INTRODUCTION

We, the members of the Fifty-First Statewide Investigating Grand Jury, having received and reviewed evidence regarding allegations of violations of the Clean Streams Law occurring in Greene County, Pennsylvania pursuant to Notice of Submission of Investigation Number 5, do hereby make the following findings of fact, and recommendation of charges.

FINDINGS OF FACT

The Grand Jury conducted an investigation into a house explosion that occurred on October 31, 2018 in Greene County that seriously injured three people. The house, which belonged to the White family, was situated at 161 Bowser Road in Clarksville, directly in the middle of extensive infrastructure related to the oil and gas industry.

There was a significant amount of data and analysis of this data that the Grand Jury reviewed during the course of this investigation, including laboratory reports, meter readings, expert reports and internal correspondence. We also heard from multiple witnesses. The evidence revealed that methane gas from a storage field operated by Equitrans L.P. (Equitrans) migrated vertically into a groundwater aquifer by way of a mechanically deteriorated and badly leaking Equitrans storage well. This occurred immediately following a test during which the entire storage field was "shut in," meaning gas was not being injected or withdrawn. The contaminated/polluted water traveled to the White's well and the gas then made its way into the White's home, causing the explosion and fire. During this investigation, the Grand Jury also discovered that Equitrans failed to adhere to a state regulation that required the company to immediately perform an investigation once it discovered that gas had been leaking. In light of the foregoing, the Grand Jury recommends that the company be charged with violating the Clean Streams Law.

I. A Description of the Company

Equitrans operates 18 storage fields in West Virginia and Pennsylvania. For a period of time, the company was a subsidiary of EQT Corporation. On November 13, 2018, EQT Corporation was divided and Equitrans Midstream Corporation was created as a publicly traded, standalone midstream company that was focused on the gathering and transportation of natural gas and natural gas liquids. Equitrans then became a subsidiary of Equitrans Midstream Corporation at the time of the split. The company has a 4.4 billion cubic feet gas transmission capacity.

II. A Brief Description of Storage Fields

Natural gas has long been used as a source of fuel in our country. The need for natural gas fluctuates seasonally and natural gas companies needed to find a way to store their gas during times of low need that would still allow them to have fairly quick access to it during times of high demand. Underground storage fields allow for just this type of storage. Currently, storage field gas accounts for roughly 20% of the natural gas consumed during winter months in the United States.

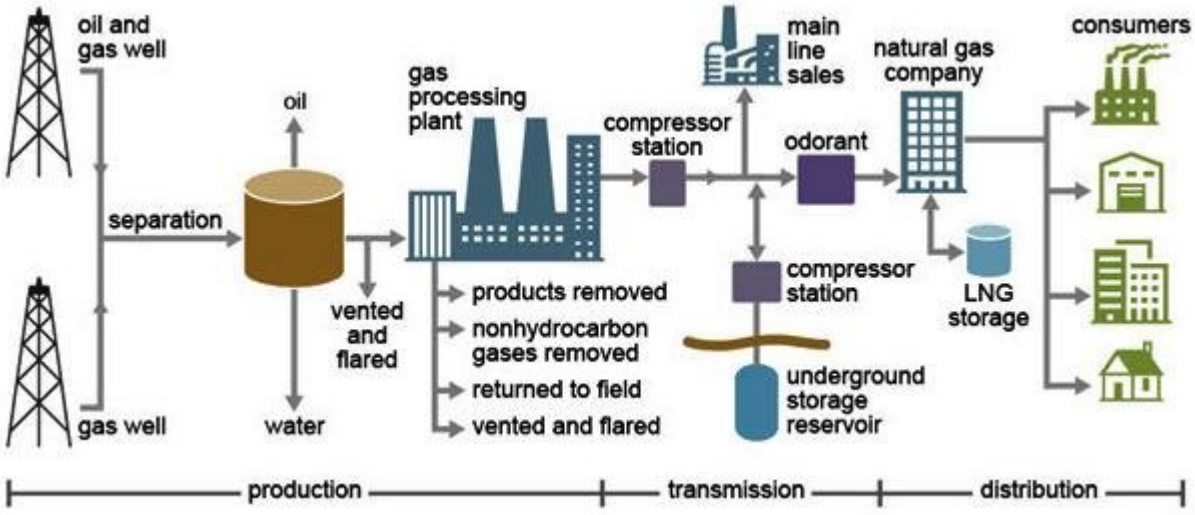
There are five main types of underground storage: salt caverns, mines, aquifers, depleted reservoirs and hard rock caverns. The type of storage relevant to the Grand Jury's investigation is the depleted reservoir. This storage field is formed after the oil or natural gas within a rock layer has been produced. The removal of oil or natural gas leaves behind pore space within the rock that can then be filled up with the natural gas that needs to be stored.

The Grand Jury learned that storage fields typically have two seasons: An injection season, when gas is injected into the field; and, a withdrawal season, when gas is withdrawn from the field. The injection season typically spans early spring through the summer months. During this period of low demand, gas is pushed into the pore spaces within the rock underground. Withdrawal

season begins in the fall and lasts throughout the winter. When the need for gas is greater to heat our homes, the gas can be pulled back out of the rock formation underground relatively quickly so that it can make its way to market.

In order to push the gas into those pore spaces and then pull it back out, a series of wells, pipelines and compressor stations are required. Storage wells are typically older conventional wells that previously existed above the storage field and are converted so that they can be used to inject and withdraw gas from the storage field. These wells will be connected to pipelines of various sizes to move the gas to the storage wells and then to also carry it away and to market. Compressor stations are necessary in order to increase pressure to enable injection of the gas into the storage field or to stabilize the pressure of the gas after withdrawal to move it along the pipeline.

The diagram below shows these interconnected pieces of the underground storage system and how it overlaps with other parts of the natural gas industry:



One of the issues associated with the underground storage of natural gas is gas loss or gas migration to areas outside of the storage field. Operators of storage fields have various methods

to track gas loss. They employ engineers to track the data and watch for occasions when the inventory of gas lessens for some reason other than its withdrawal. This loss can be attributed to gas moving laterally into areas of the field from which it is harder to pull gas, measurement issues, or vertical migration of the gas out of the field.

The Grand Jury heard testimony from a petroleum engineer employed by Equitrans about some of the calculations and tests that are performed to determine whether or not gas is being lost or gained by the storage field. First, the amount of gas that is pushed into the storage field or pulled out is monitored daily at the compressor stations associated with the storage field. In addition to the daily monitoring that occurs, Equitrans performs two "shut-in" tests on their fields each year. One occurs around the conclusion of the injection season and the other occurs at the conclusion of the withdrawal season. The Grand Jury learned that, prior to the shut-in test, the engineer will communicate with the operations team and instruct it to go out to the field and physically shut each storage well that sits atop the field. The operations team will record the pressure at each well at the start of the test and then record the pressure again five days later. The pressures documented at each storage well at the conclusion of the five day shut-in test are then averaged and used in a formula to calculate the pressure in the storage field itself. The reservoir pressure is plotted on a graph that compares yearly pressures in order to determine whether the inventory has remained the same or is gaining or losing gas. If the line is directly atop the previous year's line, this indicates that a field is not losing or gaining gas. If the line shifts to the right from past years, that is indicative of gas loss. And, if the line shifts to the left from prior years, this indicates that gas has been recovered. According to testimony, Equitrans employees often treated indications of gas loss as inaccurate readings due to measurement error rather than escaped gas due to vertical migration. Additionally, instead of comparing data on a seasonal basis, which can

be "really hard," Equitrans focused on the trend over several years, thus obscuring signs of loss from one year to the next. As an Equitrans engineer testified: "If you are losing or migrating gas at the same rate [year after year], then the [testing graph] lines are going to be right on top of each other." He explained that the company generally recognized gas losses only when the line continued to move year after year to the right or to the left.

Although all of the Equitrans employees who testified acknowledged gas migration as an issue, they focused almost exclusively on the horizontal migration of the gas. Horizontal migration is less problematic than vertical migration because the gas is still contained within the storage field but just in less accessible areas of the field. Vertical migration, on the other hand, involves the gas leaving the storage field and entering into the environment. When pressed, each employee acknowledged that vertical migration of gas can and does occur at their storage fields. We heard from a professional geologist employed by Equitrans about evidence that would indicate that there is vertical migration of gas. He stated that vertical migration of gas would release the smell of mercaptan (the additive to natural gas to give it an odor) and would cause dead or stressed vegetation in the area of the leak. He also stated that such a leak could be picked up by the gas detectors used by the employees in the field. He went on to acknowledge, however, that storage field gas is in fact not odorized with mercaptan so there is a strong possibility that the gas would not have any odor that would alert someone to a leak. He further acknowledged that, while the current policy requires all field operatives to use gas detectors during their monthly inspections, this policy is new and was not fully implemented until 2019, after the explosion. Until then, inspectors conducted Audio, Visual, Olfactory (AVO) inspections. The inspectors were therefore relying on their own senses, hearing, seeing or smelling gas, as the only method of detecting vertical migration of gas at the storage well. The witness acknowledged that such a human sensory

inspection would be less rigorous and would therefore miss some leaks. But he stated that when field operatives observed brown or stressed vegetation around a storage well, further investigation occurred to determine if there was a leak. However, other evidence before the Grand Jury showed that stressed vegetation was often discounted, as employees attributed the condition to other alleged causes, such as weed killer spraying or dry weather.

III. Storage wells

The Grand Jury heard testimony that the wells that service an underground storage field are typically older "conventional" wells – those used before the development of the "fracking" process – that have been re-worked to be able to inject and withdraw gas.

We learned that storage wells typically consist of numerous metal casings. As the well descends, the diameter of the casings decreases. In modern "unconventional" wells, used for fracking, operators must place cement in the spaces that exist between each diameter of casing (known as the annulus). However, many storage wells were converted before this requirement, and do not have cement between every layer of casing. The cement plays an important role in preventing the migration of gas through the annular spaces. When the cement is not present, gas can migrate easily. The Grand Jury heard testimony that storage wells often have cement only between the smallest casing, which is called the production casing, and, the next larger casing. The Grand Jury heard further testimony that the cement that does exist in this annulus will not typically go from the bottom of the well to the surface and that regulations in the past required cement only to 500 feet above the level at which gas is stored.

In addition to having less cement than a newer well, we heard that, on occasion, there can be issues that develop with the cement itself. An Equitrans employee testified that when a well is completed, the operator pumps cement down through the center of the smallest production casing.

The cement is pushed to the bottom of the well and then back upwards, outside of the casing. The cement then hardens in place and creates a barrier. As this process is happening, channels can develop that would allow for methane to be able to travel through the cement. In addition, as the cement comes out through the bottom of the production casing and begins traveling back up outside the pipe, some of the cement may travel away from the well and into a porous formation or a fracture in the rock. Such gaps can create further avenues for the escape of gas.

We learned that it is not Equitrans' protocol to re-cement any of its storage wells. Although it is possible to do so, the company has not chosen to add cement to any of its storage wells. An employee testified, "[n]ormally, it's easier to—when you get to the point of fixing a well, it's usually easier just to plug the well if it requires that sort of extensive remediation. It's not a simple fix…"

Another substance that can be added to storage wells is gel. Gel consists of water and clay and is used as a corrosion inhibitor. Although the Grand Jury heard conflicting testimony about whether gel could prevent methane from moving through the annular space in the well, most witnesses agreed that gas could move through the gel and therefore that gel does very little to prevent the migration of methane. Equitrans did occasionally add gel to its storage wells. The gel would be injected through annular vents at the surface of the well. We learned that Equitrans' policy regarding gelling changed over time. For a while, the policy was that every well would be re-gelled every two years. Later, the plan was to gel some wells every three to five years. But evidence showed that these policies were not regularly followed. An Equitrans employee testified that in some years wells scheduled for re-gelling were not re-gelled, either due to budgetary constraints or lack of personnel.

We learned that storage wells also have vents that are attached to a specific annulus within the well. The annular vents can be opened or closed. When they are left open, any gas in the annular space can travel up and into the atmosphere without building up pressure within the casing. We learned that there were occasions when Equitrans closed the vents on their storage wells. If the well exceeded 300 cubic feet/day of venting gas or, if the well was close to homes where the venting gas might be problematic to the homeowners, the vents were closed. Although currently the status of the vents is captured in the monthly inspections, that was not the case in 2018. In 2018, there was no way to verify with any accuracy the status of the vents at any given time absent going out to the well and visually observing the vents.

IV. October 31, 2018

The Grand Jury learned the details of the house explosion from Cody White. Mr. White was 24 years old in October 2018. He resided at his parent's house at 161 Bowser Road with his girlfriend, Samantha Adamson, and his four year old son, J.W.

On October 31, 2018, Mr. White's parents departed for work at 6:30 a.m. Neither of them detected an odor of gas in or around the house when they left that day. At 7:00 a.m., Ms. Adamson returned home from work. She prepared food for herself using the stove and then went to bed. Mr. White was at home with J.W. that day because he had switched shifts with a co-worker so that he could take J.W. trick or treating. Around 11:00 a.m., J.W. requested that his father make macaroni & cheese for him. The Grand Jury heard testimony that as Mr. White went to light the stove, the entire house blew up. He was thrown over the kitchen table and into the refrigerator, losing consciousness momentarily. After regaining consciousness, he observed that the walls were blown off the middle section of the house and that the house was actively on fire. He went down the hallway to the bathroom where his son was located. He found a piece of ceiling that had fallen

down and pinned the boy to the toilet. Mr. White removed the ceiling piece and picked up his son. At that point, as Ms. Adamson was coming out of the bedroom, a piece of ceiling fell on top of her and pinned her to the doorway. Mr. White pushed the ceiling piece off of her and helped her get out of the house. He testified that, while he could not specifically remember fire, the ceiling pieces must have been ignited in the blast because his hands were burnt after removing them.

Once all three of them were outside, Mr. White recalled turning around and seeing everything engulfed in flames. They made their way to the neighbor's house to call 9-1-1.

Eventually first responders began to arrive on scene, but they could not begin extinguishing the fire until the gas company arrived and turned off the gas line to the house. Shortly after the arrival of the fire department, emergency medical services arrived to take care of the three of them.

They were life-flighted to UPMC-Mercy hospital in Pittsburgh. Mr. White was admitted to the burn unit and J.W. was placed in the intensive care unit because there was no pediatric burn unit at the hospital. Ms. Adamson refused to be admitted because she would have been separated from J.W.; accordingly doctors and nurses cared for her in the ICU.

After the initial assessment, Mr. White was found to have suffered burns from his shoulder down to his hand on one arm and from his shoulder to the middle of his forearm on the other arm. His entire head and face were burned, as well. His son suffered burns on 60-65% of his body. The burns went from his chest to his knees and up and down his arms. Notably, he had significant burns on his backside from fire that burned him while he was on the toilet. Ms. Adamson had burns on her sides and on her arms and her face.

Although the hospital stays were fairly short, the recovery time lasted much longer. Mr. White testified that he did not return to work until January 2019 and that it took almost two years for his skin to recover fully. Ms. Adamson returned to work in the middle of January; her skin also did not fully recover for approximately two years. J.W. went back to school in January 2019. Mr. White described his son's healing process as being very hard. He testified that J.W. was wrapped in fabric that resembled a cast for about a month. The fabric made it hard for him to move or bend. There were exposed burns on his son's face that had to be taken care of every day. They each have some degree of permanent scarring or physical impacts from the burns that they suffered that day.

The explosion caused significant emotional trauma as well, particularly for the young child. His father testified that for weeks the boy was afraid to visit the lavatory, where he had been when the explosion occurred. "We would have to go to the bathroom with him and hold up the walls so he would use the bathroom because he was afraid it was going to fall on him."

The entire family had to deal with the fact that their home and all their worldly possessions vanished in a moment that day. They had seven or eight horses in a pasture next to their house. Horses require daily attention and so family members had to return to the scene of the explosion every day to care for the animals that remained. When they visited the horses and other animals,

they had to haul in water for them to drink as their well was no longer useable. The family lived in a hotel for a few weeks and then, due to the kindness of friends, they were able to move into a farmhouse in Carmichaels for almost two years. Mr. White's parents purchased a new home for the family to move to after approximately two years, although they still remain responsible for the mortgage on the Bowser Road property.

V. The Pratt Storage Field

The Pratt Storage Field sits directly below the White home on Bowser Road. It began operation in 1947. The field is located in the Fifth Sand and the Fifty Foot Sand formations, which are approximately 1,800-2,800 feet below the ground surface. The field is certificated by the Federal Energy Regulatory Commission (FERC) to store 9.3 Bcf (billion cubic feet) of gas, although it typically stores closer to 7.2 Bcf. Equitrans engineers reduced capacity after noting that gas migration worsened when they attempted to store greater quantities.

In 2002 and 2003, Equitrans undertook a study on each of the storage pools that they operated. The objectives of the study included accurately determining the capabilities of the storage fields, defining operational enhancements that were available and accurately determining gas storage balances in the fields. The study ultimately showed that several storage fields, including Pratt, had experienced "extraordinary gas loss." The gas loss from Pratt was approximately 3.4 Bcf.

Based on the extraordinary gas loss that Equitrans reported to FERC, the Commission issued an order in November 2004 which stated, in part:

> the Commission finds that Equitrans' claim, that a significant portion of the previously injected cushion volumes were 'lost' due to migration, raises operational and other issues regarding whether its storage operations and facilities are meeting its current NGA section 7 certificate requirement to provide service in the public convenience and necessity. These issues implicate the Commission's authority under section 7 of the NGA and warrant an inquiry and Commission review prior

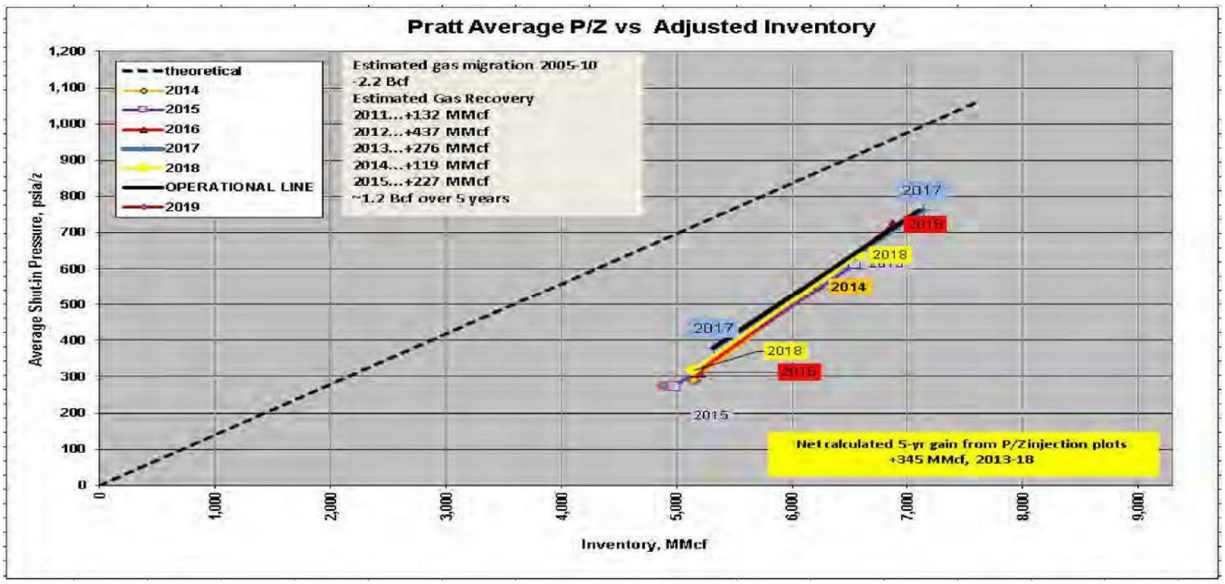
> to Equitrans being permitted to engage in these actions… If the storage reservoir is not capable of performing its storage function properly without losing significant quantities of cushion gas required to pressurize the reservoir, a proposal to merely add more cushion gas may not be appropriate and implicates the Commission's authority under the existing section 7 certificate to ensure the proposal is in the public convenience and necessity.

The Grand Jury heard from an Equitrans engineer about how the amount of gas injected and stored within the Pratt field has had an impact on gas migration. The engineer indicated that in 2010, Equitrans injected more gas into the Pratt field than usual—somewhere between 7.9 and 8 Bcf of gas. When Equitrans filled Pratt with more gas than usual, employees found that the field lost approximately 1 Bcf of gas. Due to this significant gas migration, the engineer advised not to fill Pratt up beyond approximately 7.2/7.3 Bcf of gas. He testified that reducing the inventory of gas in Pratt allowed Equitrans to recover - - during the withdrawal season of the storage field - - approximately 50% of the gas that had migrated into those harder to reach parts of the field.

The Grand Jury reviewed documentation indicating that between 2005 and 2010, the Pratt field lost 2.2 Bcf of gas. Between 2011 and 2015, the field recovered some of that lost gas. Adding the gas loss from the early 2000's to the loss and recovery that occurred between 2005 and 2010, the net loss amounted to approximately 4.4 Bcf of gas. An Equitrans engineer agreed that such a loss would be categorized as "significant." He went on to explain that the Pratt field is not a single, uniform receptacle. Some portions of the field have higher porosity, allowing gas to travel easier or further. Some areas also have better well coverage where it is easier to pull the gas back out. This means that some of the gas that is pushed into the reservoir will travel far from the nearest well. It will then get stuck in an area with poor well coverage and become very difficult to pull back out. He was asked if, in addition to gas getting stuck in places within the storage field, some of the gas could be leaving the field by traveling vertically through abandoned wells or storage

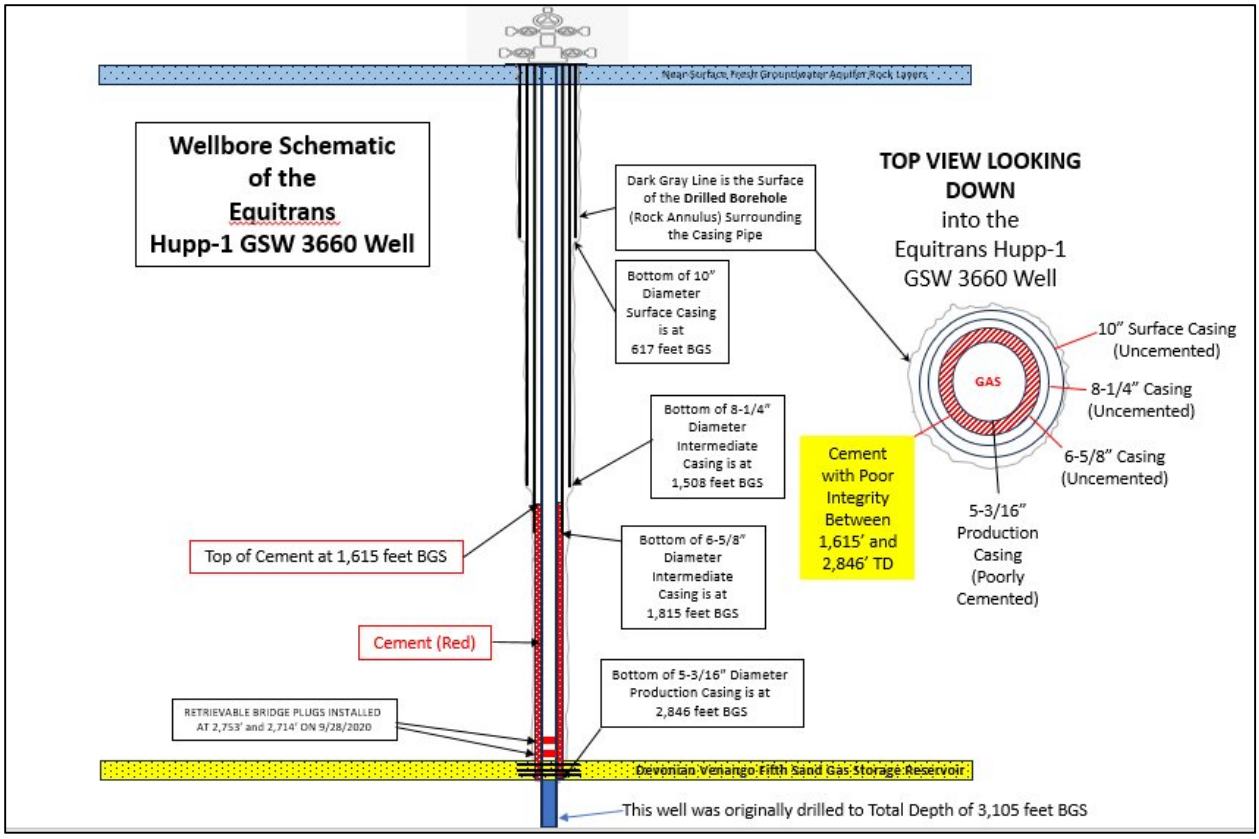
wells with integrity issues. He agreed that this was possible but argued that if that had been going on for 20 years, Equitrans would have heard about it from a resident, landowner or an employee doing a monthly inspection at a particular well. He went on to testify that Equitrans has a "robust" logging program to ensure the integrity of the production casing within the storage wells and that any problems that could result in vertical migration would be caught with the logging tools. However, the Grand Jury heard from a former Equitrans employee who stated that typical relogging of wells to check for gas migration was supposed to occur every six to seven years, with problematic wells on an "accelerated" schedule of every three years. In reality, however, the well closest to the Whites' home, which was supposed to be on the accelerated schedule, was due for relogging only every seven years. The former employee acknowledged that such a protracted schedule was inadequate for wells with "indications for cause for attention."

We reviewed the graph that Equitrans engineers use when charting the inventory verifications year after year. We learned from testimony that the dotted black line is the anticipated inventory in the field and that the actual inventory for each year is charted in a different color. The graph shows that, over time, the Pratt field has lost large amounts of gas.



VI. The A.H. Hupp Well

The A.H. Hupp well, also referred to as the 3660 well, was located approximately 300 feet from the White family home. It was originally drilled in 1930. It was reworked in 1951 and then converted to a storage well in 1968. In our review, we learned that the well has four different diameters of pipe. The outermost pipe is 10 ¾ inches in diameter. That pipe starts at the surface and extends to 617 feet below ground. Within that pipe is a smaller pipe that has a diameter of 8 ¼." That pipe starts at the base of the other casing and extends to 1,508 feet below ground. Next is a 6 5/8" pipe that extends to 1,815 feet below ground. Finally, a 5 3/16" pipe is inserted within the next larger pipe and extends from that depth to the total depth of the well—2,846 feet below ground surface. We learned that the 3660 well only has cement in the innermost space between the smallest pipe and the next larger pipe. The cement was poured only between a depth of 2,846 feet and 1,615 feet. Above 1,615 feet, that innermost space is not cemented, and is open to air. The remaining annular spaces, between the larger diameter casings, never had any cement placed in them.



Schematic of Equitrans A.H. Hupp-1 / GSW 3660 Gas Injection / Storage Well

A vertilog was run on the well in 2013. The Grand Jury learned that a vertilog is a diagnostic tool that can identify signs of corrosion or metal loss within the innermost pipe. The 2013 vertilog indicated that there were 215 metal loss features present in the innermost pipe that exceeded 20% of the pipe wall thickness. These results triggered an accelerated schedule for relogging of the well. Additionally, the 2013 log indicated that gel levels had dropped in the well. We learned that this should have triggered re-gelling the well at that time. Although the well made it onto the gelling list, it never was re-gelled prior to the explosion. A geologist for Equitrans testified that gelling the wells was "always one of those tasks that you have to sort of have the right weather for. You can't do it when it's too cold. You have to have the time and the manpower available and just the conditions. Also, we only had one 250 gallon tank that we use for gelling

that is split between West Virginia and PA. So it depends on where the tank was and if it was being used somewhere else."

We learned that Pennsylvania Department of Environmental Protection (DEP) employees inspected the 3660 well on various occasions and found evidence of methane leaking. On July 17, 2020, DEP personnel at the site photographed areas of stressed vegetation around the well.

A formal inspection occurred on July 27, 2020. At this time, DEP found the main well valve to be leaking. DEP measured 3700 ppm of methane. It was also discovered that 70% of the air coming out of the inner annular vent was methane. In Equitrans' response to DEP's inspection, the company claimed that a bird's nest inside one of the vents was the cause of the methane that was detected. Additional photographs were taken of the dead vegetation around the well.

DEP inspectors returned to the well on September 3, 2020. At that time, the bird's nest had been removed and yet, methane was found to still be leaking from the main well valve, the production casing annular vent and the coal string annular vent.

DEP inspectors again returned to the well on September 29, 2020, after temporary "bridge plugs" were installed. At that time, however, the production annular vent continued to leak at 1,780 parts per million of methane. An Equitrans geologist testified that the bridge plugs should prevent gas from the storage field from migrating up through the production casing, but that the plugs might not prevent gas from other formations from entering into the annular space and migrating up through the vents. DEP inspectors again returned to the well on March 15, 2021, and, at that time, they detected 1,840 parts per million of methane coming from Vent #1 and 60 parts per million at Vent #2.

VII. The Investigation into the Explosion

Immediately after the explosion in 2018, multiple state and federal agencies examined the site, including DEP, the Pennsylvania Utility Commission, and the Pipeline and Hazardous Materials Safety Administration. In addition, investigators were hired by the various operators of infrastructure in the area, including Peoples Natural Gas (PNG) and EQT.

PNG owned pipeline infrastructure in the area of the home explosion, including a pipeline running approximately 500 feet from the Whites' home at 161 Bowser Road. Starting the day of the explosion, October 31, 2018, PNG performed soil gas surveys in the area of 161 Bowser Road and 153 Bowser Road. This work included the installation of more than fifty soil bore holes around the property and monitoring the concentration of methane from the bore holes on a daily basis for a period of time. Soil gas monitoring took place from October 31, 2018 through January 6, 2020 around 161 Bowser Road. PNG also collected gas samples to send to the lab for isotopic analysis. While on site the day following the explosion, PNG employees detected a leak on a portion of pipeline in the area of 161 Bowser Road. The line was immediately shut down. Testing of the leaking pipe took place on November 14, 2018 and it was found to have a flow rate of 5.3 cubic feet/hour when pressured to 7.2 psi. The flow rate increased to 8.7 cubic feet/hour when pressured to 10 psi. A camera was sent down the pipe and a small area of corrosion was found. The piece of pipe was removed on April 22, 2019 and sent to a laboratory for further analysis. All of the investigative steps that PNG completed were documented in reports that were submitted to DEP, as required by 25 Pa. Code §78.89. Various experts, including some of Equitrans' own employees, have concluded that, because the leaking PNG pipeline line was only 2-3 feet below ground surface, any gas coming from the line would immediately travel up through the soil and into the atmosphere. Based on this fact, as well as the fact that the pipeline gas would be odorized with mercaptan which no one smelled on the day of the explosion, and, that the leak was at such a low pressure, investigators concluded that the leak was very minor. Because the pipeline sits topographically at a higher elevation than 161 Bowser Road, this leaking line was ruled out as the cause of the home explosion.

Very soon after the explosion, all of the appliances in the White's house, the interior gas piping and the service line that fed the house were tested. The interior piping and the service line and valves were found to be intact and not leaking. Each member of the White family was tested to ensure that they were capable of smelling mercaptan, the additive to natural gas that odorizes it. All family members passed that test and were deemed capable of smelling mercaptan.

EQT owns seven unconventional wells on the Hildebrand pad, which is roughly 1,100 feet from 161 Bowser Road. EQT undertook an investigation in the early days following the explosion. Employees collected a total of 17 gas samples. The samples came from various points of interest, including from the soil, from the headspace of the water well, from the water bailed out of the water well at 161 Bowser Road, from storage wells, from their production wells and from a natural gas pipeline nearby. Laboratory analysis determined that the signature of the gas in the Hildebrand production wells was distinct from the signature of the gas found in the soil around 161 Bowser Road. A final report was submitted to DEP on January 9, 2019. The report reiterated that the isotopic signature of the Hildebrand gas did not match the isotopic signature of the soil gas. The report also indicated that there were no issues associated with the mechanical integrity of the Hildebrand wells. EQT concluded that the Hildebrand wells were not the source of the stray gas in the soil around 161 Bowser Road.

The Equitrans A.H. Hupp 3660 gas storage well was located approximately 300 feet from the White home. After the explosion occurred, Equitrans failed to conduct an investigation pursuant to 25 Pa.Code §78.89. In the report it submitted to DEP on May 21, 2020, the company stated that "Equitrans was not previously asked to, nor did it participate in any gas migration investigations activities typically associated with a 78.89 investigation…Equitrans has no direct knowledge as to actual or suspected cause of the incident at the Bowser Road residence and

whether such facts support a gas migration investigation or were likely caused by other circumstances."

DEP found the May 21, 2020 report to be lacking in multiple ways. Through the issuance of several letters, the agency requested additional information from Equitrans, including the performance of a casing inspection/surveillance logging suite on the 3660 well and the performance of a mechanical integrity test.

Equitrans did run a logging suite on the 3660 well casing on July 9, 2020. The vertilog survey – which, when previously performed in August, 2013 found 215 metal loss features exceeding 20% of the wall thickness – now found eight metal loss features at depths exceeding 80% of the wall thickness. The maximum depth among all eight metal loss features was 89%. This degree of penetration required Equitrans to notify the Pipeline Hazardous Materials and Safety Agency within five days, and to take remedial action. On September 28, 2020, an Equitrans' subcontractor, Baker Hughes, inserted two temporary bridge plugs into the well at 2,714 and 2,753 feet below ground surface to isolate the upper portion of the production casing from the storage reservoir. On the same date, a cement bond log was run to determine the integrity of the cement surrounding the well's pipes. The cement bond log showed a significant lack of cement around the production casing, large sections of heavily channeled cement with micro-annuli, and high amounts of free phase gas in the annular spaces of the well. A second cement bond log was run on December 9, 2020, after the bridge plugs had been set inside the well. During this logging event, an engineer at Baker Hughes noted that, from a depth of four feet below ground surface to a depth of 1,964 feet, there was "no barrier to fluid flow behind casing."

Equitrans then employed another subcontractor, Weatherford, to review the data and run a Geophone Array Production Survey (GAPS) log on the well. The GAPS tool is designed to detect

flow of fluid behind the casing through evaluation of vibrations within the well. A Weatherford employee asked Equitrans to share data on the well's 7" casing because "we are seeing indications that there may be a hole in it." Equitrans responded that it had no logs to share on that casing, and thus, the evaluation that Weatherford conducted looked only at the 5" production casing. The final report on the 5" casing indicated no evidence of casing leaks at depths of 1985, 2129 and 2576 feet. Notably, the report did not mention the possibility of a hole in the 7" casing, or the fact that bridge plugs had been inserted into the well – after the explosion – below the depth at which the GAPS analysis was performed. We heard testimony from a former Equitrans storage employee that the insertion of bridge plugs in a well would prevent such a log from indicating that the well was leaking.

In November 2020, DEP also requested that Equitrans perform a mechanical integrity test in the form of a "leak off test" on the 3660 well. We learned from an Equitrans geologist that there are two methods to perform such a test. One method involves pressurizing the casing within the well to 110% of its maximum operating pressure to see if the well can hold that pressure for 30 minutes. Equitrans does not routinely perform this type of test unless it is making a change to the casing. Several letters were exchanged between DEP and Equitrans, discussing this test. A DEP geologist who testified before the Grand Jury stated that the Department had suggested that Equitrans pressure up the well using an inert gas that would not cause an explosive hazard but would still show how the well behaved under pressure. DEP suggested pressuring the well to 800 psi, which was slightly more than the maximum pressure of 721.948 that was recorded on October 8, 2018. Equitrans personnel responded that they could not perform the test with a pressure higher than 431 psi because it would not be safe to do so. Ultimately, DEP decided to stand down from

the request to perform the pressure test because, as Equitrans acknowledged, the well casing would not be able to withstand storage field pressures.

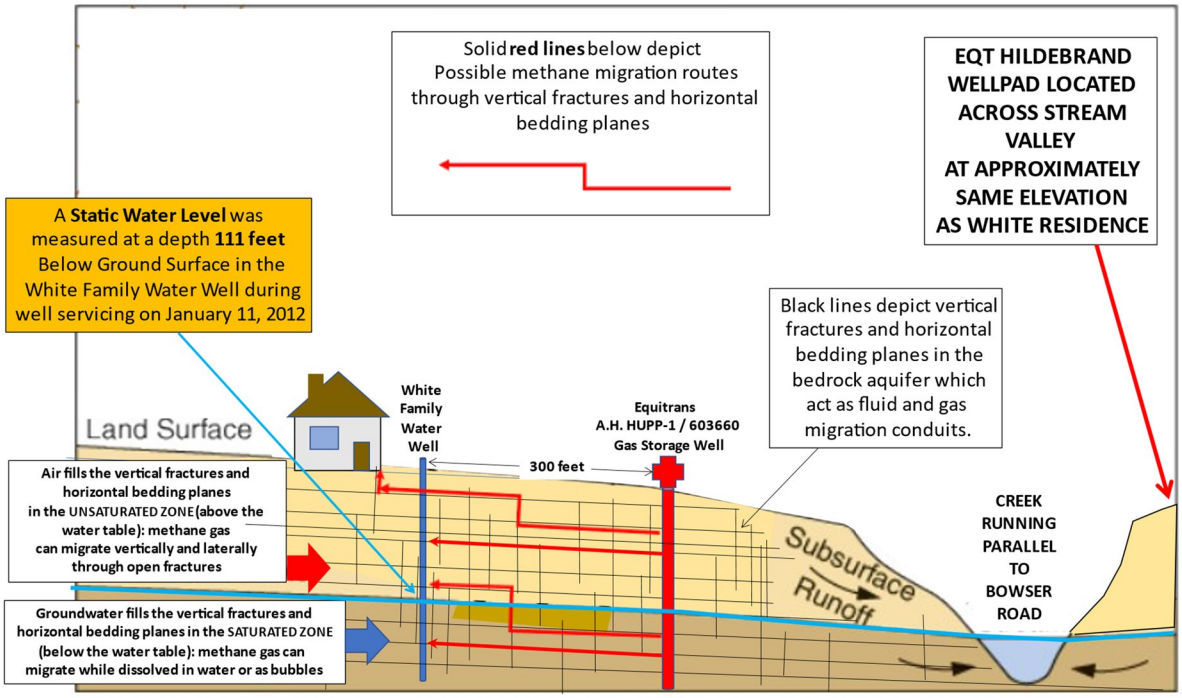
An Equitrans geologist testified about the company's internal discussions concerning the pressure test. Company employees recognized that they could not pressurize the well given the 80% metal loss feature at 2,100 feet below ground surface, because it wasn't a "safe thing to do".

VIII. The Grand Jury Investigation

Multiple lines of evidence demonstrate that escaping gas from Equitrans' 3660 storage well ultimately caused the explosion of the Whites' family home at 161 Bowser Road.

First, numerous samples were pulled from the water well that was connected to the White family home. As we learned, the burns on J.W.'s backside and legs indicate that there was sufficient methane concentration in the water well to allow it to catch on fire. Thus, the water well served at least as one conduit of gas into the house. The water well has solid PVC casing within it to a depth of approximately 23 feet below ground surface. This is important to note because it means that the gas that made its way into the water well had to come from a depth greater than 23 feet. If gas had attempted to enter the well at a shallower depth, it would have been stopped by the PVC pipe. The first sample was collected from the water well on October 31, 2018. At that time, >25% of the air in the headspace of the water well was found to be methane. Another sample was collected on November 2, 2018. At that time, methane was detected at concentrations >60% in the headspace of the water well. The well was sampled again on April 22, 2019. On that date, the sample analyzed was the water itself instead of the headspace in the water well. Methane was found to be present in the water at a concentration of 1.9 micrograms/liter. We reviewed historical data of the water well and discovered that in 2009 and 2010, methane was not detected.

We also learned that there were multiple fractures and "rubblized zones" in the rock layers underneath the White home and in the area of the 3660 storage well. We were able to observe rock cores that revealed a number of fractures at various depths below ground surface. Fractures in the rock can become pathways for gas to travel along. We learned that gas can escape from the storage field through a deteriorated storage well by escaping from the production casing through leaks in the casing and/or channels in the cement around the casing and then traveling through rock formations and up into the aquifer. The diagram below depicts how gas can migrate away from the storage well:



The gas from the 3660 well was sampled and sent for analysis in order to determine whether or not the signature of that gas matched the gas found in the soil around 161 Bowser Road or the gas found in the water well. We learned that, although not a perfect match, the gas from the production casing within the 3660 well plotted consistently with the stray gas found at 161 Bowser

Road, both in the water well and in the soil. It can be seen in the below chart as the purple line that falls within the red shaded area.[1] The red area on the chart is indicative of the stray gas that was found in the soil and water well. We learned that any isotopic samples of gas that fall within this area are potential matches to the stray gas.

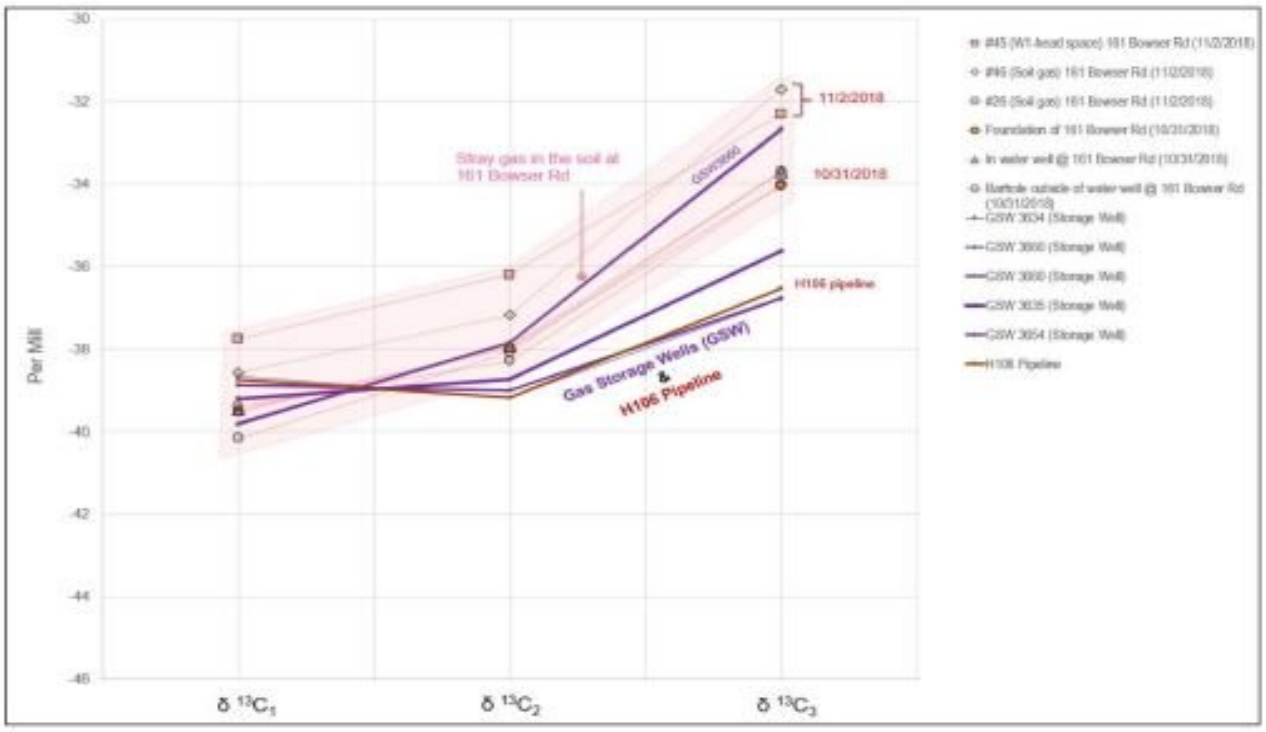


Figure 11. One gas storage well sample has some isotopic similarity to the stray gas; however, the other gas storage well samples and the pipeline gas (representative of a statistical mix of all storage field gas samples) do not resemble the stray gas.

The vertilog that Equitrans conducted in July 2020 provided evidence of the deteriorated state of the 3660 well. As stated previously, there were eight metal loss features that exceeded 80% of the wall thickness. The maximum depth of penetration measured was 89%. Baker Hughes, the subcontractor engaged by Equitrans, stated that burst pressures for pipes with such metal loss cannot be safely calculated, because the risk of pipe failure at that point is too great. Baker Hughes

[1] The expert who prepared the report containing this chart was later hired by Equitrans and appeared before the Grand Jury, where he claimed that readings from shortly after the explosion were not relevant, and that as a result, gas from the 3660 well could not be matched to the gas in the house. The Grand Jury concludes that the original report is more accurate than the later attempt to alter it.

also indicated that the testing process is not perfect, such that when results show metal loss exceeding 80%, it is safe to assume that actual conditions include total or near total body wall penetration.

Based on the metal loss features in the well, Equitrans informed DEP that it could not perform a leak-off test at the pressure that DEP requested. The Department had asked that the well be pressured to at least 800 psi, which is more than the 721.948 maximum pressure recorded a few weeks prior to the incident. Equitrans responded that the maximum safe pressure for the well was 431 psi. This is further evidence, corroborated by Equitrans' own judgment, that the well lacked proper mechanical integrity.

In addition to the vertilog, multiple inspections at the well detected a notable leak at the annular vents and stressed vegetation around the well at the surface.

Further evidence of the lack of integrity in the 3660 well comes from the cement bond logs that were run in September and December, 2020. Both logs revealed a lack of cement around the production casing, large areas of heavily channeled cement with micro-annuli and high amounts of gas in the annular spaces within the well. The lack of cement in the well provided numerous vertical pathways for gas from the Pratt Storage field to migrate up through any of the wholly uncemented shallower casing annuli. The gas was then able migrate outside the largest surface casing and continue onward and upward into the shallower rock layers and ultimately into the groundwater aquifer.

We also reviewed documentation showing that Equitrans was aware of the gas loss at Pratt for a number of years. As indicated above, in 2003, Equitrans acknowledged in a filing to FERC that it had lost 3.4 billion cubic feet of gas at the Pratt Storage Field. In a follow-up letter to the Commission in January 2005, Equitrans stated that gas loss in the Pratt Storage Field occurred due

to vertical gas migration in some of its storage wells. Equitrans then went on to state that it initiated a study and found that various wells in the field had developed integrity problems or simply were not constructed properly (no cement where well records indicated cement should be, according to its records) which could have resulted in significant vertical migration and gas loss. In that same letter, Equitrans stated that the company would recondition ten Pratt storage wells over the next 3-4 years. We saw no evidence that this actually took place. Indeed, in the filings that Equitrans submitted to FERC, the only remedial work done to a storage well in the Pratt Field occurred when the 3632 well was plugged and abandoned on November 16, 2012.

Taken together, this evidence indicates that the 3660 well was badly deteriorated and leaking and that the gas leaking from the storage well was able to make its way into groundwater and ultimately, into the White family water well.

Finally, we reviewed a certification of records from DEP to confirm that Equitrans never applied for nor was granted a permit or an exemption to a permit pursuant to the Clean Streams Law to discharge any industrial waste from the 3660 well into any waters of the Commonwealth.

IX. Applicable Environmental Statutes

We have learned much over the course of this investigation about the applicable statutes that govern this conduct. We have reviewed the various statutory provisions within the Clean Streams Law that are pertinent to our investigation. "Industrial waste" is defined as any liquid, gaseous, radioactive, solid or other substance, not sewage, resulting from any manufacturing or industry, or from any establishment…'industrial waste' shall include all such substances whether or not generally characterized as waste". Section 691.301 makes it a crime to discharge industrial waste into the waters of the Commonwealth. Section 691.401 prohibits putting, placing, allowing or permitting to be discharged into any waters of the Commonwealth, any substance of any kind

or character resulting in pollution. Section 691.611 makes it a crime to fail to comply with any DEP rule, regulation or permit, to fail to comply with any order or permit or license of the department, to violate any provisions of the Clean Streams Law to cause air or water pollution, or to hinder, obstruct, prevent or interfere with the department or its personnel in the performance of any duty.

We reviewed 25 Pa. Code §78.73, General Provisions for Well Construction and Operation. This regulation states that "the operator shall construct and operate the well in accordance with this chapter and ensure that the integrity of the well is maintained and health, safety, environment and property are protected". It goes on to state that "the operator shall prevent gas, oil, brine, completion and servicing fluids, and any other fluids or materials from below the casing seat from entering fresh groundwater, and shall otherwise prevent pollution or diminution of fresh groundwater".

We reviewed 25 Pa. Code §78.401 which governs activities associated with underground gas storage. Included within those provisions are regulations associated with the construction of storage wells, inspecting the field and wells, required integrity testing, maximum storage pressure, emergency repairs, record keeping and the plugging of storage wells.

We have also reviewed 25 Pa.Code § 78.89. The section states, "When an operator or owner is notified of or otherwise made aware of a potential natural gas migration incident, the operator shall immediately conduct an investigation of the incident. The purpose of the investigation is to determine the nature of the incident, assess the potential for hazards to public health and safety, and mitigate any hazard posed by the concentrations of stray natural gas."

We find that Equitrans' failure to adhere to the regulations that were applicable to its activities allowed methane to leave its underground storage reservoir and enter into groundwater

in the area and ultimately into the White family water well. We further find that Equitrans failed to adhere to the regulation that required the company to immediately perform a stray gas investigation.