities and to methane releases; these are few in number. Stream and wetland impacts associated with mining are not tracked in BUMIS but are compiled from other sources available to the Department, including permit applications, monitoring reports, "shadow inspector" reports, and enforcement files. Detailed map data from mining permit applications are not included in BUMIS.

Since the end of 2020, the PADEP Bureau of Mining Programs has periodically posted and updated Act 54 Yearly Data on its website, beginning with 2018 data. These *Yearly Data*, largely excerpted from BUMIS records, provide limited information on ongoing impacts to structures, water supplies, land, and related resources from underground coal mining operations after the publication of the 5th Act 54 Report.

These *Yearly Data* updates, in general, are not comparable to the much more extensive underground coal mining data analyzed and made publicly available over the preceding 20+ years in the Department's 5-Year Act 54 Reports. Notably, the *Yearly Data* provide no information on efforts undertaken to repair, restore, or otherwise mitigate the impacts of underground mining on structures, water resources, or other features. The *Yearly Data* also do not track whether or to what extent any mine-responsible impacts were predicted.

Furthermore, the *Yearly Data* are not being updated in a timely manner: as of mid-September 2025, the most recent structure damage entry was dated 30 April 2024.

The Department ostensibly seeks public input on the *Yearly Data* posted on its website (a note states that *"Comments or suggestions can be sent to RA-EPMININGPERMITS@pa.gov").* In May 2021, on behalf of the Citizens Coal Council, Schmid & Company, Inc., submitted 15 pages of detailed comments on what the Department had posted to that date (by impact category), how those data were presented, and what additional information would be needed to make them more usable and understandable to the general public. We sent comments to the provided email address and directly to the Bureau of Mining Programs (Schmid & Company, Inc. 2021b). We never received any response to those comments.

Seven months later, we reviewed the posted data again to determine whether any of our comments had been incorporated (a few had, most had not) and to make further suggestions for improvement (Schmid & Company, Inc., 2021c). Regarding the first, we received no acknowledgment or response to our second set of comments. Those comments are provided in Appendices A and B to this document. The Department appears to have largely ignored

critical, common-sense suggestions from the public regarding the *Yearly Data,* which, had they been adopted, could have greatly improved its 6th Report.

The Department has largely extracted and incorporated data from the *Yearly Data* table into its 6th Act 54 Report. Our primary concerns with both the *Yearly Data* and the tables in the 6th Act 54 Report are the lack of context in the raw data and the lack of analysis of impacts by mining type, impact resolutions, and trends.

Several specific issues associated with the *Yearly Data* incorporated into the 6th Report are summarized below.

- Each table begins with a column labeled "Problem ID." This number, as presented, is of no use to the reader. As noted elsewhere in this review, it would be immensely helpful if this number were added to the individual mine maps in the 6th Report's Appendix A so the reader could visually locate each damage incident.[8]

- Typically, there are three separate date columns: "Date Occurred," "Date Company Received," and "Date DEP Received." There is also a fourth column, "Date Final" or "resolution," as perceived by the Department. The most informative pair is "Date Occurred" and "Date Final," which represent the time elapsed from when the mining damage occurred to when a final resolution was reached; in other words, how long it took to resolve each underground mining impact.

  The Department, however, focuses primarily on the period between "Date DEP Received" and "Date Final." For internal management purposes, this makes sense because it is the only time period over which DEP has any control. (The 6th Report notes that "Date Occurred" is sometimes an estimate or guess and is not always exact.)

  However, for public policy purposes, as well as to comport with the intended purposes of Act 54, the Department should attempt to identify how long mine-related damages to landowners and public resources take to be resolved, whether resolution times vary by type of impact or by type or depth of mining, and whether those factors have changed (improved or worsened) over time.

- There are prescribed time periods between when a mine operator learns of an incident and when it must notify DEP. For land damage, the period is 10 days. For water supply losses, it is 24 hours. Although these limits are often met, the tables show that is not always the case. For example, in Land Damage Problem 5937, the operator (Harvey Mine) learned of the damage the same day it occurred (3/21/2018) but did not notify DEP until 7 months later (10/22/2018). An unspecified "agreement" was reported as the resolution of this mine-liable issue.

[8] OSMRE reviewer Rock Martin (5/23/23) had a similar comment: "*The maps in Appendix A list only the mine names, no numbers that can be correlated to the numbers in the "Key" columns of Tables 1 and 2.*" to which Greg Shuler (PADEP, 6/23/23) said: "*I will have Alex look into matching the Key to the correct map*". This apparently was not done.

For Water Loss Problem 6272, the operator (Harvey Mine) learned of the damage on 2/4/2020 but did not notify DEP until 2/26/2020; an unspecified "agreement" reached on 1/29/2021 was reported as the resolution of this mine-liable issue. It is unclear whether failing to meet the prescribed time limit for reporting a problem to DEP is penalized, but we have never heard that it is. Again, to help inform public policy decision-making, deviations, particularly large ones, from the prescribed time frame for reporting damages should, at a minimum, be noted in the Act 54 Report or highlighted in the tables, but they are not (presumably because the Mining Program is unaware of or unconcerned with those "requirements").

It is instructive to note how much time elapses between a damage incident and when the mine operator receives notice of it. Often, the mine operator receives notice on the same day or very shortly after the incident occurs. Sometimes, however, it can be a very long time, as in Land Damage Problem 5809, where it was more than two years before the mine operator was informed of the claimed damage (1/1/2016 to 3/14/2018). In that case, the damage was determined not to be related to mining (in the absence of better data, it seems reasonable to expect that the longer the time between the occurrence of an impact and its being reported by the landowner, the greater the likelihood that the impact will be determined not to be mine-related).

- As noted above, damage claims determined to be "not related to mining" can be recorded, perhaps separately, but they should not be included in the tables, statistics, or discussions of mine-liable incidents, as doing so tends to dilute the findings and conclusions. For example, if there were 100 damage claims in a particular category and 40 were ultimately determined *not* to be related to mining, the focus of the Act 54 analysis should be on the 60 mine-related claims.

  If 15 of the 60 mine-liable damages were resolved by property purchase, that would represent 25%. However, if all 100 claims are counted, it would suggest that only 15% were resolved by property purchase (as noted elsewhere in this review, "resolved" is not a positive outcome if the damaged structure or water supply is not repaired but simply removed from service and the diminished land value is subsequently deleted from the local tax base).

- Some columns that were once part of the online *Yearly Data* tables have now been removed and are not included in the 6th Report. For example, many of the tables (for land damage, structure damage, water loss, water contamination, utilities) posted online as of March 2022 reported the "mining depth" associated with each incident, as well as the (horizontal) "distance to the nearest mining." These were critically relevant technical data, apparently collected in BUMIS and may still be.

  These data are essential for any analysis of possible correlations between reported damages and distance (vertical and horizontal) to mining. The reasons for removing those

data from the tables and for not using them in in-depth analyses in the 6th Report are not stated or explained.

Previous Act 54 reports have questioned the accuracy of prescribed distances for presumed impact (such as the RPZ or other buffers – as discussed below) and recommended further investigation of those assumptions, but the 6th report does not address those distances or assumptions at all. Clearly, the preparers of the 6th report were not interested in understanding the various factors associated with underground coal mining damage and instead focused on cutting back discussion of key issues.

- Another data set that once populated many of the tables in the online *Yearly Data* included a column indicating whether the incident was determined to be "mine-liable" (A=yes, B=no). Unresolved cases were presumed to be mine-liable until determined otherwise. This presumption is clear in the *Yearly Data's yes/no column* but becomes unclear in the 6th Report, which lacks that column.

  While the 6th Report notes under "Resolution" that an incident was determined to be "not due to mining," other categories also appear to indicate no mine liability (such as "Damage not covered by BMSLCA," "Damage claim form not returned to CDMO," "No actual problem," or "Withdrawn"). The yes/no column was an efficient way for a reader to see what DEP had determined regarding liability.

  Again, as mentioned above, incidents that are determined not to be mining-related should **not** be included in the Act 54 analyses, which are focused on "effects of underground mining".

Damage Claims – Land, Structures, Water Supplies

One fundamental failing of the 6th Report, as with previous Act 54 Reports, is that total damage claims are highlighted rather than mine-liable claims. In one sense, it is useful to know the total claims because some claims will be unresolved at the end of a period, and no determination of liability will yet have been made for those. However, including claims that have been determined not to be mine-liable has the effect of diluting or distorting any understanding of the actual adverse effects of subsidence from mines.

Once the unresolved claims are separated out, what remains are claims determined to be either mine-liable or unrelated to mining. If a claim is accurately determined to be unrelated to mining, there should be no further discussion or accounting for it, because it is irrelevant to the analysis of underground coal mining impacts.

All meaningful statistics and comparisons should be based solely on damages determined to be related to underground coal mining. However, the report states, "*For this report, the Department has not focused on 'company liability'*" (page 20). Why not? Company liability was

tracked and discussed in previous Act 54 reports and is highly significant to owners of damaged surface lands. That the Department would choose not to focus on mine company liability in the 6th Report, when five-year Act 54 reports are meant to explore the effects of underground mining, is inexplicable.

The Department does not state whether any of its liability determinations have been successfully challenged by mine operators or landowners.

The number of reported mine-liable impacts (to structures, water supplies, and land) generally decreased from the 3rd Act 54 period to the 5th (our **Table 2)**, falling from more than 600 total impacts in both the 3rd and 4th periods to 486 in the 5th. Yet from the 5th to the 6th periods, the total number of mine-liable impacts rose from 486 to 711, a significant *increase* of 46%, despite a *decrease* in both the total number of mines and the total acreage mined from the 5th to the 6th period.

TABLE 2. Number of mine-liable impacts (to land, structures, and water supplies, combined) from active mines during each of the last four 5-year assessment periods (20 years), by type of mining. Data presented below for 3rd and 4th periods were not included in 6th Report.

NUMBER OF MINE-LIABLE IMPACTS**
ACT 54 FIVE-YEAR ASSESSMENT PERIOD

Mine Type	3rd	4th	5th	6th
Longwall	509	476	450	**504**
R&P	86	158	30	**206**
PR	10	13	6	**1**
Total	605	647	486	**711**

** Land + Structures + Water Supplies
(3rd = 2003-2008, 4th = 2008-2013, 5th = 2013-2018, 6th = 2018-2022)

Almost all of the increase in damages is linked to room-and-pillar mining, which rose from 30 to 206 impacts. These statistics and trends are not discussed in the 6th report, yet they are exactly the type of analyses that belong in an Act 54 report if the goal is to understand mining impacts and trends and to inform public policy choices. Clearly, the lands above Pennsylvania coal mines remain a sacrifice zone where impacts from underground mining are frequent but largely unexamined.

Upon closer inspection, some of the data in the tables of the 6th Report simply do not make sense. For example, in Water Loss claim #5745, the mining company reportedly received notice of the issue (a dry well) on 26 December 2017, and DEP received notice of it on 8 January 2018 (13 days later, notably less timely than the 24 hours allowed). But the oddest thing about this claim is that the damage reportedly occurred 13 days *after* the mining company was notified (1/8/2018). Perhaps those two dates were transposed, but there are

numerous other instances where the incident reportedly occurred *after* it was reported to either the operator or DEP.

This sloppiness was not caught in any review of the data and suggests that the regulatory 24-hour reporting "requirement" is not closely scrutinized by the Department.

Another example is on page 124 in the Findings section of the 6th Report which states:

> *Of the total reported water loss reported effects in the 6th period, 272 were found to be "company liable" upon resolution, compared to the 5th assessment reported claims of 232 "company liable". This shows an increase of 40 company liable reported claims for this 6th assessment period.*

There are many errors in just these 2 sentences. First, the number 272 refers to both water loss and water contamination, not just water loss claims as stated. Also, the 272 number does not represent only resolved claims because it includes 119 listed as "unresolved." The number 232 for 5th-period company-liable claims does not match the 191 such claims listed in the table on page 124. If the 191 number is correct, the actual increase from the 5th to the 6th period is 81 claims (not 40), representing a 42% increase (all due to room-and-pillar mines), a very significant change that is not acknowledged or further analyzed.

As noted above, Act 54 reversed a prohibition on structural damage that had been imposed on underground coal mining in Pennsylvania since 1966 by the original underground mining law (BMSLCA). In doing so, Act 54 established formal requirements to repair homes, other structures, and water supplies damaged by subsidence, whether intentional or unintentional. The public was led to believe that Act 54 implemented a *"you break it --- you fix it"*[9] approach to subsidence damages. The 6th Report, like previous ones, identifies several categories of impact resolution, and "repair" is among them. However, documented repair or replacement of such damage is rare.

The summary tables in each impact category section of the 6th Report are difficult to reconcile with the more detailed tables that follow and with the tables in the "Findings" section (pages 122 to 127). For example, the Land Damages summary table on page 22 identifies a total of 106 claims, which matches the 106 claims listed in the detailed Table 4 (pages 23 to 27). But the summary table notes that 82 of the 106 claims have been found to be "company action required" (which is not the same as company-liable), while the remaining 24 are not "company action required" (determined either "to be not due to underground mining" [16] or "claim form not returned to CalDMO" [8]). However, the 82 apparently include 18 unresolved cases (16 listed as "unresolved" and 2 others left blank), any or all of which may ultimately be determined to be not mine-related. In reality, if the 18 unresolved cases are subtracted from the 82, there are only 64

[9] "*The act …. put in place a '*you break it, you fix it*' rule for many types of structures that could be damaged by deep mining…*" explained PADEP Secretary James Seif in his June 1999 letter transmitting the first Act 54 Five-Year Assessment to Governor Tom Ridge, the General Assembly, the Citizens Advisory Council, and the Environmental Quality Board.

documented company-liable land damage claims that have been determined to be mine-related and for which some resolution has been reached. That is the more informative number.

As shown in our **Table 3**, a high percentage of total damage claims was unrelated to underground coal mining during the 6th period, consistent with prior Act 54 periods. More than half of water contamination claims were determined to be not mine-related, as were about one-third of water supply losses and 15% each of structure and land damage claims.

Claims determined to be unrelated to underground mining should be noted and excluded from further consideration or analysis. Similarly, unresolved claims should be noted and excluded from further analysis.

The last column in Table 3 shows the total number of claims, reduced by claims found not to be mine-related and those that remain unresolved. The remainder, mine-related damages that have been resolved, accounts for less than half of the total claims (475 of 1,007, or 47%). Final resolutions for mine-related damage claims are lowest for water contamination (27% of total claims) and water loss (38%), and slightly better for structure damage claims (57%) and land damage claims (60%).

TABLE 3. Status of damage claims reported during the 6th Act 54 Period (2018-2022).

Category	Total Claims	Not Mine-Related*		Unresolved**		Resolved Mine-Related	
Structures	455	66	(15%)	129	(28%)	260	(57%)
Water Loss	273	86	(32%)	83	(30%)	104	(38%)
Water Contamination	173	90	(52%)	36	(21%)	47	(27%)
Land	106	16	(15%)	26	(25%)	64	(60%)
TOTAL	**1,007**	**258**	**(26%)**	**274**	**(27%)**	**475**	**(47%)**

* includes "no liability", "withdrawn", "not covered by BMSCLA", "referred to another Division"
** includes "claim form not returned to DEP", "owner did not respond", or a blank

Damage Claim Resolutions

More important than *whether* a damage claim has been *resolved* is the nature of the resolution. The various types of "resolution" reported in the 6th Report Tables are not always clear, and the text does not explain them. Pages 20-21 of the 6th Report mention "typical" types of final resolution, which include:

- Agreement (unspecified or pre-mining)
- Company purchase of damaged property
- Damage claim forms not returned.

It is notable that "Repaired" is not listed as a "typical" final resolution, even though it appears in the Resolution column of the Tables where appropriate.

Our **Table 4** presents the resolution categories for "resolved mine-related claims" within each damage category. These data provide the most relevant and informative information for assessing how damages from underground coal mining during the 6th period were resolved. One might expect, given the intent of Act 54, that "repair" would be the largest category of impact resolution. In fact, that is not the case.

TABLE 4. Type of resolution for mine-related claims settled during the 6th Act 54 Period (2018-2022). Note that "Repair" represents the smallest category of resolution.

Resolved Category	Mine-Related Claims	Repair		Property Purchase		Agreement		Other/ Misc.**
Structures	260	4	(1.5%)	53	(20%)	194	(75%)	9
Water Loss	104	9*	(9%)	6	(6%)	70	(67%)	19
Water Contamination	47	3*	(6%)	2	(4%)	28	(60%)	14
Land	64	18	(28%)	13	(20%)	30	(47%)	3
TOTAL	**475**	**34**	**(7%)**	**74**	**(16%)**	**322**	**(68%)**	**45 (9%)**

* 2 others listed as "recovered" and 7 others listed as "permanent supply" (added to the Misc. column).
** Other/Misc. includes "resolved", "property abandoned", "no current use", "MSI".

Of the 475 resolved "company-liable" damage claims overall (for structures, water loss, water contamination, and land), only 34 (7%) were listed as "repaired." Of the 260 resolved structure damage claims, only 4 (1.5%) were "repaired," the lowest proportion of any group.

Of 47 resolved water contamination damages, only 3 are listed as “repaired”, 2 as “recovered”, and 2 as “permanent supply”, for a total of 7 positive outcomes (15%). Of 104 resolved water supply loss damages that were “company-liable”, only 9 are listed as “repaired”, 2 as “recovered”, and 7 as “permanent supply”, for a total of 18 positive outcomes (17%). For land damages, only 18 of 64 resolved company-liable claims were “repaired” (28%).

Similarly, during the 5th period, 486 company-liable damages to structures, water supplies, and land were documented, and only 37 (7.6%) were recorded as repaired or recovered. The 6th Report does not provide these statistics or analyze the trend from the 5th to the 6th period, yet we believe this information would be important and relevant. Thus, we derived these results by reviewing the Department’s reported numbers. The 6th Report likewise does not analyze the extent to which recorded damages are overwhelmingly related to longwall mines rather than room-and-pillar or retreat mines (although that is apparent from the summary tables).

The 6th Act 54 Report provides no discussion of the time that elapses before damages are repaired or otherwise “resolved,” nor does it address whether the times to resolution are increasing or decreasing. Likewise, there are no comparisons by resolution type, even though such comparisons were important considerations discussed in the 5th and earlier Act 54 Reports.

Perhaps the authors of the 6th Report were unaware of the Department’s prior reports or regarded them as uninformative.

After listing the various types of resolutions, the 6th Report fails to disaggregate each impact type (structures, land, etc.) by resolution type to determine which resolutions are most common or whether there are differences by mine type (longwall vs. room-and-pillar) or by impact type (structure, land, water supply). These analyses were conducted in previous Act 54 reports, and this information would be essential to inform policymaking going forward.

This is another step backward in the 6th Report, which was apparently ignored or approved by any Department managers responsible for its preparation.

Some resolutions are clearly positive, such as repairing a damaged structure or providing a permanent replacement water supply. Other resolution categories are more difficult to evaluate. One is “MSI,” which refers to Mine Subsidence Insurance. The MSI Program will take a case if the damage is caused by an abandoned mine and the landowner had an MSI policy in force at the time of the damage. There were 5 instances of structural damage associated with Maple Creek Mine and 1 associated with Emerald Mine that occurred during the 5th Act 54 period and were listed as MSI resolutions in the 6th Report.

The outcome of a case transferred to the MSI Program remains uncertain because the landowner must prove a direct link between the damage and the abandoned mine, and past experience shows that MSI payouts are very rare.

“Property Purchase” is another resolution that is not necessarily positive. Purchase of damaged property accounts for 74, or 16%, of the 475 mine-related claims resolved overall (our Table 4).

An operator's purchase of damaged property is not a positive outcome if the damage is not repaired. In most cases where damage occurs (or is about to occur), the mine operator determines it is cheaper to buy the damaged (or about-to-be-damaged) property and abandon it or tear it down rather than make the necessary repairs.

When this happens frequently, it harms community cohesion and reduces the local tax base.

By far the largest resolution category (more than two-thirds---68%---overall, and 75% for structural damage) is "Agreement". In the vast majority of cases, the Agreement is "unspecified" (most likely an NDA). The actual outcome is unknown when an agreement is the resolution. The Department claims it cannot track the outcome of a claim when a private agreement is involved, particularly an NDA. Yet its field inspectors could readily note whether repairs were made to Department-acknowledged damages.

Failing to follow up to determine the ultimate outcome of agreements is a serious shortcoming in the Department's tracking of damage claims.

The second most common resolution for company-liable damages documented from underground mining during the 6th period was "property purchase" (representing 16%, per our Table 4). Department shadow inspectors should be able to determine whether any obvious repairs were made when a property purchase is the resolution, even if an NDA is involved.

Cumulative data on whether a shadow inspector observed repairs *could* be reported without breaching any individual confidentiality agreement, thereby allowing at least a credible estimate of the long-term damage to structures and resources caused by underground coal mining in Washington and Greene Counties. Unfortunately, for 83% of resolutions overall (agreements and mine company purchases of damaged properties), this 6th Act 54 Report fails to inform the public whether any damage was actually repaired.

By this failure, the Department again undermines the basic intent of Act 54.

The 6th Report Tables include a "Days to Resolution" column but offer no analyses, such as average time to resolution by resolution type, average time to resolution by mine type (longwall v. room-and-pillar), or a comparison of those averages for the 6th period with the 5th or other prior periods. These analyses have repeatedly been key components of prior Act 54 reports. This is yet another major step backward in the usefulness of the 6th Report from Department staff.

REBUTTABLE PRESUMPTION ZONE

The tables in the 6th Act 54 Report for Water Loss Claims (Table 6) and Water Contamination Claims (Table 7) each include a Rebuttable Presumption Zone (RPZ) column with entries of Y (yes) or N (no). Many claims outside the RPZ were determined by DEP to be "Not Due to

Underground Mining," as expected. As reported in 2021,[10] outside the RPZ, it becomes more difficult to assign liability to a mine operator because:

a) the damage is farther away from the locus of mining;

b) the mine operator was not required to conduct a pre-mining survey, so none exists unless the landowner took it upon herself to document pre-mining conditions; and most importantly

c) the burden of proof shifts from the coal operator to the landowner, and most landowners do not have the technical or financial resources to challenge and successfully pursue a mine operator.

Nevertheless, about 20 water loss/contamination claims outside the RPZ were determined by DEP to be mine-liable during the 6th Act 54 period. It is reasonable to assume that at least some others outside the RPZ that were "determined" **not** to be due to underground mining were actually mining-related, although they could not be documented under current requirements for a limited pre-mining resource inventory.

The 6th Report contains no discussion or analysis of the actual distance from the RPZ to any claims reported to be "outside" the RPZ. The 4th and 5th Act 54 Reports included extensive discussion of the RPZ's likely *undersizing* and of impacts both within and outside the RPZ, including impacts from individual mines. Maps associated with the 5th Report identified the RPZ for all relevant mines and all water supply impacts related to the RPZ.

The 4th Act 54 Report found that 50% of its mining-liable water supply damages occurred *outside* the prescribed 35° RPZ, including one case at a distance equivalent to an 85° angle of draw. The Excel spreadsheet *Yearly Data,* posted online by DEP as of March 2022, included a column identifying the distance from mining for each water loss incident and whether it was inside or outside the RPZ.

However, the 6th Report contained no such information or analyses, making comparisons with prior periods impossible. None of the mine maps in Appendix A of the 6th Report identifies the RPZ limits for any mine or indicates whether water supply incidents occurred within or outside the RPZ. Rebuttable presumption zones were addressed in Act 54 itself and clearly warrant analysis in each 5-year report. The Department's failure to analyze RPZs with respect to water supply damage prevents corrective legislative action and marks another serious step backward in the 6th Report.

The table on page 58 of the 6th Report identifies 160 (of 186) water loss claims within the RPZ for which "company action is required," and 12 (of 87) claims within the RPZ for which "no company action is required," for a total of 172. However, Table 6 of the 6th Report identifies 178 total water loss claims within the RPZ. This discrepancy is neither identified nor explained in the Report. One incident in Table 6, Problem ID #6504 ("total loss of well water," associated with Crooked Creek Mine), is listed as "U" under RPZ (not one of the listed Y/N choices, but possibly "unknown"); this case was unresolved as of the end of the period (the "U" in this case

[10] UNDERMINING TRUST: The COLLAPSE of Environmental Protection in Pennsylvania (Schmid & Company, Inc. 2021a)

would not mean unresolved, because the distance from mining, if known, is unrelated to whether the claim is resolved). Unfortunately, such internal discrepancies are not uncommon in the 6th Report.

Methane Damages

During the 6th period, there were reportedly 2 methane-related claims (6th Report Table 9). Both were complaints about methane in residential well water and reportedly occurred in late 2018. Given the small number of "methane" cases (only 2 in five years) and their focus on well water, it would be reasonable to include them in the water contamination category. Indeed, one incident (#6441) listed in Table 7 (Water Contamination Claims) occurred in late 2020 and was described as "*Methane gas smell in well, sink and faucet*". Another (#6451) is described as "*Gas smell in water well*". The difference between these two and the two incidents in Table 9 (Methane Claims) is not explained. Methane is an odorless gas, so mercaptan is added to commercial natural gas before retail distribution to enable the detection of leaks. How coal-mine methane could be smelled in well water is not explained.

One methane incident (#5951, associated with Bailey Mine) was resolved by an unspecified agreement after 370 days. The well in that incident was located nearly a mile (5,102 feet) from the nearest active mining (Panel 10L), though that is not mentioned in the Report [we determined that distance from the shapefiles Schmid & Company, Inc., obtained via a Right to Know Law (RTKL) request]. A structure damage claim (#5950) at the same location (again, nearly a mile from the nearest mining) also took 370 days to be resolved by an unspecified agreement.

The other reported methane incident (#5961, associated with Washington County Mine [formerly known as Mine 84]) was repaired after 282 days. It is unclear which nearby mine caused this December 2018 methane incident, because Washington County Mine is listed as inactive during the 6th period, and the panels nearest to it were mined between 1979 and 1987 (by Mine 84). This methane incident is not shown on any of the maps in Appendix A (presumably because those maps depict only mines that were active during the 6th period).

Without the shapefiles we obtained, incident #5961 would not have been located. Indeed, this incident is 9.8 miles from the nearest mine active during the 6th period, raising the question of whether it should be included in the statistics for this period. In previous Act 54 reports, incidents that occurred during the period but were related to mining in prior periods were discussed separately under "inactive mines". Not so in the 6th Report.

Streams

The 6th Act 54 Report's section on streams notes that underground mining can affect waterways through streambed heaving, flow loss, and pooling. It also states that these effects can result in *"habitat loss for aquatic and terrestrial fauna,"* which is "pollution" prohibited by the Pennsylvania Clean Streams Law. Although Table 10 documents specific lengths of stream "impacts," the Report contains no discussion of the extent of habitat loss for aquatic and terrestrial fauna. The authors of the 6th Report showed no interest in biological impacts. Nor does the Report mention any enforcement action taken to address the pollution of waterways caused by longwall mining-induced "planned and controlled subsidence."

The stream section of the 6th Report states that *"the Department ensures that underground mining activities are designed to protect and maintain the existing and designated uses of perennial and intermittent streams and to protect the functions and values of wetlands."* Yet neither the 6th Report nor any of the data compiled for streams in the context of Act 54 mentions the existing or designated uses of streams or the functions and values of wetlands.[11]

The 6th Report merely repeats regulatory language about what the Department is supposed to do but offers no evidence of stream protection or restoration in the face of many miles of documented stream impacts from ongoing underground (mainly longwall) mining.

Does the Department ever try to ensure *that "underground mining activities are designed to protect and maintain the existing and designated uses of perennial and intermittent streams and to protect the functions and values of wetlands"?* If so, where are the data?

Stream protection would be best accomplished by implementing measures (e.g., avoidance) *before* anticipated (i.e., predicted) intentional damage occurs.

The 6th Report states that if flow loss is predicted, flow augmentation should begin within 24 hours of the impact. If flow loss is not accurately predicted, *"which is typically the case"* (page 104), the operator has 15 days from the impact date to begin augmentation.

But the Department has no concern for the accuracy of stream-damage predictions – none of the listed stream impacts indicates whether the impact was predicted. Again, where are the data?

A major benefit ascribed to the longwall mining method --- long touted by the coal industry and repeated by PADEP management --- is that any resulting subsidence is "planned", "controlled", and "predictable". This argument was repeatedly made during consideration of Act 54. "Planned" subsidence was promoted as superior to "unplanned" or unanticipated and long-delayed subsidence at legacy room-and-pillar mines because:

> *(a) the longwall operator could take steps before and during undermining that might minimize any predicted damage (such as trenching around foundations and installation*

[11] Brian Dailey (OSMRE reviewer) made a similar comment on this on 28 June 2023: "*No other mention of designated uses in this section or protection of functions and values. Were designated used protected? How would we know? Same question for functions and values.*"

> *of cables to hold structures together), or switching to room-and-pillar extraction beneath sensitive features, and;*
>
> *(b) the operator would be available to repair promptly any damage that results from the expected, almost immediate surface subsidence.*

Stream damage *predictions* are required by Pennsylvania mining regulations at 25 Pa. Code Chapter 89 and solicited in each mine permit application. Those predictions are supposed to be reliable and used "*to prevent or minimize adverse hydrologic consequences"* (§89.36). Does the Department actually modify permits to prohibit stream damage *predictions,* as required by Pennsylvania mining regulations at 25 Pa. Code Chapter 89 and solicited in the mine permit application? (Room-and-pillar mining beneath a stream could be used to avoid any predicted damage, but it is expensive for mine operators and not required by permit conditions.)

If so, where are the data showing that the Department and the mining company are complying with the law? The existing, unanalyzed Department data document that longwall mining impacts are minimally predictable, but that is of minimal concern to Department staff.

Despite predictability being claimed as a fundamental aspect of longwall mining and DEP's mining regulations requiring predictions of stream pooling and flow loss, the Department has never tracked or monitored predictions of stream damage. When a stream experiences flow loss or pooling due to longwall mine subsidence and the damage is reported, no record is kept of whether the damage was predicted or whether the actual damage is more or less extensive than predicted (despite numerous such recommendations over the decades).

Likewise, neither the 6th Report nor any prior Act 54 report has attempted to quantify or track the number of predicted (versus unpredicted) stream impacts at each longwall mine, nor has it evaluated whether any or all stream impacts that actually occurred were of the same kind, location, or magnitude as predicted.

There is no evidence that the Department requires avoidance or other preventive measures to be implemented beforehand when stream damage is predicted (which itself is extremely rare). Rather, for underground mining the Department operates in a reactive manner.

Regarding flow loss, the 6th Report notes (page 91) that *"once a partial or total flow loss has been identified, the mine operator is required to augment (supplement) the stream until the flow returns on its own or the fractures in the stream bed can be sealed…"*. On page 126, it is noted that *"Operators have 5 years to fully restore a stream as detailed in the guidance document (563-2000-655)."* After five years, the Department apparently loses interest in unsuccessful restoration efforts. The 6th Report (page 5) states that 15.6 stream miles were affected by flow loss, pooling, and/or heaves/fractures during its reporting period. The total is repeated (as 15.62 miles) on page 126. However, the GIS shapefiles Schmid & Company, Inc.,

FIGURE 1. Examples of heaves/fractures (black dots) in relation to flow loss (red lines) during the 6th Act 54 Period. Graphic above is a section of Harvey Mine where most of the heaves/ fractures occurred within areas of flow loss. Graphic at left is a section of Tunnel Ridge Mine where at least 13 instances of heaves/fractures occurred outside of flow loss areas. Source: PADEP GIS shapefiles

received per our RTKL request record 15.62 miles of streams (107 incidents) affected *by flow loss*, plus an additional 2.88 miles of streams (29 incidents) affected by pooling, for a total of 18.5 miles.

An additional 89 incidents of heaving/fractures were recorded with no mileage indicated. Some heaves/fractures occurred within sections of impacted streams and were counted as flow loss (as expected, since the fractures contribute to a loss of stream flow), but many reportedly occurred alone or in series outside areas determined to have experienced flow loss (see our **Figure 1**).

Where a series of heaves or fractures occurs along a stretch of stream, a reported loss of flow in that section would be reasonable, but in several instances, that is not the case (e.g., see the

bottom graphic in our Figure 1). The 6th Report text provides no discussion or explanation of those discrepancies and scrupulously avoids mentioning correlations, let alone potential causation.

Table 10 on page 92 of the 6th Report (incorrectly labeled Table 40) lists 98 instances of flow loss that reportedly occurred during the 6th Period. (As noted previously, the GIS shapefiles identify 107 instances of flow loss during the 6th Period.) The text notes that all but one instance of flow loss was associated with a longwall mine; Crooked Creek Mine, a room-and-pillar operation, also reportedly *"experienced a flow loss*." Nothing more is said about that incident, even though it has several notable aspects.

For one, the impact was not minor: the flow loss reportedly affected 0.35 mile of Two Mile Run, a cold-water fishery. Also, the impacted area was not *above* the mined area (as is common with longwall mines), but began 270 feet downstream from the nearest mining. Why and how room-and-pillar mining caused this stream to lose flow warrant explanation and evaluation. This impact is particularly notable because it is the first acknowledged room-and-pillar-related flow-loss incident in the last 20 years and only the third room-and-pillar-related flow-loss incident reported in the last 30 years (longwall mines having caused the other 457 flow-loss incidents).

Given that room-and-pillar mine flow loss is such a rare occurrence, the 6th Report should have devoted at least some discussion and analysis of Two Mile Run, but no attention was given to it at all.

Stream augmentation for flow loss is addressed in Act 54 Report Table 13 ("Stream Augmentation"; pages 105-107). Table 13 identifies 81 streams that reportedly were being augmented during the 6th assessment period. However, Table 10 (incorrectly labeled Table 40) lists 98 (GIS identifies 107) streams that reported flow loss between 2018 and 2022. The two tables are organized differently, making direct comparison difficult – Table 10 is arranged chronologically by the date of flow loss, whereas Table 13 is arranged alphabetically by mine name, then chronologically by the date augmentation began.

The fact that 98 (or 107) streams were damaged by flow loss, but only 81 received augmentation, suggests that at least 17 dewatered streams did not receive added water. In fact, even fewer streams apparently received augmentation. Table 13 lists 31 streams that were being augmented prior to the start of the 6th period (2018), as far back as February 2012. Only 50 of the 98 (or 107) streams damaged by flow loss during the 6th period received any augmentation during that period.

Notably, the augmentation of one stream, which began on 1 February 2012 (Ten Mile Creek above Enlow Fork Mine), did not end until 1 June 2018, more than a year beyond the prescribed 5-year time limit for stream "repair". That discrepancy was not noted in the 6th Report (and likely was not even noticed by its authors or reviewers).

Whether the mine operator faced consequences for failing to meet the 5-year limit is unknown, but past experience with exceeding time limits for stream restoration suggests this was unlikely. The 6th Act 54 Report is consistently silent on exceedances of time limits for notifications and for stream restoration.

Tables 10 and 13 in the 6th Report should have been combined to make it easier to see how soon after flow loss occurred any augmentation began. As it stands, one must switch back and forth between the two tables to determine when augmentation began relative to when the stream was damaged, or whether augmentation was used at all. Combining the two tables also would have highlighted the many instances where flow loss occurred but no augmentation was listed (for example, 2,049.23 feet of Stream 40957 experienced flow loss on 6/16/2020 above Panel E31 of Enlow Fork Mine, according to Table 10; however, no augmentation of Stream 40957 is listed in Table 13).

Another stream above Enlow Fork Mine (Stream 32980) suffered flow loss on 6/5/2018, according to Table 10, and augmentation from wells began two days later on 6/7/2018, according to Table 13. While the quick response to that damage is commendable, Table 13 notes that augmentation of Stream 32980 remains "ongoing" (presumably as of the end of 2022), so it had not yet been fully restored more than 4.5 years after the damage (and likely longer).

For some streams, augmentation was not initiated promptly. Above Harvey Mine, 1,121.76 linear feet of Stream 40575 experienced flow loss on 7/9/2020 (per Table 10), but augmentation did not begin until more than 4 months later, on 11/10/2020 (per Table 13). In that case, augmentation "ended" on 1/1/2022. It is unclear from the text or the table whether the "end date" for augmentation indicates that the stream was determined (by the operator or the Department) to have been fully restored on that date, or whether augmentation was simply stopped for another reason.

If the Tables in the 6th Report are to be believed, some streams were being augmented *before* they were damaged. For example, above Bailey Mine, 566 linear feet of Stream Segment 32605 reportedly experienced flow loss on 4/13/2018 (per Table 10), yet augmentation reportedly began 8 months earlier on 8/10/2017 (per Table 13). Thus, the quality of the reported data is questionable. Presumably, the DEP fails to review operator-submitted data and therefore does not notice such irregularities.

Table 11 in the 6th Report identifies 27 instances of stream pooling. (The GIS shapefiles we obtained from DEP identify 29 instances of pooling.) The 6th Report text on page 96 briefly discusses the impact of pooling on a stream and its fish and other organisms, as well as "gate-cutting," the most common technique used to try to alleviate pooling damage. Other than the length of each reported pooling incident (which add up to 2.88 miles total, more than 500 feet each on average) and the date it occurred as listed in Table 11, the 6th Report contains no mention of whether restoration was attempted on every pooled stream, whether any stream

impacted by pooling was ever fully restored to its original flow rate and/or habitat conditions, or how long restoration efforts were attempted in any pooled stream (all factors that were discussed in the 5th and previous Act 54 Reports). The "Findings" section of the 6th Report does not even mention stream pooling.

As noted above, the DEP-reported total for stream impacts from all causes (15.62 miles) completely ignores the 2.88 miles of stream pooling that occurred during the 6th period, as our examination of the Department's GIS shapefiles shows.

Not unexpectedly, the 6th Report does not specify which, if any, of the 27 incidents of stream pooling damage were predicted. Since the 1980s and early 1990s, the "Peng Model"[12] has been used to predict pooling effects caused by longwall mine subsidence. (There is no comparable model for predicting stream flow loss.) The model is based on factors such as mining depth, rock type, and stream gradient.

But pooling still occurs in streams where it was not predicted, and in some cases affects much longer lengths of streams than predicted. The Department has made no effort to analyze the Peng model's accuracy or to update or recalibrate it.

The model is now more than 35 years old, is not always accurate, and needs review to assess its ability to predict damage from ever-larger (and more destructive) longwall panels. Given that a model is in use to predict pooling and that full stream restoration after pooling is uncertain, one might expect the Department to require mine operators to avoid longwall mining under areas where pooling is predicted to occur. However, that is not the case. (Room-and-pillar mining beneath a stream can be used to avoid stream pooling, but it is expensive for mine operators.)

Table 12 in the 6th Act 54 Report lists 89 instances in which longwall mining caused heaves and fractures in streambeds. Understandably, many of these impacts overlap with those listed in Table 10 for flow loss. For example, Panel 5L of Bailey Mine on 2/20/2018 caused heaves and fractures along 1,130 linear feet of NoF-17L and 1,165 linear feet of flow loss along the same stream. Act 54 6th Report Appendix A Figure 1.4 (Stream Impacts – Bailey Mine) shows that almost every longwalled stream that suffered flow loss also experienced heaves/fractures. In several locations, heaves/fractures occurred where no flow loss was reported (see our Figure 1 above).

The text makes no attempt to correlate heaves/fractures with flow loss, nor to explain why some heaves/fractures appear to cause flow loss (or prolonged flow loss) while others do not.

Except for augmentation for flow loss, the 6th Act 54 Report generally does not identify when remediation began for each impacted stream section, the type of remediation implemented, when the stream was fully restored, the status of stream remediation at the end of the period,

[12] Comprehensive and Integrated Subsidence Prediction Modeling (CISPM) (Peng & Chiang 1984, Peng 1992, Peng & Luo 1994).

or the number of stream remediation efforts that had exceeded the 5-year limit. Previous Act 54 reports provided this information for pooling.

The 6th Report contains no discussion or analysis of the number of pooling and flow-loss incidents during the 6th period compared with the 5th or prior periods, nor of incidents by longwall *v*ersus room-and-pillar mining types. Despite the miles of streams reportedly affected during the 6th period, the 6th Act 54 report provides no information on the recovery status of any stream.

TECHNICAL GUIDANCE DOCUMENT 563-2000-655

The current version of the Technical Guidance Document (TGD) 563-2000-655 (PADEP 2005), titled "Surface Water Protection - Underground Bituminous Coal Mining Operations," has reportedly been in effect for twenty years.

The 2005 TGD includes detailed (though obsolete[13] and superseded) methods for identifying and assessing streams and wetlands; determining whether and when subsidence-induced changes have caused adverse effects; and determining whether and when a mine-impaired stream has recovered or been restored to approximately its normal pre-mining range of conditions. The 2005 TGD was one of the most significant policy changes the Bureau of Mining Programs ever adopted to address stream protection since the enactment of Act 54 in 1994. However, its implementation has been erratic and partial at best, and it is now obsolete.

The 2005 TGD was adopted during the 3rd Act 54 assessment period (2003-2008). The 3rd Act 54 Report noted its adoption and suggested that, if mine operators follow its monitoring schedules, it *"may allow for more robust accounts of flow impacts on undermined streams*." The 4th Act 54 Report noted that the TGD had begun to be implemented at some mines during the 2008-2013 reporting period, but its directives were being applied inconsistently by mine operators and the Department.

The Department's 5th Act 54 Report (2013-2018 period) likewise noted that the TGD's monitoring directives were still not consistently followed and that the TGD itself has technical shortcomings that reduce its utility, even if it were fully followed. An internal Mining Bureau workgroup proposed that any TGD revisions be delayed until an ongoing USGS study of small-watershed hydrology was completed.

The USGS study was completed in June 2019 (Hittle and Risser 2019). In May 2021, the CAC drafted for the Department multiple proposed changes to the 2005 TGD.

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[13] A more current and appropriate set of methods and protocols for stream monitoring is: *Pennsylvania Department of Environmental Protection. 2023a. Water Quality Monitoring Protocols for Surface Waters. Office of Water Programs. Bureau of Clean Water. 384 p. + Appendix.* Recognition of impacts is detailed at length in *Pennsylvania Department of Environmental Protection. 2023b. Water Quality Assessment Methodology for Surface Waters. Office of Water Programs. Bureau of Clean Water. 319 p.* The 2005 mining TGD is not compatible with these methods.

The Department never published any changes for formal public review, so the 2005 version remains current on paper. The Department has never applied it consistently or fully during mining permit review, as detailed in the CAC's review of the 5th five-year Act 54 Report.

The 6th Act 54 Report mentions this TGD only three times (pages 89, 104, and 126). On page 126, it references mine operator claims for stream recovery post-mining:

> *The Department denied multiple stream release requests during the 6th assessment period due to the SREs [stream recovery evaluations] not meet[ing] the minimum requirements detailed in the guidance document, Surface Water Protection – Underground Bituminous Coal Mining Operations (563-2000-655). In some cases, the Department has required additional flow data or supplementary mitigation work. To date, operators have complied with the requests and have provided additional information to support their determination that flow recovery has occurred.*

No examples or tallies were provided for the "multiple" SREs that failed to meet TGD requirements, the specific "minimum requirements" they failed to meet, or the "some cases" that complied with DEP requests for additional supporting information before the release of restoration liability. On page 89, the 6th Report notes that the TGD *"will be updated based on the findings and recommendations of this report and published for public comment during that process"*.

A revised TGD has been promised for more than a decade; the affected public should not get its hopes up that an updated version is forthcoming any time soon or will ever be implemented.

STREAM RECOVERY EVALUATION REPORTS

According to the 6th Report (Page 104),

> *Stream Recovery Evaluation Reports (SRE) are submitted by mine operators following a period of mitigation or monitoring of a mining-impacted stream to demonstrate to the Department that the stream has now returned to its normal range of conditions. The SRE includes pre- and post-mining flow measurements as well as a comparison of the pre- vs post-mining biological habitat.*

A total of 82 submitted SREs were discussed at length and in great detail (more than a dozen pages, including tables, charts, and graphs) in the DEP's 5th Act 54 Report. The DEP's 5th Report reached this dismal conclusion:

> *The incomplete reported hydrologic data in the SRE reports can undermine the accuracy of flow comparisons and will cause problems in potential new flow monitoring schedules based on statistical methods (Hittle and Risser, 2019). At present, determination of recovery based on incomplete data sets occurs too often, and when it occurs the circumstances are often not documented. The data gaps are not small or infrequent (i.e., this is not a case where one week is missed during the six-month period or the longwall moves a little faster than anticipated during daily sampling). Fundamentally, assuring data completeness is vital to assessment of hydrologic recovery and therefore protection of the hydrologic balance.*

The Citizens Advisory Council (CAC) to the DEP provided detailed comments on the 5th Act 54 Report in general and on the issue of SREs in particular. The CAC's specific comments on SREs, prepared as part of its overall review of the 5th Act 54 Report (CAC 2023), are as follows:

> *Council's Work Group reviewed additional information provided by the Department concerning mine consultants' Stream Recovery Evaluation (SRE) files mentioned in the 5th Report. The release status of recovered streams tallied in the 5th Report differed from that in the files provided to the Council, with acceptance rate of proposed SREs varying widely by mine. Few if any of the SREs strictly followed the Department's technical guidance (fully applicable since 2007) for documenting stream recovery, but half (49%) of the submitted SREs were released during the period. The Department's full technical-guidance stream flow documentation was provided in no SRE. All SRE files are fragmentary and none mentions the accuracy of damage prediction at any damage site. Sparse if any information is included on site-specific measures taken to lessen actual damage, such as the amount or timing of flow augmentation, the quality of augmentation water, or even major interventions such as liner installation attempting to restore surface flow.*
>
> *Thus the Council renewed its 2015 recommendation for a scientific study to ascertain whether water resources impacted by underground coal mining can practically be restored to pre-mining flow patterns and pre-mining chemical and biological characteristics.*

Given the serious deficiencies and concerns identified in the Department's 5th Report and by the CAC, one might have expected a vigorous, detailed review of the 86 SREs submitted during the 6th Report period, with the issues at least addressed, if not fully resolved. Unfortunately, that did not happen.

The 6th Act 54 Report devotes less than 2 full pages (104 and 126) to SREs, providing only the total numbers submitted each year by each mine operator, but no specific details about any of them.

Only generalizations are provided, with no supporting evidence or examples: *"the quality of the submittals of SREs by operators has improved," "the Department denied multiple stream release requests,"* and *"In some cases, the Department has required additional flow data or supplementary mitigation work."*

The 6th Report notes on page 126 that *"The Department is currently reviewing the status of all Open SRE cases to determine which streams have exceeded the five-year period. This is expected to be completed in 2024."*

That sounds reasonable until you remember that this 6th Report was released in February 2025 (<u>after</u> 2024, so the obsolete prediction should have been edited out), that it was more than 2 years after the close of the reporting period, and that it should have allowed ample time to determine which stream recoveries had exceeded the prescribed 5-year period.

In response to the 2025 Schmid & Company, Inc., RTKL request (#2025-0372) for a copy of the SRE review that was to have been completed in 2024, we received the following response from the Department:

> *DEP possesses no records responsive to your request and is aware of no records in the possession of a third party that would be covered under Section 506(d)(1) of the RTKL, 65 P.S. § 67.506(d)(1).*

Clearly, that review was not completed on time. It remains unclear whether the review was ever initiated or when it will be completed. A follow-up email exchange with Sharon Hill in May 2025 suggests that those reviews are ongoing, with no target date for completion.

As part of a separate RTKL request (#2025-0356), we received a multi-page Excel table named SRE Tracking, which appears to list some stream-recovery project assessments by year (2009 to 2024) and by mine, but its contents do not align with the data in the 6th Report, Tables 10 or 13. Its data are neither informative nor current: *for example*, one entry for Crows Nest (a stream undermined and damaged by Bailey Mine and assigned to DEP enforcement in March 2011) notes that a new SRE submitted in October 2016 is under review (more than 5 years later), yet no further information on its status is provided. The damage to and recovery status of streams impacted by longwall underground coal mining has been a public concern for a quarter of a century. The Department appears to treat it as a minor issue not warranting priority staff attention. Neither the ongoing stream damage from current longwall mining nor any effective recovery from it is mentioned in the Department's biennial Integrated Water Quality Reports to the US Environmental Protection Agency.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENTS

A Cumulative Hydrologic Impact Assessment (CHIA) is to be prepared *by the Department* using operator-supplied data whenever the Department reviews an application for a new underground mine permit or for a mine permit renewal or revision (expansion). CHIAs are required not only under the federal Surface Mine Control and Reclamation Act (SMCRA) but also in accordance with the explicit directives of the Pennsylvania Clean Streams Law, which predates SMCRA.

The requirements to protect hydrologic resources and to predict hydrologic consequences are directly incorporated into Pennsylvania's current Surface and Underground Coal Mining regulations (25 Pa. Code §86.37) and into the regulations governing Underground Mining of Coal and Coal Preparation Facilities (§89.35-36).

A 5-page technical guidance document (TGD 563-2112-219, prepared in 1997) outlines the purpose of a CHIA, and a 5-page form (5600-FM-MR0017, last revised in 2009) is used to prepare the CHIA. According to the TGD, *"the Department will determine the cumulative hydrologic impacts of the proposed mining activities on the designated watershed and will make a written finding that the proposed activities have been designed to prevent damage to the hydrologic balance within and outside the permit area*." OSMRE has overseen the preparation of excellent model CHIAs, all of which appear unknown to the Department.

Because CHIAs are required for every new or revised underground mine permit application, many hundreds of CHIAs should have been prepared over the past 30 years. Together, those hundreds of substantive CHIAs should constitute a substantial database of information, and because they are prepared by the Department itself, they should be readily available and consistent across applications.

In reality, CHIAs prepared over the last few decades tend to consist of perfunctory box-checks with little substantive data and no analysis. They almost never address cumulative impacts, rarely address the specific impacts of the *proposed* mine activity, and never address the accuracy of any predictions of hydrologic damage from underground mining.

CHIAs appear to be among the more relevant sources of information for which the Department is specifically responsible for monitoring the individual and cumulative impacts of underground mining activities on surface water and groundwater resources. Logically, they should be a principal source of information on hydrologic impacts in Act 54 reports. The 6th Act 54 Report briefly discusses what CHIAs are, how they are supposed to be used, and how "important" they are (page 59). Otherwise, CHIAs were completely ignored in the 6th Report: *"Review of the CHIAs associated with each individual underground mining operation was not part of this assessment."* This illustrates how unseriously the Department takes its mandated responsibilities under Act 54 and other Commonwealth laws that protect water resources.

Wetlands

As in previous Act 54 reports, the 6th Report's discussions of wetlands are a jumbled mess. Wetland delineations are not required for room-and-pillar mine applications, a point the 6th Report neither mentions nor justifies. If mine subsidence associated with room-and-pillar mines damages water supplies and streams, as the 6th Report documents, it is reasonable to suspect that it may also adversely affect wetland hydrology and character. The simple fact that the Department lacks information about wetland effects from non-longwall mines (because it does not ask permit applicants to collect it) does not mean that such impacts do not occur.

The 6th Report notes that the Department's wetland tracking and assessment of underground mining operations are deficient. *"The Department acknowledges that wetlands data collection and analysis are lacking…. OSMRE commented that wetland function and value are not represented in the data collected. Therefore, it is unclear whether the overall picture of post-mining wetland areas represents a loss, an improvement, or a more complex result."* [pages 126-127]

Wetland protection in Pennsylvania began in the 1980s with regulations in 25 Pa. Code Chapter 105, but it is still not effectively applied to longwall bituminous coal mines (unlike highways, residential subdivisions, and commercial construction projects throughout the Commonwealth).

The Department acknowledges that it tracks wetland status only at five-year intervals, when a longwall mine applies for permit renewal. However, each mine's renewal and expansion dates differ, and 5-year renewal periods do not align with the 5-year Act 54 periods. As a result, pre-mining and post-mining wetland acreage calculations, when reported, typically span two Act 54 periods, posing an apparently insurmountable impediment to tallies by Report staff.

However, the location of wetlands is a spatial factor, as is the specific area mined by each longwall operation during any Act 54 period, so it should be easy enough to track wetland impacts reported by mine operators, at least. But apparently the Department has not yet tried to figure out how to do that, even after 30 years. Nevertheless, the minimal wetland information in the 6th Act 54 Report is presented as if those data all apply to the 6th period mining (when in fact they do not). None of the meager data for wetlands discussed in the 6th report text can be compared with or related to the wetlands mapped in its Appendix A for any of the mines.

Table 14 (page 109 of the 6th Report) identifies the acreage of (presumably pre-mining) wetlands undermined *"during this assessment"* by each of the 7 longwall mines. The total reported acreage is 125.46 acres. The maps in the 6th Report Appendix A show the same acreages listed in Table 14. 6th Report Table 15 (page 110) reports post-mining wetland acreage for each longwall mine, along with its pre-mining wetland acreage, and calculates the net change.

None of the pre-mining wetland acreages in Table 14 exactly match those in Table 15. Some are close (Cumberland Mine has 13.64 acres in Table 14 and 13.61 acres in Table 15), but others are not (Tunnel Ridge has 15.15 acres v. 4.69 acres; Enlow Fork has 53.65 acres v. 72.97 acres).

Similarly, our measurements of the shapefiles for pre-mining wetlands above each longwall mine during the 6th Period do not exactly match the totals in either Table 14 or Table 15, although some are close to the numbers in Table 14 (we measure 15.35 acres for Tunnel Ridge v. 16.15 acres in Table 14; we measure 10.58 acres for Monongalia County v. 11.09 acres in Table 14). (The Department generally requires wetland impacts and mitigations to be measured and accounted for to the nearest 0.01 acre across the Commonwealth.)

The Cumberland Mine map indicates that 13.64 acres of wetlands were undermined during the 6th period; our GIS measurements show 16.58 acres, a 22% difference that suggests potential underreporting of damage. Enlow Fork is not even close (we measure 35.66 acres of pre-mining wetlands v. 53.65 acres listed in Table 14, a 50% difference). These discrepancies should not exist (or should be explained) because they affect other data presented, such as net gain/loss of wetlands. The data for post-mining wetlands are even more questionable than those for pre-mining wetlands. Table 15 in the 6th Report lists acreages of 6th-period post-mining wetlands by longwall mines, totaling 181.29 acres (no data are reported for Marshall County Mine). Our measurements of the DEP shapefiles for post-mining wetlands above areas mined during the 6th period total 39.78 acres, a difference of 141.51 acres, or 356%. Extensive

wetlands are shown on 6th report maps above panels that were longwall-mined during previous Act 54 periods, and even outside the permit boundaries of all longwall mines.

It appears that many wetlands reported as post-mining wetlands for the 6th period do not coincide with the areas *mined* during that period—just because a post-mining wetland was first recorded during the 6th period does not mean it was created as a result of 6th-period mining.

For example, 6th Report Table 15 lists 33.38 acres of post-mining wetlands for Harvey Mine (we measure 38.52 acres from the GIS shapefiles). However, Appendix A Figure 4.5 for Harvey Mine shows that only 1.74 acres of that total are above areas mined during the 6th Act 54 period; most of the acreage is above areas mined in previous Act 54 periods (see our **Figure 2** below).

Thus, the Appendix A maps are highly misleading regarding pre-mining wetlands, post-mining wetlands, and any net gain or loss of wetlands attributable to 6th period mining. Clearly, the Department still has no clue about the pre-mining extent of wetlands above longwall mines, the extent of wetlands damaged by longwall mining, or the extent of wetlands that become established after mining (whether through permittees' efforts or otherwise).

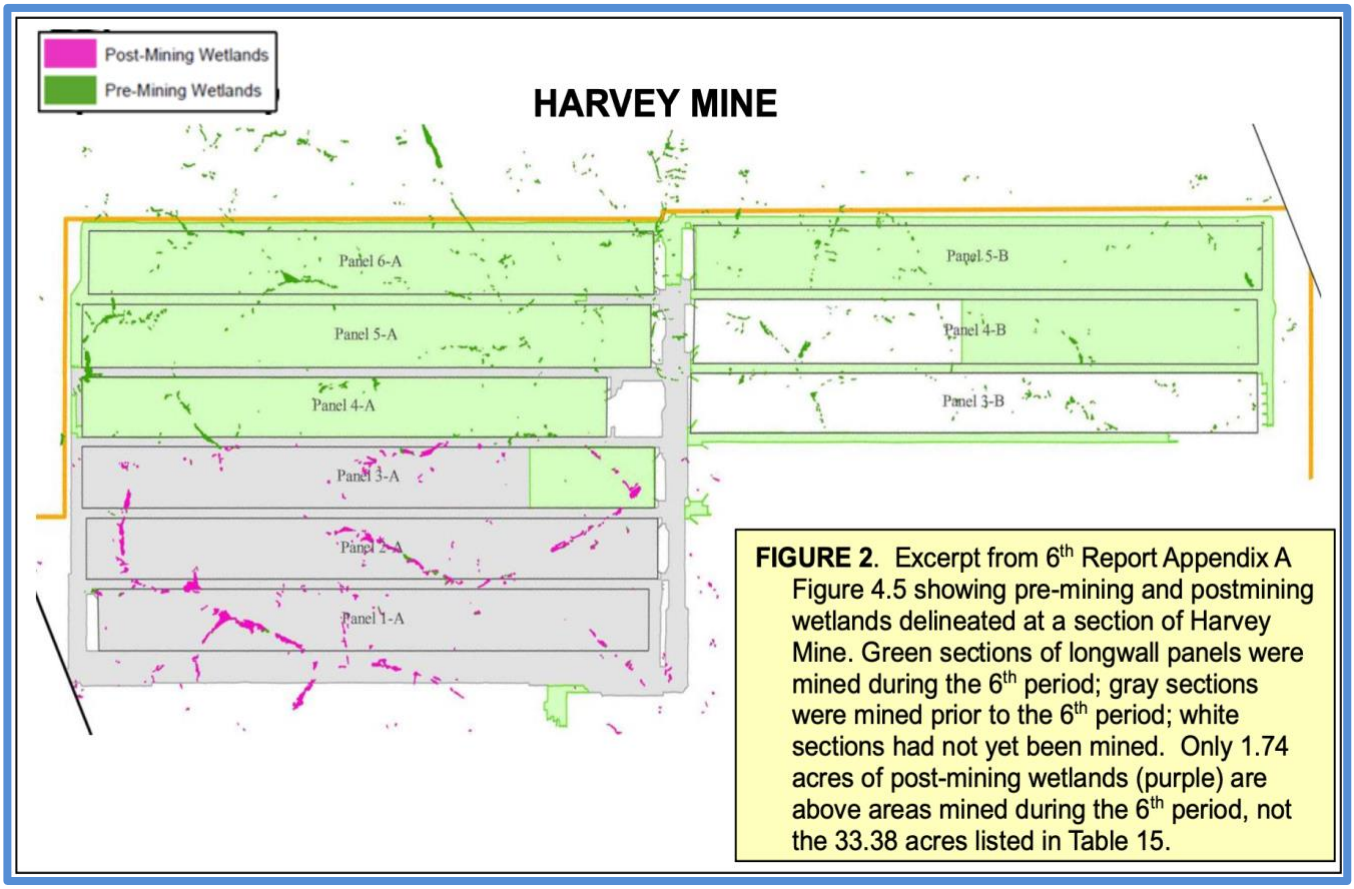


FIGURE 2. Excerpt from 6th Report Appendix A Figure 4.5 showing pre-mining and postmining wetlands delineated at a section of Harvey Mine. Green sections of longwall panels were mined during the 6th period; gray sections were mined prior to the 6th period; white sections had not yet been mined. Only 1.74 acres of post-mining wetlands (purple) are above areas mined during the 6th period, not the 33.38 acres listed in Table 15.

In calculating net loss or gain, the Department and mine operators have never considered the quality, functions, and values of wetlands. The 6th Report is no exception. The likely permanence of any "created" wetlands is not considered – the 6th Report provides no assurance (e.g., a deed restriction) that any of those wetlands will remain permanently. There is no indication that any surface landowners consented to the creation of replacement wetlands on their lands or that they will commit to keeping them as wetlands.

The 6th Report text (page 108) notes that wetlands must be delineated both before and after mining. As noted above, it fails to state that this requirement applies only to longwall mines. It further states that if a net loss is identified after mining, *"operators are required to develop a mitigation plan in which new wetlands of an equivalent size and quality will be created*." That statement raises several significant problems.

First and foremost, none of the pre-mining or post-mining wetland areas is reviewed in the field by qualified agency staff to ensure that the delineations are accurate. Many post-mining wetlands are located in places (along streams, for example) where one would have expected to find them pre-mining, yet they were not delineated in the pre-mining permit applications.

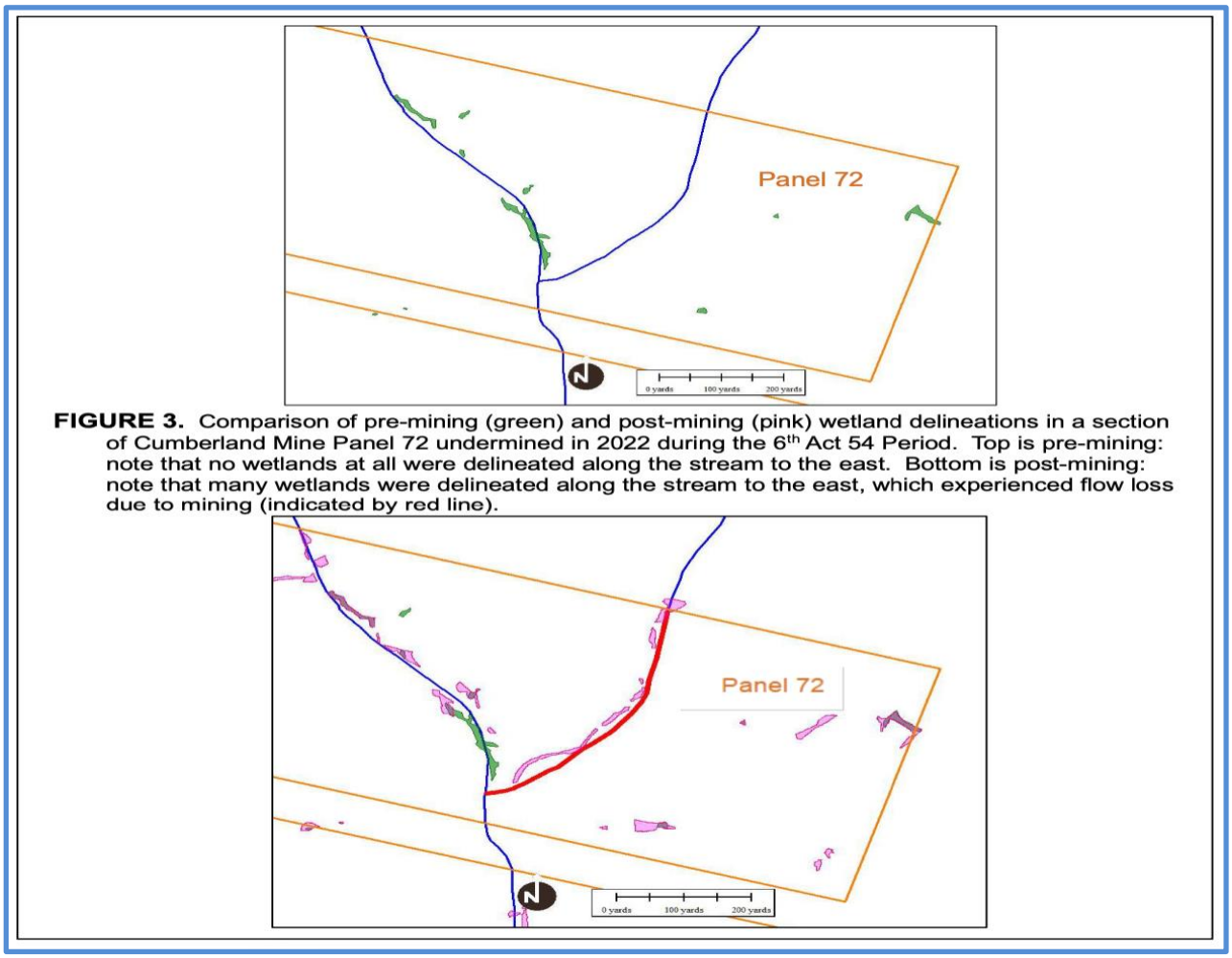


FIGURE 3. Comparison of pre-mining (green) and post-mining (pink) wetland delineations in a section of Cumberland Mine Panel 72 undermined in 2022 during the 6th Act 54 Period. Top is pre-mining: note that no wetlands at all were delineated along the stream to the east. Bottom is post-mining: note that many wetlands were delineated along the stream to the east, which experienced flow loss due to mining (indicated by red line).

Many post-mining wetlands are shown along streams that were reportedly damaged by flow loss, which is counterintuitive (since subsidence that drained a stream's flow would likely have reduced the hydrologic balance in nearby areas rather than increased it) and is not explained in the text. For example, in our **Figure 3** above, no wetlands were delineated pre-mining along a stream that subsequently experienced flow loss, yet post-mining a significant number of wetlands are delineated here --- this makes no sense. Comments by Rock Martin (OSMRE 6/29/23) and Brian Dailey (OSMRE 5/30/23) on drafts of the 6th Act 54 Report's wetland section are reasonable but, unfortunately, were ignored:

> *An analysis could be conducted evaluating the overlap between stream and wetland impacts. This would be a way of addressing the hydrologic balance. (RM)*
>
> *Should include a discussion on wetland functions and values and no net loss. Also, information on any regulatory requirements. (BD*

Findings

The only "analyses" in the 6th Act 54 Report appear in a 5.5-page "Findings" section at the end of the Report (pages 122-127). The 6th Report compares a limited set of data from the 5th reporting period with similar data from the 6th reporting period. Previous reports provided comparable data from multiple prior reporting periods to identify trends, but the 6th Report does not. This is inexcusable, given that the Department has all the data to make such comparisons: the DEP's 5th Act 54 Report routinely included and compared data from the 5th period with comparable data from the 4th and 3rd periods. It would have been easy to extract that data from the 5th Report and add comparable data from the 6th.

To compensate for the Department's failure to do so, we have attempted to make some of those comparisons throughout this review.

On page 123 of the 6th Report, a table compares structural damage claims between the 5th and 6th periods. The first two columns show the *number* of structures undermined by mine type. However, for the 5th period, the "number" is the number of *structures* undermined, whereas for the 6th period, the "number" is the number of *properties* undermined (which often have more than one structure). The text points out this discrepancy, concedes that the two cannot be compared directly, and explains that *"the Department does not have the capabilities to"* count the total number of structures undermined, although it may in the future. Why not? Are current Department staff incapable of reading the large-scale, detailed maps submitted by mine operators?

The Department has received these data in mine permit applications (which are submitted digitally), and those data were included in the previous Act 54 reports. Indeed, the next two pairs of columns disclose, for both periods, the actual number of structures with "reported effects" and the number determined to be "company liable". The Department clearly was uninterested in the numbers or in analyzing the origins of structural damages resulting from longwall mining.

The "Findings" Section of the 6th Report (pages 122-127) offers mostly speculation about the likely causes of some changes since the 5th period and ignores other changes that appear significant. For example, the 6th Report notes (on page 122) that the number of traditional room-and-pillar mines declined from 37 in the 5th period to 23 in the 6th period. On the next page, it reports that the number of structure-damage claims for which room-and-pillar mines were found responsible increased dramatically from 3 in the 5th period to 82 in the 6th period.

A 38% decline in the number of room-and-pillar mines, accompanied by a 96% increase in the number of mine-liable structure damages, is a significant finding that ought to be further explored and explained, but it is not. The Department appears to be satisfied with this astonishing increase in structural damages to property of Commonwealth citizens, if it even noticed. The totals for "company liable" structure effects, which the 6th Report notes increased by 125 (54%, from 232 in the 5th period to 357 in the 6th), despite a 37% *decrease* in the total number of active mines from 49 to 31, are identified but likewise are not discussed.

Some of the data, as reported in the "Findings" for the 6th period, appear questionable. On page 123, the 6th Report states there were 455 reported structure effects during the period (which aligns with the figures in its Table 5 on pages 30 to 56). Of the 455 reported structure effects, 357 were reportedly determined to be "company liable effects" (page 123). That leaves 98, which presumably were *not* company-liable. But Table 5 lists 60 claims that were "not due to mining" and another 93 that were "unresolved" at the end of the period, any or all of which may ultimately be found not to be due to mining. The numbers provided by the Department simply do not add up, and thus the credibility of the 6th Report is suspect.

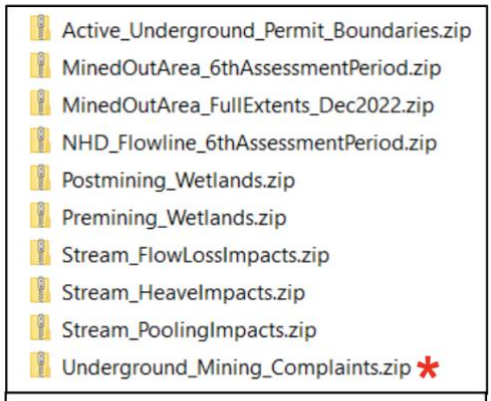
It is noteworthy that the Department deemed 60 landowner claims of mine damage to surface resources unrelated to underground mining. The Department has never addressed the nature of landowner damage claims deemed unrelated to mining. Liability determinations by the Department are apparently difficult to make and can take many years to resolve. No five-year report addresses the accuracy of the Department's liability determinations. Mine operators presumably have the resources to challenge liability determinations, should they choose to do so, whereas most landowners presumably do not.

Appendix A Maps

The final two pages of the main text of the 6th Act 54 Report (pages 130-131) describe the map figures in Appendix A. Appendix A includes a series of maps for each mine that was active at some point during the 6th Act 54 period. Although it is noted that the maps *"are intended to be viewed along with the report text and are not stand-alone map exhibits for detailed visual analysis,"* Appendix A is provided as a separate PDF. Thus, the explanations about the maps on pages 130-131 of the main text should have been repeated at the start of Appendix A (or included only there, not in the main text), rather than plunging a reader directly into the maps.

Also, a cover page should have been provided for Appendix A showing its connection to the main report.

Each mine is represented by a series of informational maps in Appendix A of the 6th Act 54 Report. The maps show the currently permitted limits of each mine, as well as the extent of land that was mined during (A) the 6th period (in green) and (B) prior periods (in gray). One map shows the mine-impact complaints associated with the mine, including, as appropriate, for methane, water contamination, water loss, structural damage, utilities, and land damage (see the Cumberland Mine example in our **Figure 4** below). For longwall mines, the individual panels are shown.



Shapefiles which were used by DEP to create the maps in Appendix A, and subsequently provided to Schmid & Company per an RTKL request.

There are numerous deficiencies in the mine maps in Appendix A which become apparent only by comparison with the drawings provided by DEP in response to our RTKL request.

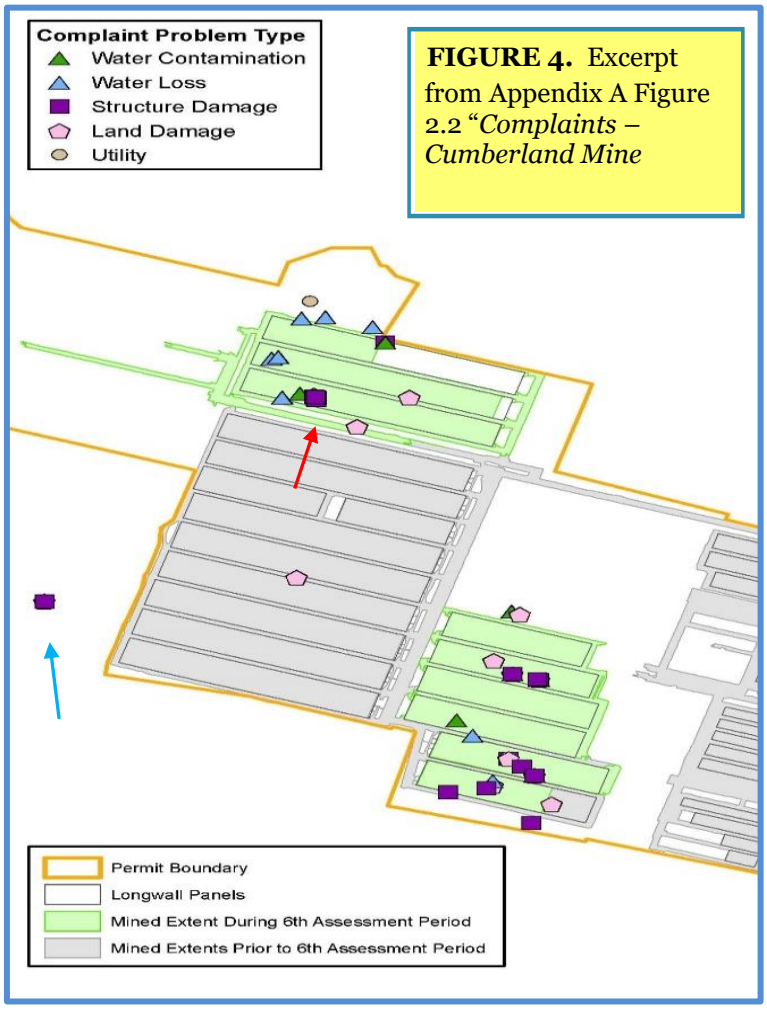


FIGURE 4. Excerpt from Appendix A Figure 2.2 "*Complaints – Cumberland Mine*

The biggest shortcoming is that the impact complaints are not numbered on the maps to match the impact complaints listed in the tables in the main Report. For example, in the 6th Act 54 Report Table 5 (beginning on page 30), every "*Structure Damage Claim*" is listed by "*Problem ID Number*". For example, Problem ID 6330 was described as "cracks in foundation" for a structure above Cumberland Mine, occurring on 1 June 2020 and resolved by "*Agreement (unspecified)*" 609 days (1 year and 8 months) later. But the map for Cumberland Mine (our Figure 4) does not identify which of the 31 reported structure impacts (represented by purple squares) corresponds to #6330.

Another problem with the Appendix A maps is that they were created by the Department in a GIS using shapefiles of various mine-related features.

However, when the maps were reduced for inclusion in the 6th Report, the scale became too small to show all the features and impacts reportedly depicted.

For example, in our Figure 4 (the 6th Report's Appendix A Figure 2.2), all 31 structure damage complaints for Cumberland Mine during the 6th period are supposedly shown. However, only about 10 structure symbols are visible because the map's scale causes many nearby symbols to overlap. The red arrow points to what appears to be a single "structure damage," but in fact there are five separate structure damages in that vicinity (which one can determine ONLY if one has the shapefile overlay for the "Underground Mining Complaints" [the file with the red asterisk in the box that precedes our Figure 4], which Schmid & Company, Inc., reviewed after our RTKL request).

In addition to providing the Report and Appendix A as PDFs, the Department should have made the digital shapefiles used to produce the Appendix A maps available on its website, which would have made them much easier to interpret and understand. Alternatively, and even more useful, the Department could have provided interactive online versions of each Appendix A map.

As noted above, the Appendix A maps identify only "complaints," so for any given complaint, it is not possible to determine whether it was deemed mining-related or whether it was resolved. Also, the Problem ID numbers should have been shown alongside the complaint symbols on the Appendix A maps, allowing the reader at least to refer to the tables in the main Report to learn more about their status. Even that would require considerable effort on the part of the reader. Better would have been to include the ID number and to represent the mine-liability status directly with a different symbol or color.

Many of the Appendix A maps show damage complaints outside the mine's permit boundary. In our Figure 4 above, a structure damage (purple square) is shown west (left) of the Cumberland Mine permit boundary, indicated by the light blue arrow we added. That structure (Problem ID 6501) is located 0.7 mile outside the permit boundary and 2.6 miles away from the nearest Cumberland Mine underground mining conducted during the 6th period.

The *type* of structure damaged in this instance is not specified in the text or tables and cannot be determined from the maps. According to Table 2 of the 6th Report, this structure damage ("minor cracks") occurred on 8 March 2021, was determined to be mine-related, and was resolved 338 days (more than 11 months) later by *"Agreement (unspecified)."*

The 5th Act 54 Report devoted an entire section (11.C.1) to what it called *"Far Field Effects*," meaning impacts that occurred unexpectedly far from active mining, typically outside the land inventoried for the mine permit application. The 6th Report contains no such analysis or discussion. For example, the specific structural damage incident discussed in the previous paragraph is not addressed in the 6th Report and likely was not even noticed by its authors. Nor is there any mention of how many other such "far field" damages occurred during the 6th period.

One land damage complaint (Problem ID 5812) above the Monongalia County Mine reportedly occurred on 27 March 2018. According to Table 4 of the 6th Report (erroneously labeled Table 3 on page 23), it involved a "slip on well pad area" and was resolved 25 days later by *"Agreement (unspecified)"* [presumably mine-related]. It is shown but not identified by ID number in Appendix A Figure 6.6 ("Complaints – Monongalia County Mine"). Its location is 6 miles east of the nearest 6th-period underground mining for the Monongalia County Mine, above Panel 8-R, which reportedly was completed in 2002. There are several unexplained issues here.

First, why was land damage above a section of the mine that was mined 16 years earlier and 6 miles away attributed to 6th-period mining? Also, this is one of 20 land-damage claims listed in Table 4 of the 6th Report that occurred during the period (1 January through 20 August 2018) overlapping with the 5th Act 54 period. The 5th Report also identified and analyzed this mine-liable land damage. The 6th Report Appendix A maps should have distinguished all damages that occurred during this overlap period, and the text should have discussed them.

Finally, the legality of a mine operator causing property damage well outside the mine's permit area and beyond any regulated "buffer" around the mine should be addressed in the Report and considered more broadly as a mining policy issue.

An important consideration regarding mining-related water-supply impacts is the location of the affected water supply relative to the RPZ (Rebuttable Presumption Zone). The 6th Report briefly discusses the RPZ (pages 58-59), and its Tables 6 and 7 each include a column indicating (Y or N) whether a water supply complaint was located within the RPZ. However, none of the Appendix A maps identifies the RPZ for any mine, so it is not possible to determine where any particular water supply damage claim occurs relative to the RPZ. The Department, of course, requires the RPZ to be shown on mine application maps. (The RPZ issue was discussed in greater detail above.)

The maps in Appendix A show the number of impact claims for each category at each mine. For example, Appendix Figures 3.2, 3.2.A, and 3.2.B show complaints/problems for Enlow Fork Mine during the 6th Period. The maps indicate 150 Structure Damage complaints for Enlow Fork Mine, but given the scale of the mapping, it is impossible to distinguish them. Table 5 in the 6th Report lists 151 instances of structure damage for Enlow Fork. Schmid & Company, Inc., obtained the shapefiles for "complaints" for all mines for the 6th Act 54 period.

For Enlow Fork, only 148 structure-damage complaints are documented in the electronic files. We cannot determine which number is correct for Enlow Fork (148, 150, or 151). There are likely additional discrepancies among the Report text, Appendix A maps, and shapefiles; we have not attempted to identify them all. It is clear that providing accurate damage information in the 6th Act 54 Report was not a priority for the Department.

Separate mine maps in Appendix A (for longwall mines only) show wetlands as mapped pre-mining and post-mining. Other maps show (a) streams undermined and (b) stream impacts

reported (heave, fracture, flow loss, and pooling) during the 6th period. The maps of undermined streams are based on National Hydrography Database (NHD) maps (gross-level nationwide stream mapping prepared by the US Geological Survey).

Longwall mine applicants, however, are required to identify all streams above their mines that are regulated in Pennsylvania, resulting in many more miles than the NHD-mapped streams because the level of detail is much finer.

This is evident when comparing the two Appendix A stream maps (for undermined vs. impacted streams). Numerous impacted streams are not shown (or counted) as undermined streams. This discrepancy is confusing and affects any evaluation or analysis of streams undermined and impacted by flow loss or pooling.

This issue was raised by the public in reviews of previous Act 54 Reports and could be easily corrected if the Department used the detailed stream mapping provided to it by mine operators for every longwall mine application as baseline data.

Appendix B Wetlands Tables.xls (digital file)

Appendix B is not a document per se but rather a set of links to PDFs and Excel spreadsheets for each of the seven longwall mines active during the 6th Act 54 period. There is no unifying text that attempts to make sense of these various Appendix B files, which differ in type, length, and specifics from mine to mine. It is impossible to determine whether or how these numerous disparate files support or contradict the descriptions of wetlands in the text of the 6th Report or the wetland maps in its Appendix A.

GENERAL COMMENTS

The presentation of the 6th Act 54 Report, much like its substance, is extremely unprofessional. As already mentioned, there is no date on the report: it appears to have been largely written by the end of 2023, yet it was not published until early 2025. There is no identification of the specific (or even primary) authors or contributors to the report. There is no identification of the qualifications or expertise of any of the authors of the report, and no indication of their familiarity with prior Act 54 reports (other than a bit of the 5th Report).

The 6th Report lacks a list of references, even though it contains citations in the body of the report. Numerous questions have been raised in this review about when and where impacts actually occurred, impacts cataloged in the 6th Report as if associated with 6th-period mining. The 6th Report appears to have received no careful editing or attention from Department managers who are knowledgeable about underground mining or interested in the regulatory protection of Commonwealth residents or resources.

On pages 9-10 of the 6th Act 54 Report, "public input" is discussed, and both the DEP's Citizens Advisory Council (CAC) and the nonprofit Citizens Coal Council (CCC) are mentioned. CAC, which by law must receive a copy of each 5-year Act 54 report, has provided voluminous, thoughtful comments in its reviews of each Act 54 report, including more than 100 pages in its review of the 5th Act 54 Report (CAC 2023). Many of CAC's comments highlight problems with the Act 54 reports and with the DEP Mining Program's inept, ongoing data collection. CAC also offered pointed, practical suggestions for improvement in both regards. Yet the 6th Report merely states that Mining Program staff have "*responded to Council questions and supplied additional supporting information,"* which, though it may be true, severely understates the extent to which CAC comments, questions, and suggestions have been ignored.

For example, following the release of the 4th Act 54 Report in 2014, the Department contracted with the USGS to conduct a study in southwestern PA to help mine operators and DEP staff better evaluate the effects of mining on natural streamflow and to assist in maintaining and protecting the existing and designated uses of intermittent and perennial streams. The study was expected to be completed by the end of 2017. An internal workgroup established by DEP's Mining Program in 2017 to evaluate the 4th Act 54 Report's recommendations identified several "action items" to be addressed regarding stream protection. The workgroup proposed making programmatic changes to its stream protection program for underground mining and revising the TGD on stream protection, noting that those changes would be made after completion of the USGS study. The USGS study was completed in 2019 (Hittle and Risser 2019).

In its formal comments dated May 26, 2023, to the Department regarding the 5th Act 54 Report, the Citizens Advisory Council wrote:

> *The new, practical USGS methodology for characterizing pre-mining baseflow hydrology clearly would provide a major improvement in the documentation of conditions in streams threatened by water loss atop longwall mines, but the Department has not moved to recognize, much less adopt such methodology, into its technical guidance for stream protection. 153 incidents of significant stream flow loss were recorded affecting 24.6 miles of streams (29% of the total stream miles undermined) during the 5th Report period. Thus the Council strongly recommends that the Department adopt the mandatory use of the USGS methodology to characterize pre-mining baseflow hydrology in all longwall permit applications as soon as possible.*

Despite the USGS study's completion more than 6 years ago, CAC recommendations that it be incorporated into revised guidance for stream protection, and DEP's previous assertions that it would be, DEP's Mining Program has yet to make any changes to its stream protection program or hydrologic guidance based on the study. No mention of the USGS study appears in the 6th Act 54 Report.

Regarding CCC involvement, the 6th Report states, "*The Department reviewed and considered all comments and suggestions made by the CCC.*" Although the Department may have listened

to CCC's concerns, there is no evidence that **any** of the numerous substantive issues raised, many of which were also voiced by the CAC, have been addressed or implemented.

Thus, the underground mining program authorized by the 1994 Act 54 remains poorly regulated, sloppily documented, and unnecessarily damaging to the residents and resources of the Commonwealth, with minimal post-mining repair and restoration of surface resources.

SUMMARY AND CONCLUSIONS

The 6th Act 54 Report is essentially a haphazard compilation of selected raw BUMIS statistics that the Department has posted as Excel spreadsheet files on its website for the past several years. Some of the information in the Report is contradictory, and many of the numbers presented are clearly inaccurate. Raw, incomplete data are tabulated with little or no analysis.

The Report fails to analyze trends over time (except in a few instances where comparisons are made with the 5th Act 54 period) or to compare impacts and their resolutions by mining type (longwall v. room-and-pillar), even though the data were readily available (often in DEP's prior Act 54 reports). Consequently, transparency and credibility are significantly reduced in this 6th Act 54 Report compared with its predecessors. DEP authors of the 6th Report appear to have merely collected some of the data encountered during the designated report period, but clearly failed to examine the dates and locations of mine damage in any attempt to understand causal linkages or the accuracy with which "planned subsidence" can be predicted. Thus it is not surprising that damages to property and environmental resources are increasing in the coalfields of southwestern Pennsylvania.

Consequently, this 6th Act 54 Report documents that, due to the Department's administration, Act 54 is **not** working as intended, even though that is nowhere stated in the 131 pages of the main text and tables or the 153 pages of the Appendix A maps. Most impacts to structures and water supplies **are not** being repaired or restored as anticipated by the Act more than 30 years ago. Impacts to natural features---streams, wetlands, groundwater---are not well tracked or documented and are almost exclusively associated with one underground mining method (longwall).

Widespread use of NDAs prevents the Department from achieving a clear understanding of the ultimate outcome of most mining-related damages to structures. Post-mining repairs and restorations are rare. Implementation of any regulatory reform to the underground mining program has been extraordinarily slow, and the Department's Act 54 5-year reports obscure ongoing damages to landowners.

Perhaps because outside technical assistance was **not** used, this 6th Act 54 Report fails to provide the thoughtful analyses evident in the 2nd through 5th Act 54 Reports prepared for the Department by researchers from local universities. Those reports were not perfect and drew

sharp criticism for lacking cumulative analyses. But the 6th Report demonstrates a new low. A major Department failure persists---not integrating the detailed electronic map data provided by mine operators in permit applications with the assessment and enforcement data its staff enters into its BUMIS database---thereby minimizing the ability to analyze impacts.

One gets the impression that the Department is more concerned with "resolving" impacts than with protecting, repairing, replacing, or restoring damaged structures, waterways, and other features of areas undermined to produce bituminous coal. The poor presentation and lack of comparisons with prior Act 54 five-year report periods prevent both the public and their elected representatives from fully understanding the effects of recent underground mining on the resources, people, and communities of southwestern Pennsylvania. This 6th Report fails to meet the objectives of the analysis specified by the General Assembly when it adopted the Act 54 amendments. As a result, it fails to comply with the law.

AUTHORSHIP AND ACKNOWLEDGMENTS

This report was prepared on behalf of the Citizens Coal Council by Stephen P. Kunz, with assistance from James A. Schmid. Both are senior ecologists with Schmid & Company, Inc. Mr. Kunz has been a consulting ecologist since earning a degree in human ecology from Rutgers University in 1977. Dr. Schmid is a biogeographer and plant ecologist with more than 50 years of experience in ecological consulting. Both Mr. Kunz and Dr. Schmid are certified as Senior Ecologists by the Ecological Society of America and as Professional Wetland Scientists by the Society of Wetland Scientists.

Mr. Kunz and Dr. Schmid offer outstanding credentials as experts in ecology, wetlands, environmental regulation, and impact assessment. They have analyzed the environmental impacts of many kinds of proposed development activities in many states, including coal mining facilities, industrial and energy facilities, transportation facilities, and commercial and residential developments. They have prepared environmental inventories and written Environmental Impact Statements under contract to various federal, State, and local government agencies, and a diverse array of private sector entities.

Regarding the regulation of underground coal mining, they have reviewed and provided public comments on proposed new regulations, revisions to existing regulations, technical guidance documents, and permit application forms and procedures at both the state and federal levels. They have also reviewed and assessed specific coal mine permit applications on behalf of mine operators and the Department. Regarding Pennsylvania Act 54, they have reviewed and provided formal comments on all five five-year assessments and associated documents.

Citizens Coal Council (CCC) is a 501(c)(3) nonprofit environmental organization with deep roots in Southwestern Pennsylvania's coalfield communities. CCC has worked alongside residents and property owners whose homes, farms, water supplies, and streams have been

damaged by underground coal mining — helping them understand their rights and insist on real accountability from regulators and lawmakers. Over the years, CCC has produced seven reports examining DEP's process for approving longwall mines, participated in each Act 54 5-year reporting cycle beginning with the 4th report of 2008-2013, and worked with the DEP Citizens Advisory Council to publicly document and highlight community concerns about chronic problems permitted and enabled by the DEP. Those documents and CCC's series of constructively critical reports are publicly available on the CCC website.

CCC commissioned this independent technical review of the 6th Report because Pennsylvania's mining-impacted communities deserve honest, rigorous answers about what their government is — and is not — doing to protect them. The Citizens Coal Council is grateful to the Community Foundation for the Alleghenies and the Colcom Foundation for funding that made this report possible.

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Schmid & Company, Inc. 2025 (14 October). Comments on the 6th PADEP Bituminous Mine Subsidence and Land Conservation Act Report. Presented to the PADEP Citizens Advisory Council on behalf of the Citizens Coal Council. Media PA. 10 p. *https:www.schmidcoinc.com/6th_Report_Oral%20Comments_for_CAC.pdf*

Appendices A

Comments on Act 54 Annual Data Updates

Posted on the

Pennsylvania Department of Environmental Protection Web Page

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12 May 2021

Act 54 Yearly Data (annual updates, beginning with 2018, now are being provided by PADEP Mining Program; they are found at the following website: https://www.dep.pa.gov/Business/Land/Mining/BureauofMiningPrograms/Act-54-Yearly-Data/Pages/default.aspx

Excerpts from Act 54 Yearly Data opening webpage:

> *The Department compiles, on an ongoing basis, claims of effects from bituminous underground mining relating to land damage/subsidence, methane intrusion, structure damage, utility damage, water supply contamination and water loss, and stream impairments. With the availability of tools and applications that allow for* ***real time data compiling*** *and* ***public release****, the Department is publishing the data from the Bituminous Underground Mining Information System (BUMIS)* ***in an understandable format each year*** *beginning with the data from 2018*. [bold added]

We are pleased to learn that data extraction into tables is now more efficient and no longer requires manual recompilation from a data "dump" onto a spreadsheet. Apparently, the Department is making these data available to the public because they are more current ("real time") than the 5-year assessments, and it believes that the format and data it provides annually will be useful to the public ("understandable"). That is far from accurate. We cannot understand these data tables. Furthermore, these annual updates are not comparable with the data in the last 25 years' Act 54 Reports.

The Department appears not to have looked at the substance of what it has posted online. With some careful editing the current postings could begin to convey some useful information. However, we hope that the Department will go beyond simply correcting typos and adding necessary labels, and add some interpretative and basic analytical information as well.

The opening webpage begins with some general questions that the Department attempts to answer.

Why is the Department changing the process of data release?

The Department recognized several disadvantages to the production of reports every five years.

- *Because of the process to compose, review and finalize a report, the data contained in a report are at least a year old. A significant incident that occurred near the end of one report would not have a resolution until the next report was released five years later, which means the report information can feel outdated even upon issuance.* That is not convincing. *Resolution* of an incident does not depend on when in the period it occurs. Reporting on the resolution may, however, and it is important for the Department to keep close tabs on how long it takes from reported damage to final resolution, as well as the type of resolution (repair or not). None of these new tables does that.
- *Using outside contractors to collate the data and compose a report takes excessive time and funds. The Department can more quickly supply the raw data directly to the public.* Who decided the cost was "excessive", and compared to what? It should be noted that the federal OSMRE pays for half of the cost of the 5-Year Act 54 Reports. The Department's contractors have said repeatedly that most of their work consists of extracting data from files of the Department or of mine operators into a usable GIS system, which work apparently must be done over again each five years. Any discussion of "costs" should include the costs to coalfield residents, the public, and the environment that are being **externalized** by mine operators and

PADEP. Of what value are quickly-provided raw data when they are haphazard, unexplained, misleading, and incomplete as at present?

- *The recent reports contained significantly more background information than the law requires of the reports* (is this a legal interpretation? – the Department always should have the discretion to add any background needed in order to make information more useful and informative, both to the public and to decisionmakers*) resulting in repetition and a massive volume that is daunting to read* (first, let the public decide whether it is "daunting" to them; second, understanding the data would be less daunting if they were complete and not contradictory; third, the reports continue to be thin on analysis and recommendations for policymakers). *Reports remain available for reference* (only the ones already prepared, or will new 5-year reports also be produced in addition to the annual updates?), *but the Department will attempt to provide useful, more up-to-date data based on feedback we receive*. (**We provide herewith considerable feedback for your consideration.)**

Another of the general questions on the opening webpage seems simple enough:

How many underground mines are operating in Pennsylvania?

When you click on that link to expand it, the answer appears:

> There are currently approximately 80 underground mines (longwall and room and pillar mines) that are in various stages of activity or reclamation in Pennsylvania. This is a dynamic number that changes each year.
>
> List of existing mines updated December 2020

This might lead one to believe that there are 80 underground mines operating as of December 2020. But that is not correct. Indeed, there *are* 80 mines in the linked Excel list as of December 2020, but only 41 of them are listed as "Active" (a decrease from 49 active mines during the 5th Period). The other status categories include "Approved Cessation" (11), "Not Started" (3), "Stage 2 Approved" (7), "Stage 2 Eligible" (4), and "Stage 1/Regraded" (14). These appear to represent various types of inactive mines, but none of those categories is defined. Perhaps those categories are meaningful to Department staff, but they are not self-explanatory for others. Why include mines in "reclamation" in this list when reclamation is not part of Act 54? At the very least, the date that production ceased should be noted for each inactive mine listed.

If one focuses only on the 41 underground mines listed as "Active", one notices that under the column heading "OPER_CHAR_DESC" (not described anywhere), the mines are listed as being either (1) "Long Wall Mining" or (2) "Room and Pillar Mining". None is described as "Pillar Recovery[1]". Six of the Room and Pillar descriptions are highlighted in yellow on the Excel spreadsheet. What distinguishes the highlighted from the not-highlighted Room and Pillar mines is not defined either. Clearly, these data are not comparable to prior Act 54 report statistics. Comparability of data and analyses from one 5-year Report to another has not been a priority for the Department. It is unfortunate that these annual updates are not comparable to past reports.

The 5th Act 54 Report listed 49 mines that had been active at some point during the 5th five-year Period. Among them were 5 Pillar Recovery mines, but there are no mines labeled "Pillar

[1] The last four Act 54 reports provided details about 3 separate methods of mining, including Pillar Recovery (sometimes called pillar removal, pillar extraction, or retreat mining).

Recovery" among the 80 listed as "existing" in December 2020. Have all the Pillar Recovery mines closed? Apparently, the highlighting on 6 of the listed R&P mines is not meant to designate Pillar Recovery mines (only one of the 6 -- Prime #1 -- was identified as a Pillar Recovery mine in the 5th Act 54 Report, but that appears to be only a coincidence). Four of the five previous Act 54 Reports all separately assessed impacts and resolutions from Pillar Recovery mines, but no such evaluation is possible with these newer data. No explanatory discussion is included.

One of the "Long Wall Mining" mines listed as "Active" is called "**Ohio County Mine**". It is listed as being operated by "The Ohio County Coal Company" and is said to be located in West Finley Township in Washington County. The column for "permitted underground acres" for this mine is blank. No mine (or mine operator) by this name was discussed in the 5th Act 54 Report (or any previous Act 54 Report). The GIS mining files available from PASDA, updated to April 2021, identifies the **Ohio County Mine**, operated by Ohio County Coal Company in West Finley Township (Washington County), but notes that it was formerly known as Consol's **Shoemaker Mine**, and that the latest longwall panel completed there (14-A 8 North) was in 2005. The Shoemaker Mine was not mentioned in either the 5th or the 4th Act 54 Reports (covering 2008-2018); it was last discussed in the 3rd Act 54 Report (covering the period 2003-2008). If it has been renamed and reactivated by a new operator subsequent to the closing of the 5th Act 54 period, those relevant facts should be disclosed by PADEP for the benefit of the public.

To make the data understandable, the Excel list for December 2020 should, at minimum, have a column for previous mine (and mine operator) names, if applicable. It also should have additional columns listing when the mine was first permitted, and when the mine ceased production. And, as mentioned above, all column headings should be defined, and any special highlighting should be explained. There also ought to be a heading or title to the spreadsheet, and a date of last revision.

The Department explains on its website that these Annual Updates are a way for it to "*more quickly provide the raw data directly to the public*", because the 5-year reports required considerable time and expense involving outside contractors. These Annual Updates are meant to be an "*attempt to provide useful, more up-to-date data*" in "*an understandable format each year beginning with the data from 2018*". Those objectives are reasonable, but the data as posted to date do not begin to further them.

Instead, the data provided so far by the Department in these Annual Updates do exactly the opposite. They are not clear or understandable, they are not comparable to one another or to data presented in the 5-year Reports, and they are not useful to policymakers or the public who may wish to actually understand what is going on and where. Presumably this is the best that Department staff can do, given current resources. If the Department seeks to demonstrate that the 5-year Act 54 Reports were extremely valuable and should continue to be prepared by outside contract workers, then these tables make more sense. Department staff prepared the first Act 54 Report and a supplement to it; both were scathingly criticized.

One thing that **would be very useful** to the public, and in particular to residents of the coalfields in Washington and Greene Counties, would be an online interactive map application that compiles all of these underground mine data in a convenient and visual format. The application could be similar to the *FracTracker* maps (https://www.fractracker.org/map/us/pennsylvania/) that for more than 10 years now have been used to track oil and gas activity throughout the Commonwealth, as well as related impacts. The Department's Mining Program is receiving permit applications from most, if not all, underground mine operators in digital form. Those files include detailed and specific inventory information for structures, water supplies, wetlands, streams, etc. It also collects additional information such as the location of each mine's active mining at least every six months. To that the Department could add its ongoing compilation of impacts, restorations, and resolutions.

Then landowners could easily locate their property on the map and determine what mining-related activities are happening, what has already happened, and what is proposed to happen. The Department has indicated that it is expanding the records of latitude and longitude to impact categories other than streams. That appears to be a major step forward toward implementing a FracTracker-style geographical information system.

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The following sections examine the details of each of the eight specific impact categories provided in the Department's ***Act 54 Yearly Data***, which are listed alphabetically: Land Damage, Methane, Streams, Structures, Utilities, Water Contamination, Water Loss, and Wetlands. For most of these categories, data are provided for all of 2018, 2019, and 2020, and through March for 2021. We discuss each category in the order in which it appears in the tables posted on the website. We recommend that the relevant tables be viewed on the screen when reading the text below.

LAND DAMAGE

QUESTIONS/COMMENTS:

- Why include columns for Problem ID # (Column A) and Mine ID # (Column F)? These are not useful or relevant to the public, only perhaps to DEP, and should be deleted. If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- What is the relevance of Depth to Mining (Column J)? Land damage impacts in 2020 occurred where depths ranged from 300 to 1,000 (feet, presumably, beneath the site of observed impact) and in some cases no depth is reported. Depth of mining might be significant, but without further analysis, such as comparing it with other factors such as distance to reported mining damage and time to resolution, by itself it is confusing at best. This is a good example of the value of the recent 5-year Act 54 assessments, which provide more context, additional analyses, and useful explanation.

- What does Column K (Mining distance) mean? Is it the horizontal distance across the land surface from some kind of land impact to the nearest shadow area of a longwall panel? If not, what? And are the entries in "feet"? This should be clarified.

- Additional columns that *would* be useful and should be added:
    - Identify the "mine type" (longwall, room-and-pillar, or pillar recovery), because these are the categories in the Act 54 Reports.
    - Identify the "type/manner of resolution" (repair, compensation, etc.), again, to be consistent with Act 54 reporting.
    - Identify the "latitude/longitude" location of the limits of each impact, or at least the center of impact.
    - Identify the "acreage" of each land damage.
    - Identify the "mine panel(s)" nearest to where the impact occurred.

- Are all of these impacts "*reported* damages", are they all "*mine-liable* damages", or are they a mix? How can the public distinguish? Both classes are significant and should be reported for each impact. A separate column

is needed to make this distinction.

- According to your summary description for the Land Damages Data Section: "Land damage from underground coal mining are [sic] grouped into four main impact types: *Tension cracks, Flooding, Mass wasting, and Other* (such as localized sinkholes). Since the Excel table for this category is "Land Damage", it is unnecessary clutter, redundant, and not informative that the entries in column B (Description) all are "Land Damage"; instead, the entries in this column should identify which of the four types listed above is/are applicable.

- According to the description, a landowner is supposed to report a problem to the mine operator, who then has **10 days** to report it to DEP. What is "Date Problem Received"? Is this when it was reported to DEP by the operator? In some cases the entry is **much longer than 10 days** from when the problem occurred.

- All incidents of land damage should immediately be reported, not only to the operator but also to PADEP. Large gaps (more than 90 days) between when a problem occurred and when it was "received" (ex., Problem # 5809 in 2018, was **811 days**) should be flagged, investigated by the PADEP, and explained. There also should be a separate column in these tables for "Days from damage to reporting to PADEP".

- Clarify that the column "Time" (I) is "Time from Date Problem Received to Final Resolution" (if indeed that is what it is). And "time" should probably be replaced by "days", if that is what the entries signify.

- A column should be added stating the days elapsed between undermining by the panel and observation of impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- All column headings should be defined.

- What does it mean that a damage was resolved (i.e., "Time") in "0" days? What kinds of resolution are these, or were they determined to be not mine liable?

- An additional column that would be useful and should be added, right after Column H (Resolution) is "Type of Resolution", which should descriptively include repair, compensation, property purchase, secret agreement, etc.

- What is the relevance of last column (L, "RPZ") to land damage? The 5th Act 54 Report, and the Act itself, discuss the RPZ only in relation to water supply impacts. What is the distance/angle used for an RPZ for land damages? What empirical and/or legal support does it have?

- How can a land damage problem not be within the RPZ if it occurred "0" feet from the mining? (see for example "N" for Problem # 5937 in 2018)

- There needs to be some way to track in these tables the restoration status of land impacts beyond the year that the damage first occurred. Perhaps this requires an entirely new Excel sheet for "On-going Unresolved Land Damage Impacts".

- These tables should be supplemented with detailed maps that identify the location of each land damage impact and the responsible mine.

METHANE

It is unclear, and not explained, why the Department chose to include Methane as a separate category for these yearly updates. Methane has never been discussed separately in the Act 54 Reports, and it is not mentioned in Act 54. When it has been mentioned in the Act 54 Reports, it is included with the water loss/water contamination issue. Inasmuch as there are only 2 reported issues of "methane" among the 3.25 years covered by these yearly updates so far, it would appear to be simpler to have incorporated these two instances (one in 2018 and one in 2019) into the "water contamination" category.

QUESTIONS/COMMENTS:

- Why include columns for Problem ID # (Column A) and Mine ID # (Column F)? These are not useful or relevant to the public, only perhaps to DEP, and should be deleted. If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- As with other impacts from underground mining, the initial reporting of methane problems should be revised. Currently, the process works as follows, per the introductory paragraph on the Yearly Updates webpage:

> If a homeowner believes that undermining is causing a methane problem on their property, they report this to the mine operator. The operator will report the claim to the Department.

Accordingly, there may be a lag, sometimes a very large lag, between the occurrence of a problem and the Department learning about it. It would be more helpful to the affected public if the landowner was directed to initially notify both the mine operator and the Department at the same time. That way, if the operator does not resolve the problem in a timely fashion, then the Department will be aware, can intervene, and hopefully can help resolve the problem quicker.

- A separate column is needed to identify whether the impact was determined to be "*mine-liable*" or not (unless these tables list only those impacts which were determined to be mine-liable, in which case that should be explained up front).

- All column headings should be defined.

- Another column that would be useful and should be added after "Mine Name" (G) is "Mine Type" (longwall, room-and-pillar, or pillar recovery).

- An additional column that would be useful and should be added, right after Column H (Resolution) is "Type of Resolution", which should descriptively include repair, compensation, property purchase, secret agreement, etc.

-Is the column "Time" (I) reporting "Time from Date Problem Received to Final Resolution" (or something else)? And "time" should probably be replaced by "days", if that is what the entries signify.

- Clarify that the units in Column J (Mining depth) [below the observed impact?] and Column K (Distance to mining) [horizontal distance across the surface to shadow area above the nearest panel(s)?] are in "feet", if indeed that is what they are.

- The location of each methane issue should be identified by latitude/longitude.

- These tables should be supplemented with detailed maps that identify the location of each methane impact and the responsible mine.

STREAMS

Stream effects are subdivided into 3 categories: Flow Loss, Pooling, and Fracture/Heaving.

Flow Loss

QUESTIONS/COMMENTS:

- All column headings need to be defined. For example, it is not clear what the heading "Utility Name" (Column D) means in relation to streams. The entries in this column all appear to be stream or tributary segment numbers identifiable in PASDA (but whatever the source, it should be named).

- In addition to the stream number, a separate column for "Stream Name" should be added (just as it is for the Pooling" tables).

- The following columns are not useful or relevant to the public, only perhaps to DEP, and should be deleted: Utility Number (E), Panel ID (G), Flow Loss ID (K), and Impact ID (L). If they have some relevance and should be retained, they need to be explained.

- The 3 separate columns for Month/Day/Year could be combined into one "Date of Occurrence" or "Impact Date" (just as in the Pooling and Fracture/Heaving tables).

- One column that would be useful and should be added is "Mine Type" (longwall, room-and-pillar, or pillar recovery)

- Two columns that would be useful and should be added are "Designated Use" and "Existing Use" for each impacted stream segment pre-mining.

- Two more columns that would be useful and should be added are "Depth to Mining" and "Mining Distance", for each impacted stream segment, so that these tables are comparable to the others for Land Damage, Structures, etc.

- Another column that would be useful and should be added is "Predicted? Y/N", which datum should be available from Module 8 in every permit application.

- A column should be added stating the days elapsed between undermining by the panel and observation of flow loss impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- Three other columns that would be useful and should be added are "Date Augmentation Began", "Source of Augmentation Water", and "Date Restoration Began" ("restoration" being physical activities other than augmentation, such as shaving/grading heaves, grouting, liner installation, etc.).

- Another column that would be useful and should be added is "Status at Year End", which descriptively could include restored, augmentation ongoing, grouting ongoing, other restoration ongoing, restoration not begun, other.

- Another column should be added to indicate whether all or part of a specific Flow Loss impact overlaps geographically with either a pooling impact or a fracture/heave impact, and if so, by how much.

- There needs to be some way to track in these tables the restoration status of streams beyond the single year that the flow loss first occurred. Perhaps this requires an entirely new Excel sheet for "On-going/Unresolved Flow Losses". That table should identify the date of the initial impact as well as the elapsed time from initial impact either to documented restoration or to the date being reported on the table.

- These tables should be supplemented with detailed maps that identify the location of each flow loss impact and the responsible mine.

Stream Pooling

QUESTIONS/COMMENTS:

- The Update for 2020 for Pooling is simply a verbatim copy of the information in the 2018 Update. Provide actual 2020 information, if any was collected.

- The following columns are not useful or relevant to the public, only to DEP, and should be deleted: Panel ID (H), Impact ID (I), Utility Number (J), and Pooling ID (K). If they have some relevance and should be retained, then they need to be explained.

- One column that would be useful and should be added is "Company Name" (this would allow the Pooling table to be consistent with the Flow Loss and Heaving tables)

- Another column that would be useful and should be added is "Mine Type" (longwall, room-and-pillar, or pillar recovery)

- Two columns that would be useful and should be added are "Designated Use" and "Existing Use" pre-mining for each stream.

- Two more columns that would be useful and should be added are "Depth to Mining" and "Mining Distance", for each impacted stream segment, so that these tables are comparable to the other for Land Damage, Structures, etc.

- Another column that would be useful and should be added is "Predicted? Y/N", which should be available from Module 8 in every permit application.

- Two other columns that would be useful and should be added are "Maximum Depth of Pooling" observed in the affected segment, and "Consistency with Prediction" (more, less, same).

- A column should be added stating the days elapsed between undermining by the panel and observation of the pooling impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- Two other columns that would be useful and should be added are "Date Gate Cutting Began" and "Date Gate Cutting Completed" (this process typically lasts only a month or less). Gate Cutting should **not** be confused with pooling restoration, because the stream is not "restored" until after monitoring has documented that both the pre-mining flow and the pre-mining biology have been achieved.

- Another column that would be useful and should be added is “Status at Year End”, which descriptively could include: gate cutting not begun, gate cutting ongoing, post-gate cut monitoring ongoing, or flow/biological restoration complete.

- Another column should be added to indicate whether all or part of a specific Pooling impact overlaps geographically with either a flow loss impact or a fracture/heave impact.

- There needs to be some way to track in these tables the restoration status of streams beyond the year that the pooling first occurred. Perhaps this requires an entirely new Excel sheet for “On-going/Unresolved Pooling Impacts”. That table should identify the date of the initial impact as well as the elapsed time from initial impact either to documented flow/biological restoration or to the date being reported on the table.

- These tables should be supplemented with detailed maps that identify the location of each pooling impact and the responsible mine.

Stream Fracture/Heaving

QUESTIONS/COMMENTS:

- The typo “Frature” at the top of the 2018 and 2020 tables should be corrected to “Fracture”.

- The typo “Pamel ID” at the top of the 2018 and 2019 tables should be corrected to “Panel ID”.

- The following columns are not useful or relevant to the public, only perhaps to DEP, and should be deleted: Utility Number (E or F, depending on year), Panel ID (G or H), Fracture ID (I or L), and Impact ID (J or M). If they have some relevance and should be retained, then they need to be explained.

- The column “Utility Name” (E) in the 2018 and 2019 tables should be renamed “Stream ID” to be consistent with the 2020 table (Column D).

- One column that would be useful and should be added, in addition to the “Stream ID” number, is “Stream Name” (this would allow the Fracture/Heaving table to be consistent with the Pooling table).

- The asterisk in Column N (length of Fracture/Heave) in the 2019 table should be explained like it is in the 2018 table, and the “a” in the same column in the 2020 table should be changed to an asterisk.

- Another column that would be useful and should be added is “Mine Type” (longwall, room-and-pillar, or pillar recovery).

- Two columns that would be useful and should be added are “Designated Use” and “Existing Use” pre-mining for each stream.

- Two more columns that would be useful and should be added are “Depth to Mining” and “Mining Distance”,

for each impacted stream segment, so that these tables are comparable to the other for Land Damage, Structures, etc.

- It is not clear how Fracture/Heaving differs or is distinguished from Flow Loss. A column should be added to indicate whether all or part of a specific Fracture/Heaving impact overlaps geographically with either a flow loss or a pooling impact.

- Two other columns that would be useful and should be added are "Predicted? Y/N" which should be available from Module 8 in every permit application, and "Consistency with Prediction" (more, less, same).

- A column should be added stating the days elapsed between undermining by the panel and observation of the fracture/heaving impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- Another column that would be useful and should be added is "Date Restoration Began".

- Another column that would be useful and should be added is "Status at Year End", which could include descriptively restored, restoration ongoing, restoration not begun, other.

- There needs to be some way to track in these tables the restoration status of streams beyond the year that the fracture/heaving first occurred. Perhaps this requires an entirely new Excel sheet for "On-going/Unresolved Fracture/Heaving Impacts". That table should identify the date of the initial impact as well as the elapsed time from initial impact either to documented restoration or to the date being reported on the table.

- These tables should be supplemented with detailed maps that identify the location of each fracture/heaving impact and the responsible mine.

STRUCTURES

QUESTIONS/COMMENTS:

- All column headings need to be defined. For example, it is not clear what the heading "Time" (Column I) refers to – it should be the elapsed time from damage to resolution but appears to be the time from when a problem was "received" (and what is "received"? received by whom, DEP?) to resolution. Time presumably refers to "days" and the heading probably should be changed to "Days from __to ___". Entries with a zero or a blank need to be explained.

- All incidents of structure damage should immediately be reported, not only to the operator but to PADEP. Large gaps (more than 90 days) between when a problem occurred and when it was "received" (such as Problem ID 6238 in 2020, where the gap is **140 days**) should be flagged, investigated by the PADEP, and explained. There also should be a separate column for it in these tables (Days from damage to reporting to PADEP).

- The following columns are not useful or relevant to the public, only perhaps to DEP, and should be deleted: Problem ID (A), and Mine ID (F). If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- Column B (Description) is unnecessary clutter, redundant, and not informative, inasmuch as all its entries are "structure damage" and this entire table is for Structure Damage. It would be better to change the heading to "Type of structure", and list such things as: dwelling, outbuilding, barn, church, etc.

- Another column that would be useful and should be added after "Mine Name" (G) is "Mine Type" (longwall, room-and-pillar, or pillar recovery).

- A separate column is needed to identify whether the impact was determined to be "*mine-liable*" or not (unless these tables list only those impacts which were determined to be mine-liable, in which case that should be explained up front).

- A column should be added stating the days elapsed between undermining by the panel and observation of the structure impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- An additional column that would be useful and should be added, right after Column H (Final Resolution Date) is "Type of Resolution", which should include descriptive entries such as repair, compensation, property purchase, secret agreement, etc.

- What is the relevance of Mining Depth (Column J)? Impacts in 2020 occurred where depths range from 220 to 1,000 (feet, presumably). Depth of mining beneath the impact site might be significant, but without further analysis, such as comparing it with other factors such as distance to mining and time to resolution, by itself it is confusing at best. This is a good example of the value of the 5-year Act 54 assessments, which provide more context, additional analyses, and useful explanation.

- What does Column K (Distance to Mining) mean? Is it the horizontal distance from the impacted structure to the shadow area of the nearest longwall panel(s)? If not, what? And if the entries are in "feet", that should be stated.

- What is the relevance of the last column (L, "RPZ") to structure damage? The 5th Act 54 Report, and the Act itself, discuss the RPZ only in relation to water supply impacts. What is the distance/angle used for an RPZ for structure damages? What are the empirical and legal bases for this RPZ?

- The location of each structure issue should be identified by latitude/longitude.

- These tables should be supplemented with detailed maps that identify the location of each structure impact and the responsible mine.

UTILITIES

QUESTIONS/COMMENTS:

- It's not clear why this category is included at all. Damage to utilities is not specifically mentioned in Act 54. The general public is not particularly concerned about damages to (public/private?) utilities, unless it directly affects their service. These impacts appear to be very uncommon (one in 2018, one in 2019, and none in 2020 or the first quarter of 2021), and might better be combined with "structures".

- Why include columns for Problem ID # (Column A) and Mine ID # (Column F)? These are not useful or relevant to the public, only perhaps to DEP, and should be deleted. If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- Column B (Description) is unnecessary clutter, inasmuch as all of the entries are "Utility", but that should be obvious because the tables in this group all are "Utility". Column C (Description) is more informative.

- A column that would be useful and should be added after G (Mine Name) is "Mine Type" (longwall, room-and-pillar, or pillar recovery).

- Another column that would be useful and should be added before H (Final Resolution Date) is "Final Resolution", which should be populated with descriptive entries such as repair, compensation, property purchase, secret agreement, etc.

- A separate column is needed to identify whether the impact was determined to be "*mine-liable*" or not (unless these tables list only those impacts which were determined to be mine-liable, in which case that should be explained up front).

- Clarify that the column "Time" (I) is "Time from Date Problem Occurred to Final Resolution" (if indeed that is what it is). And "time" should probably be replaced by "days", if that is what the entries signify.

- A column should be added stating the days elapsed between undermining by the panel and observation of the utility impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- What is the relevance of the last column (L, "RPZ") to utility damage? The 5th Act 54 Report, and the Act itself, discuss the RPZ only in relation to water supply impacts. What is the distance/angle used for an RPZ for utility damages? What are the empirical and legal bases for this RPZ?

- The location of each utility issue should be identified by latitude/longitude.

- These tables should be supplemented with maps that identify the location of the utility impacts and the responsible mine.

WATER LOSS

QUESTIONS/COMMENTS:

- All column headings need to be defined. For example, it is not clear what the heading "Time" (Column I) refers to – it appears to be the time from when a problem was "received" (and what is "received"? received by whom, DEP?) to resolution. Time presumably refers to "days" and the heading probably should be changed to "Days to ___". Entries with a zero or a blank need to be explained.

- All incidents of water supply damage should immediately be reported, not only to the mine operator but to PADEP. According to the introductory description for Water Loss, "*If the water user or owner believes their water has been affected by mining, they must contact the mine operator. The operator will then report this to the Department within 24 hours."* This often is the case, but not always. Large gaps (more than 90 days)

between when a problem occurred and when it was reported to the Department, or "received" (such as Problem ID 6210 in 2020, where the gap is **731 days**, or Problem ID 5745 in 2018, where the gap is **2,929 days** [8 years, 7 days]) should be flagged, investigated by the PADEP, and explained. There also should be a separate column for it in these tables (Days from damage to reporting to PADEP).

- The following two columns are not useful or relevant to the public, only perhaps to DEP, and should be deleted: Problem ID (A), and Mine ID (F). If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- Column B (Description) is unnecessary clutter, redundant, and not informative, inasmuch as all its entries are "water loss" and this entire table is for Water Loss. It would be better to change the heading to "Type of water supply", and list such things descriptively as: well, spring, pond, etc.

- A column that would be useful and should be added after "Mine Name" (G) is "Mine Type" (longwall, room-and-pillar, or pillar recovery).

- A separate column is needed to identify whether the impact was determined to be "*mine-liable*" or not (unless these tables list only those impacts which were determined to be mine-liable, in which case that should be explained up front).

- A column should be added reporting whether the impact was predicted ("Predicted? Y/N") according to Module 8 of the permit application.

- An additional column that would be useful and should be added, right after Column H (Final Resolution Date) is "Type of Resolution", which should include repair of damaged well, new well, connection to public supply, compensation, property purchase, secret agreement, etc.

- A column should be added stating the days elapsed between undermining by the panel and observation of the water loss impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- What is the relevance of Depth to Mining (Column J)? Impacts in 2020 occurred where depths range from 100 to 938 (feet, presumably). Depth of mining might be significant, but without further analysis, such as comparing it with other factors such as distance to mining and time to resolution, by itself it is confusing at best. This is a good example of the value of the 5-year Act 54 assessments, which provide more context, additional analyses, and useful explanation.

- What does Column K (Mining Distance) mean? Is it the horizontal distance from the impacted water supply to the nearest longwall panel? If not, what? And if the entries are in "feet", that should be stated.

- The location of each water loss issue should be identified by latitude/longitude.

- These tables should be supplemented with detailed maps that identify the location of each water loss impact and the responsible mine.

WATER CONTAMINATION

QUESTIONS/COMMENTS:

- All column headings need to be defined. For example, it is not clear what the heading "Time" (Column I) refers to – it appears to be the time from when a problem was "received" (and what is "received"? received by whom, DEP?) to resolution. Time presumably refers to "days" and the heading probably should be changed to "Days from ___ to ___". Entries with a zero or a blank need to be explained.

- All incidents of water contamination should immediately be reported, not only to the mine operator but to PADEP. According to the introductory description for Water Loss, "*If the water user or owner believes their water has been affected by mining, they must contact the mine operator. The operator will then report to the Department within 24 hours."* This often appears to be the case, but not always. Large gaps between when a problem occurred and when it was reported to the Department, or "received" (such as Problem ID 6333 in 2020, where the gap is **75 days,** or Problem ID 6473 in 2021, where the gap is **1,101 days**) should be flagged, investigated by the PADEP, and explained. There also should be a separate column for it in these tables (Days from damage to reporting to PADEP).

- A separate column is needed to identify whether the impact was determined to be "*mine-liable*" or not (unless these tables list only those impacts which were determined to be mine-liable, in which case that should be explained upfront).

- The following two columns are not useful or relevant to the public, only perhaps to DEP, and should be deleted: Problem ID (A), and Mine ID (F). If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- Column B (Description) is unnecessary clutter, redundant, and not informative, inasmuch as all its entries are "water contamination" and this entire table is for Water Contamination. It would be better to change the heading to "Type of water supply", and list such things as: well, spring, pond, etc.

- A column that would be useful and should be added after "Mine Name" (G) is "Mine Type" (longwall, room-and-pillar, or pillar recovery).

- A column should be added reporting whether the impact was predicted ("Predicted? Y/N") according to Module 8 of the permit application.

- An additional column that would be useful and should be added, right after Column H (Final Resolution Date) is "Type of Resolution", which should include descriptive entries such as cleanup of damaged well, new well, connection to public supply, compensation, property purchase, secret agreement, etc.

- A column should be added stating the days elapsed between undermining by the panel and observation of the water contamination impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- What is the relevance of Depth to Mining (Column J)? Impacts in 2020 occurred where depths range from 135 to 1,024 (feet, presumably). Depth of mining might be significant, but without further analysis, such as comparing it with other factors such as distance to mining and time to resolution, by itself it is confusing at best. This is a good example of the value of the 5-year Act 54 assessments, which provide context, additional analyses, and useful explanation.

- What does Column K (Mining Distance) mean? Is it the horizontal distance from the impacted water supply to the nearest longwall panel(s)? If not, what? And if the entries are in "feet", that should be stated.

- The location of each water contamination issue should be identified by latitude/longitude.

- These tables should be supplemented with detailed maps that identify the location of each water contamination impact and the responsible mine.

WETLANDS

QUESTIONS/COMMENTS:

- There are no data or annual spreadsheets provided for wetlands. The explanation in part, as provided in the introduction, is:

> *As part of the permitting process, mine operators are required to delineate wetlands in each permitted area prior to mining and again five years post-mining. If a net loss in wetlands is identified during the post-mining delineation, the operators are required to develop a mitigation plan in which new wetlands of an equivalent size and quality will be created.*
>
> *Data on wetlands consists of measuring acreage of small parcels of land before and after mining. The Department is still formulating a way to represent this data and more will be available in future updates.*

The delineation of wetlands pre- and post-mining has been described in TGD 563-2000-655 since 2005. The Corps Manual for wetland identification and delineation (adopted by the Department) has existed since 1987, and regional supplements were published nearly a decade ago. According to the TGD, wetlands are to be delineated prior to mining, and a prediction is supposed to be made as to whether the wetland will be adversely affected. Each wetland then is supposed to be assessed 12 months following mining. It is unclear whether the 12-month follow-ups are ever done, or whether any predictions of adverse wetland effects ever are made or followed-up. No agency reviews of the accuracy of wetland delineations pre- or post-mining are being conducted, even though there exists a formal (and cost-free) process to do so, called a Corps of Engineers JD (jurisdictional determination). Thus, the accuracy of any wetland assessment regarding net changes is highly suspect.

Section 10 in the Department's 5th Act 54 Report notes that wetland data collected and evaluated by the Department are inadequate:

> *As a result of the incomplete and inconsistent data obtained for wetlands, the University could only report limited conclusions.*

These fundamental deficiencies in the identification of wetlands must be corrected before the Department can credibly assert that it is protecting these valuable and scarce resources.

Appendices B

Comments on *Act 54 Yearly Data* Updates

As Posted on the
Pennsylvania Department of Environmental Protection Web Page

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12 May 2021
Revised 9 December 2021

INTRODUCTION

Since the end of 2020, the PADEP Bureau of Mining Programs has posted on its website, and periodically updated, **Act 54 Yearly Data** (beginning with 2018 data):
https://www.dep.pa.gov/Business/Land/Mining/BureauofMiningPrograms/Act-54-Yearly-Data/Pages/default.aspx

These Yearly Data provide certain information about ongoing impacts to structures, water supplies, land, and streams from underground coal mining operations subsequent to the publication of the latest (5th) 5-Year Act 54 Report. According to the opening webpage:

> *With the availability of tools and applications that allow for **real time data compiling** and **public release**, the Department is publishing the data from the Bituminous Underground Mining Information System (BUMIS) **in an understandable format each year** beginning with the data from 2018.* [bold added]

The format of the posted BUMIS data is far from "understandable". Terms and table headings are not defined. Also, these Yearly Data updates are mostly not comparable with the underground coal mining data that have been analyzed and made publicly available over the last 25 years in the Department's 5-Year Act 54 Reports.

We first examined these *Act 54 Yearly Data* updates and provided specific comments and suggestions for improvement to them to the Bureau of Mining Programs in May 2021. Since then, some helpful changes and corrections to the online Yearly Data have been made by the Department. Now, seven months later, we are revisiting the Yearly Data updates. This revised Commentary examines each of the 9 "Data Sections", identifies changes that we notice have been made since May 2021, and lists changes that we believe still should be made to make the data more useful and understandable to the general public. We are providing this revised Commentary both to the Mining Program, and also to the link provided on the Updates webpage which solicits comments or suggestions (RA-EPMININGPERMITS@pa.gov).

In the sections below we repeat suggestions/comments that we made in May 2021 that have not yet been changed (in **black bold**). We also identify recent changes that we recognize and which we believe are positive/beneficial (in **green bold**) or not helpful (in **red bold**). (Note: all brown text is quoted directly from the *Act 54 Yearly Data* webpage as of November 2021.)

One of the general questions on the opening webpage is:

> How many underground mines are operating in Pennsylvania?

When you click on this link, you get a list of "existing mines" (as of December 2020). This list has not been recently updated, but hopefully *will* be updated at the end of 2021. This list identifies 41 "active" mines, including 7 longwall mines. [The other status categories include "Approved Cessation" (11), "Not Started" (3), "Stage 2 Approved" (7), "Stage 2 Eligible" (4), and "Stage 1/Regraded" (14). These appear to represent various types of inactive mines tracked by the Department, but none of those categories is defined.]

- The status categories (and all other headings) should be defined.

- Columns should be added listing when each mine was first permitted, and when the mine ceased production (if applicable).

- An interactive map has been added which identifies active and pending mine boundaries, and longwall panels (active, completed, or projected). These are helpful.

The following pages provide specific comments and suggestions for each of the 9 Data Sections, in the alphabetical order they are listed on PADEP's *Act 54 Yearly Data* webpage.

1. LAND DAMAGE

Data for land damage are presented for 2018, 2019, 2020, and through 29 November 2021.

- Columns for Problem ID # (Column A) and Mine ID # (Column F) should be deleted. These are not informative or relevant to the public, only perhaps to DEP. If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- The relevance of Column K (Depth to Mining) should be explained (presumably the numbers are in "feet" and represent distance to coal existing beneath the site of the observed impact). In some cases no depth is reported. Depth of mining might be significant, but without further analysis, such as comparing it with other factors such as distance to reported mining damage and time to resolution, by itself it is confusing at best. This is a good example of the value of the 5-year Act 54 assessments, which provide more context, additional analyses, and useful explanation.

- Column L has been renamed to make clear it is the "Distance to Nearest Mining". Presumably it is the horizontal distance across the land to the nearest vertical shadow area of a longwall panel -- if not, what? And are the entries in "feet"? This should be clarified.

- Additional columns that would be useful and should be added:

- **Identify the "mine type" (longwall, room-and-pillar, or pillar recovery), because these are the long-established categories in the Act 54 Reports.**
- **Identify the "latitude/longitude" location of the limits of each impact, or at least the center of impact.**
- **Identify the "acreage" or "square footage" of each land damage.**
- **Identify the "mine panel(s)" nearest to where the impact occurred.**

- A new column (J) "Description" [of the final resolution] has been added; this helps make these data more useful and also consistent with Act 54 reporting.

- It is not clear whether all of these impacts are "*reported* damages", are all "*mine-liable* damages", or are a mix. Both classes are significant and should be noted for each impact. A separate column should be added to make this distinction, and to identify who "reported" the damage (landowner, operator, shadow inspector, etc.).

- The summary description for the Land Damages Data Section notes: "Land damage[s] from underground coal mining are grouped into four main impact types: *Tension cracks, Flooding, Mass wasting, and Other* **(such as localized sinkholes). Since the Excel table for this category is "Land Damage", it is unnecessary clutter, redundant, and not informative that all the entries in column B (Description) are "Land Damage"; instead, the entries in this column should identify which of the four types listed above is/are applicable.**

- According to the introductory description on the website, a landowner is supposed to report a problem to the mine operator, who then has 10 days to report it to DEP. "Date Problem Received" is not clear. Is this when it was reported to DEP by the operator? In some cases the entry is much longer than 10 days from when the problem occurred. These should be investigated.

- All incidents of land damage should be reported immediately, not only to the operator but also to PADEP. Large gaps (more than 90 days) between when a problem occurred and when it was "received" (ex., Problem # 5809 in 2018, was 811 days) should be flagged, investigated by the PADEP, and explained in footnotes. There also should be a separate column in these tables for "Days from damage to reporting to PADEP".

- The column previously labelled "Time" has been clarified as "Time to [presumably Final] **Resolution". The word "time" should probably be replaced by "days", because that apparently is what the entries**

signify. Also, this duration should be measured from when the damage *occurred*, not when the DEP learned about it.

- A column should be added stating the days elapsed between undermining by the nearest panel and observation of impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- All column headings should be defined.

- The column "RPZ" has been deleted. This is appropriate, inasmuch as the 5th Act 54 Report, and the Act itself, discuss an RPZ only in relation to water supply impacts.

- There needs to be some way to track in these tables the restoration status of land impacts beyond the year that the damage first occurred. This may require an entirely new Excel sheet for "On-going Unresolved Land Damage Impacts".

- These tables should be supplemented with detailed maps that identify the location of each land damage impact and the resolution status.

2. MAPS

Links to the following 6 GIS interactive maps or tools are now provided:

- **Underground Bituminous Coal Mining**
- **PA DEP GIS Open Data Portal**
- **PASDA**
- **PA Mine Map Atlas**
- **PA Historic Underground Mine Map Inventory System**
- **PA DEP Mine Subsidence Insurance Risk Map**

This is a good start toward digitizing some Act 54 information. For the most part, however, these maps/tools only show existing or historical mining information. What would be more helpful and important in the context of Act 54 is to map the effects of underground coal mining: to structures, water supplies, streams, etc., including the specific location of impacted features, whether or not the impact was predicted, the nature of the impact, and the type and status of restoration or resolution. These *Act 54 Yearly Data* updates are meant to be annual interim updates between the formal 5-year Act 54 Reports. As reported in the 5th Act 54 Report in 2020 (and as also was the case for the 4th and 3rd Reports), much of the data was provided to the University researchers by the Department and by mine operators in digital formats and incorporated into GIS databases created specifically for those analyses; the Act 54 Reports discuss having received or created GIS shapefiles or other spatial data files for most of the key elements evaluated. Thus, to be comparable to the 5-year Reports, these updates should likewise provide digital representations of the annually-reported effects of underground mining.

3. METHANE

Given the fact that methane is now recognized as a key greenhouse gas (although its discharges into the atmosphere by coal mines are not regulated or monitored), it is encouraging to see methane listed here as an area of concern to the Department. However, it is unclear, and not explained, why the Department chose to include methane as a separate category for these *Act 54 Yearly Data* updates. Methane has never been discussed separately in the Act 54 Reports, and it is not mentioned in Act 54. When it *has* been mentioned at all in the Act 54 Reports, it typically is included with the water supply loss/contamination issue. Inasmuch as there are only 2 reported issues with "methane" during the nearly 4 years covered by these yearly data updates through 29 November 2021 (one in 2018 and one in 2019), and both relate to methane in a water well, it would be simpler to have incorporated these two instances into the "water contamination" category.

- Columns for Problem ID # (Column A) and Mine ID # (Column F) should be deleted These are not informative or relevant to the public, only perhaps to DEP. If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- As with other impacts from underground coal mining, the initial reporting of methane problems should be revised. Currently, the process works as follows, per the introductory paragraph on the *Act 54 Yearly Data* updates webpage:

> If a homeowner believes that undermining is causing a methane problem on their property, they report this to the mine operator. The operator will report the claim to the Department.

Accordingly, there can be a lag (in the 2019 case, 37 days) between the occurrence of a methane "problem" and the Department learning about it. It would be more helpful to the affected public if the landowner was directed to initially notify both the mine operator and the Department at the same time. That way, if the operator does not resolve the problem in a timely fashion, then the Department will be aware, can intervene, and hopefully can help resolve the problem quicker.

- The column previously labelled "Time" has been clarified as "Time to [presumably Final] **Resolution". The word "time" should probably be replaced by "days", because that apparently is what the entries signify. Also, this duration should be measured from when the damage *occurred*, not when the DEP learned about it.**

- It is not clear whether both of the listed impacts are "*reported* damages", are "*mine-liable* damages", or are a mix. Both classes are significant and should be noted for each impact. A separate column should be added to make this distinction, and to identify who "reported" the damage (landowner, mine operator, shadow inspector, etc.).

- All column headings should be defined.

- Another column that would be useful and should be added after "Mine Name" (G) is "Mine Type" (longwall, room-and-pillar, or pillar recovery).

- A new column (J) "Description" [of the final resolution] has been added; this helps make these data more useful and also consistent with Act 54 reporting.

- The column "Distance to Mining" has been renamed to make clear it is the "Distance to Nearest Mining". Presumably it is the horizontal distance across the land to the nearest vertical shadow area of a longwall panel -- if not, what?

- Clarify that the units in Column K (Mining depth) and Column L (Distance to nearest mining) are in "feet", if indeed that is what they are.

- The column "RPZ" has been deleted. This is appropriate, inasmuch as the 5th Act 54 Report, and the Act itself, discuss an RPZ only in relation to water supply impacts.

- The location of each methane issue should be identified by latitude/longitude.

- These tables should be supplemented with detailed maps that identify the location of each methane impact and the resolution status.

4. STREAMS

Stream effects are subdivided into 3 categories: Flow Loss, Pooling, and Fracture/Heaving. Data reportedly are current as of 11 June 2021, but no data for 2021 are provided in any of the 3 categories.

Stream Flow Loss

- All column headings need to be defined. For example, it is not clear what the headings "Utility ID" (Column L) or "Utility #" (Column M) mean in relation to streams. These columns should be deleted.

- The following columns now grouped under "BUMIS Information" (are not all of these tabulated data from BUMIS?) are not informative or relevant to the public, only perhaps to DEP, and should be deleted: Flow Loss ID (I), Impact ID (J), Panel ID (K), Utility ID (L), and Utility # (M). If they have some relevance and should be retained, they need to be explained.

- A column "Mining Type" (longwall, room-and-pillar, or pillar recovery) now has been added (Column D) after the Mine Name (Column C).

- The 3 separate columns for Month/Day/Year now have been combined into one "Date of Occurrence".

- Column F ("Stream") now identifies the stream name/number.

- Two columns that would be useful and should be added are "Designated Uses" and "Existing Uses" for each impacted stream segment pre-mining.

- Two more columns that would be useful and should be added are "Depth to Mining" and "Mining Distance", for each impacted stream segment, so that these tables are comparable to the others for Land Damage, Structures, etc.

- Two columns that would be useful and should be added are "Predicted? Y/N" (which datum should be readily available from Module 8 in every permit application), and "Consistency with Prediction Length" (longer, shorter, same).

- A column should be added stating the days elapsed between undermining by the panel and observation of flow loss impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- Other columns that would be useful and should be added are "Date Augmentation Began" and "Source of Augmentation Water", and "Type of Restoration" ("Restoration" being physical activities *other than* augmentation, such as shaving/grading heaves, grouting, liner installation, etc.) and "Date Restoration Began".

- Another column that would be useful and should be added is "Status at Year End", which descriptively could include entries such as: restored, augmentation ongoing, grouting ongoing, other restoration ongoing, restoration not begun, other.

- Another column should be added to indicate whether all or part of a specific Flow Loss impact overlaps geographically with either a pooling impact or a fracture/heave impact, and if so, by how much.

- Another column should be added to indicate the elapsed time from initial impact to either documented restoration or to the date being reported on the table.

- These tables should be supplemented with detailed maps that identify the location of each flow loss impact and the type and status of restoration.

Stream Pooling

- The Update for 2020 for Pooling has been corrected, and no longer is simply a verbatim copy of the information in the 2018 Update.

- The following columns now grouped under "BUMIS Information" (are not all of these data from BUMIS?) are not informative or relevant to the public, only perhaps to DEP, and should be deleted: Impact ID (I), Panel ID (J), Pooling ID (K), Utility ID (L), and Utility # (M). If they have some relevance and should be retained, they need to be explained.

- One useful column that has been added is "Company Name" (Column B).

- Another useful column that has been added is "Mining Type" (Column D; longwall, room-and-pillar, etc.)

- Two columns that would be useful and should be added are "Designated Uses" and "Existing Uses" pre-mining for each stream.

- Two more columns that would be useful and should be added are "Depth to Mining" and "Mining Distance", for each impacted stream segment, so that these tables are comparable to the others for Land Damage, Structures, etc.

- Another column that would be useful and should be added is "Maximum/Minimum Depth of Pooling" observed in the affected segment.

- Two columns that would be useful and should be added are "Predicted? Y/N" (which should be readily available from Module 8 in every permit application), and "Consistency with Prediction Length" (longer, shorter, same).

- A column should be added stating the days elapsed between undermining by the panel and observation of the pooling impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- Two other columns that would be useful and should be added are "Date Gate Cutting Began" and "Date Gate Cutting Completed" (this process typically lasts only a month or less). Gate Cutting should *not* be confused with pooling restoration, because (a) the gate cutting is additional impact to the stream which typically does not entirely overlap the pooled section, and (b) the stream is not "restored" until after monitoring has documented that both the pre-mining flow and the pre-mining biology have been achieved throughout the impacted stream segment.

- Another column that would be useful and should be added is "Status at Year End", where entries descriptively could include: gate cutting not begun, gate cutting ongoing, post-gate cut monitoring ongoing, or flow and biological restoration complete.

- Another column should be added to indicate whether all or part of a specific Pooling impact overlaps geographically with either a flow loss impact or a streambed fracture/heave impact.

- Another column should be added to indicate the elapsed time from initial impact to either (1) the documented restoration or (2) the date being reported on the table.

- These tables should be supplemented with detailed maps that identify the location of each pooling impact and the type and status of restoration.

Stream Fracture/Heaving

- The typo "Frature" at the top of the 2018 and 2020 tables has been corrected to "Fracture".

- The typo "Pamel ID" at the top of the 2018 and 2019 tables has been corrected to "Panel ID".

- The following columns now grouped under "BUMIS Information" (are not *all* of these data from BUMIS?) are not informative or relevant to the public, only perhaps to DEP, and should be deleted: Fracture ID (I), Impact ID (J), Panel ID (K), Utility ID (L), and Utility # (M). If they have some relevance and should be retained, they need to be explained.

- A useful column that has been added is "Mining Type" (Column D; longwall, room-and-pillar, etc.)

- Two columns that would be useful and should be added are "Designated Uses" and "Existing Uses" pre-mining for each impacted stream segment.

- Two more columns that would be useful and should be added are "Depth to Mining" and "Mining Distance", for each impacted stream segment, so that these tables are comparable to the others for Land Damage, Structures, etc.

- It is not clear how streambed Fracture/Heaving differs or is distinguished from Flow Loss. A column should be added to indicate whether all or part of a specific Fracture/Heaving impact overlaps geographically with either a flow loss or a pooling impact.

- Two other columns that would be useful and should be added are "Predicted? Y/N" which should be available from Module 8 in every permit application, and "Consistency with Prediction Length" (longer, shorter, same).

- A column should be added stating the days elapsed between undermining by the panel and observation of the fracture/heaving impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- Another column that would be useful and should be added is "Date Restoration Began".

- Another column that would be useful and should be added is "Status at Year End", which could include descriptions such as restored, restoration ongoing, restoration not begun, other.

- Another column should be added to indicate the elapsed time from initial impact to either documented restoration or to the date being reported on the table.

- These tables should be supplemented with detailed maps that identify the location of each fracture/heave impact and the type and status of restoration.

5. STRUCTURES

Data are presented for 2018, 2019, 2020, and through 29 November 2021.

- All column headings need to be defined.

- The column previously labelled "Time" has been clarified as "Time to [presumably Final] **Resolution". The word "time" should probably be replaced by "days", because that apparently is what the entries signify. Also, this duration should be measured from when the damage *occurred*, not when the DEP learned about it.**

- The following columns are not informative or relevant to the public, only perhaps to DEP, and should be deleted: Problem ID (A), and Mine ID (F). If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- All incidents of structure damage should immediately be reported, not only to the operator but to PADEP. Large gaps (more than 90 days) between when a problem occurred and when it was

"received" (such as Problem ID 6238 in 2020, where the gap is 140 days) should be flagged, investigated by the PADEP, and explained in footnotes. There also should be a separate column for it in these tables (Days from damage to reporting to PADEP).

- Column B (Description) is unnecessary clutter, redundant, and not informative, inasmuch as all its entries are "structure damage" and this entire table is for Structure Damage. It would be better to change the heading to "Type of structure", and list such things as: dwelling, outbuilding, barn, church, etc.

- Another column that would be useful and should be added after "Mine Name" (G) is "Mine Type" (longwall, room-and-pillar, or pillar recovery), as now is done in most other tables.

- A separate column is needed to identify whether the impact was determined to be "*mine-liable*" or not (unless these tables list only those impacts which were determined to be mine-liable, in which case that should be explained up front).

- A column should be added stating the days elapsed between undermining by the panel and observation of the structure impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- A new column (J) "Description" [of the final resolution] has been added; this helps make these data more useful and also consistent with Act 54 reporting.

- The relevance of Mining Depth (Column K) is not clear. Impacts in 2020 occurred where depths range from 220 to 1,000 (feet, presumably, that should be made clear). Depth of mining beneath the impact site might be significant, but without further analysis, such as comparing it with other factors such as distance to mining and time to resolution, by itself it is confusing at best. This is a good example of the value of the 5-year Act 54 assessments, which provide more context, additional analyses, and useful explanation.

- Column L has been renamed to make clear it is the "Distance to Nearest Mining". Presumably it is the horizontal distance across the land to the nearest vertical shadow area of a longwall panel -- if not, what? And are the entries in "feet"? This should be clarified.

- The column "RPZ" has been deleted. This is appropriate, inasmuch as the 5th Act 54 Report, and the Act itself, discuss an RPZ only in relation to water supply impacts.

- The location of each structure issue should be identified by latitude/longitude.

- These tables should be supplemented with detailed maps that identify the location of each structure impact and the resolution status.

6. UTILITIES

- It's not clear why this category is included at all. Damage to utilities is not specifically mentioned in Act 54. The general public is not particularly concerned about damages to (public/private?) utilities, unless it directly affects their service. These impacts appear to be very uncommon (one in 2018, one in 2019, and none in 2020 or 2021); might they better be combined with "structures"?

- Why include columns for Problem ID # (Column A) and Mine ID # (Column F)? These are not informative or relevant to the public, only perhaps to DEP, and should be deleted. If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- Column B (Description) is unnecessary clutter, inasmuch as all of the entries are "Utility", but that should be obvious because the tables in this group all are "Utility".

- Column C has been renamed from "Description" to "Nature of Damage", which is more informative.

- A column that would be useful and should be added after G (Mine Name) is "Mine Type" (longwall, room-and-pillar, or pillar recovery).

- A new column (J) "Description" [of the final resolution] has been added; this helps make these data more useful and also consistent with Act 54 reporting. (Note: both utility impacts were repaired.)

- A separate column is needed to identify whether the impact was determined to be "*mine-liable*" or not (unless these tables list only those impacts which were determined to be mine-liable, in which case that should be explained up front).

- The column previously labelled "Time" has been clarified as "Time to [presumably Final] **Resolution". The word "time" should probably be replaced by "days", because that apparently is what the entries signify. Also, this duration should be measured from when the damage *occurred*, not when the DEP learned about it.**

- A column should be added stating the days elapsed between undermining by the panel and observation of the utility impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- The column "RPZ" has been deleted. This is appropriate, inasmuch as the 5th Act 54 Report, and the Act itself, discuss an RPZ only in relation to water supply impacts.

- The location of each utility issue should be identified by latitude/longitude.

- These tables should be supplemented with maps that identify the location of each utility impact and the status of its resolution.

7. WATER CONTAMINATION

Data for water supply contamination are presented for 2018, 2019, 2020, and through 29 November 2021.

- All column headings need to be defined.

- The column previously labelled "Time" has been clarified as "Time to [presumably Final] **Resolution". The word "time" should probably be replaced by "days", because that apparently is what the entries signify. Also, this duration should be measured from when the damage *occurred*, not when the DEP learned about it.**

- All incidents of water contamination should immediately be reported, not only to the mine operator but to PADEP. According to the introductory description for Water Loss, *"If the water user or owner believes their water has been affected by mining, they must contact the mine operator. The operator will then report to the Department within 24 hours."* This often appears to be the case, but not always. Large gaps between when a problem occurred and when it was reported to the Department, or "received" (such as Problem ID 6333 in 2020, where the gap is 75 days, or Problem ID 6473 in 2021, where the gap is 1,101 days) should be flagged, investigated by the PADEP, and explained. There also should be a separate column for it in these tables (Days from damage to reporting to PADEP).

- A separate column is needed to identify whether the impact was determined to be "*mine-liable*" or not (unless these tables list only those impacts which were determined to be mine-liable, in which case that should be explained up front).

- The following two columns are not informative or relevant to the public, only perhaps to DEP, and should be deleted: Problem ID (A), and Mine ID (F). If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- Column B (Description) is unnecessary clutter, redundant, and not informative, inasmuch as all its entries are "water contamination" and this entire table is for Water Contamination. It would be better to change the heading to "Type of water supply", and list such things as: well, spring, pond, etc.

- Column C has been renamed from "Description" to "Nature of Damage", which is more informative.

- A column that would be useful and should be added after "Mine Name" (G) is "Mine Type" (longwall, room-and-pillar, or pillar recovery).

- A column should be added reporting whether the impact was predicted ("Predicted? Y/N") according to Module 8 of the permit application.

- A new column (J) "Description" [of the final resolution] has been added; this helps make these data more useful and also consistent with Act 54 reporting.

- A column should be added stating the days elapsed between undermining by the panel and observation of the water contamination impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- What is the relevance of Mining Depth (Column K), and how is it measured (depth from ground surface, depth from bottom of well)? Impacts in 2020 occurred where depths ranged from 135 to 1,024 (feet, presumably). Depth of mining might be significant, but without further analysis, such as comparing it with other factors such as distance to mining and time to resolution, by itself it is confusing at best. This is a good example of the value of the 5-year Act 54 assessments, which provide context, additional analyses, and useful explanation.

- Column L has been renamed to make clear it is the "Distance to Nearest Mining". Presumably it is the horizontal distance across the land to the nearest vertical shadow area of a longwall panel -- if not, what? And are the entries in "feet"? This should be clarified.

- The location of each water contamination issue should be identified by latitude/longitude.

- These tables should be supplemented with detailed maps that identify the location of each water contamination impact and the status of resolution.

8. WATER LOSS

Data for water supply loss are presented for 2018, 2019, 2020, and through 29 November 2021.

- All column headings need to be defined.

- All incidents of water supply loss should immediately be reported, not only to the mine operator but to PADEP. According to the introductory description for Water Loss, "*If the water user or owner believes their water has been affected by mining, they must contact the mine operator. The operator will then report this to the Department within 24 hours.*" This often is the case, but not always. Large gaps (more than 90 days) between when a problem occurred and when it was reported to the

Department, or "received" (such as Problem ID 6210 in 2020, where the gap is 731 days, or Problem ID 5745 in 2018, where the gap is 2,929 days [8 years, 7 days]) should be flagged, investigated by the PADEP, and explained in footnotes. There also should be a separate column for it in these tables (Days from damage to reporting to PADEP).

- The following two columns are not informative or relevant to the public, only perhaps to DEP, and should be deleted: Problem ID (A), and Mine ID (F). If they have some relevance and should be retained, then the information being conveyed needs to be explained.

- Column B (Description) is unnecessary clutter, redundant, and not informative, inasmuch as all its entries are "water loss" and this entire table is for Water Loss.

- Column C has been renamed from "Description" to "Nature of Damage", which is more informative.

- A column that would be useful and should be added after "Mine Name" (G) is "Mine Type" (longwall, room-and-pillar, or pillar recovery).

- A separate column is needed to identify whether the impact was determined to be "*mine-liable*" or not (unless these tables list only those impacts which were determined to be mine-liable, in which case that should be explained up front).

- A column should be added reporting whether the impact was predicted ("Predicted? Y/N") according to Module 8 of the permit application.

- The column previously labelled "Time" has been clarified as "Time to [presumably Final] **Resolution". The word "time" should probably be replaced by "days", because that apparently is what the entries signify. Also, this duration should be measured from when the damage *occurred*, not when the DEP learned about it.**

- A column should be added stating the days elapsed between undermining by the panel and observation of the water loss impact. Negative numbers would indicate days prior to undermining, positive numbers would indicate days since undermining.

- A new column (J) "Description" [of the final resolution] has been added; this helps make these data more useful and also consistent with Act 54 reporting.

- What is the relevance of Depth to Mining (Column J), and how is it measured (depth from ground surface, depth from bottom of well)? Impacts in 2020 occurred where depths ranged from 100 to 938 (feet, presumably). Depth of mining might be significant, but without further analysis, such as comparing it with other factors such as distance to mining and time to resolution, by itself it is confusing at best. This is a good example of the value of the 5-year Act 54 assessments, which provide more context, additional analyses, and useful explanation.

- Column L has been renamed to make clear it is the "Distance to Nearest Mining". Presumably it is the horizontal distance across the land to the nearest vertical shadow area of a longwall panel -- if not, what? And are the entries in "feet"? This should be clarified.

- The location of each water loss issue should be identified by latitude/longitude.

- These tables should be supplemented with detailed maps that identify the location of each water supply loss impact and the status or resolution.

9. WETLANDS

Some [pre-mining, presumably, but that should be made clear] data are presented for 2018, 2019, 2020, and through July 2021. This is a major positive change from just seven months ago when no wetland data were provided in these *Act 54 Yearly Data* updates.

- It is unclear which wetlands are presented in these tables – all of the wetlands undermined in a given year or only those for which the 5-year renewal data were available?

- All of the wetland data are highly suspect. There is no indication that the delineation of any wetland listed was ever reviewed in the field by a qualified expert from any agency (Corps of Engineers or PADEP), either prior to mining or post-mining.

- A new column should be added after Column A (Wetland Number) and be labeled "Pre-Mining Wetland Type" (if that is what it is). It should be populated with the relevant wetland symbol for the major Cowardin wetland class (PEM, PSS, PFO, PUB).

- Many entries in Column D (Year Surveyed) are blank, and many others provide a range (e.g., 2011-2014). This column should be renamed "Date of Original Delineation", and the exact date should be provided (this information is available from the mine permit application). The date is important, in part, because it provides information about the season when the delineation was performed.

- Column E (Year Mined) should be placed after Column I (Panel).

- Column G (Acres Source) should be defined, particularly the notation "Calculated by ArcGIS".

- It is useful that the latitude and longitude (Columns J and K) of the [pre-mining?] wetland are provided. This begins to provide geographic locational information for each wetland. Since the location of most (if not all) of the wetlands presumably was field-identified using GPS equipment, the actual shapefile of each wetland should be available, and should be provided on an interactive map.

- New columns should be added at the end of the table to identify the following:
    - "Date of Post-mining Delineation" (exact date)
    - "Post-mining Wetland Type", to include the Cowardin class
    - "Post-mining Acreage"
    - "Latitude" and "Longitude" (or better, the actual shapefile on an interactive map)
    - "Net Gain/Loss"
    - "Corps JD?" (to indicate whether the net gain/loss was confirmed by a Corps JD).

- Regarding the delineation of wetlands, the introduction on the website says this, in part:

> ***As part of the permitting process, mine operators are required to delineate wetlands in each permitted area prior to mining and again five years post-mining. If a net loss in wetlands is identified during the post-mining delineation, the operators are required to develop a mitigation plan in which new wetlands of an equivalent size and quality will be created.***

That timeline conflicts with the TGD 563-2000-655 description of the delineation of wetlands. According to the TGD, wetlands are to be delineated prior to mining, a prediction is supposed to be made as to whether any wetland will be adversely affected, and then each wetland is supposed to be re-assessed 12 months following mining. Presumably, each wetland throughout the permit area is supposed to be evaluated separately for mining-related impacts.