



2018



CORPORATE SOCIAL  
RESPONSIBILITY

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## SUSTAINABILITY—LETTER FROM FOUNDERS

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Since we set out on this incredible journey as shale gas pioneers in 2003, we have remained vigilant in exhibiting our values of creating a sustainable and resilient company. Our company culture promotes core business principles of safety, integrity, performance, stewardship and innovation. These values and principles are part of our corporate DNA and we are committed to Zero Compromise.

Every day, the safety of our employees and contractors is the top priority and our actions and performance demonstrate that commitment. In 2018, Antero Resources and Antero Midstream had zero employee or contractor fatalities, a combined employee and contractor Lost Time Incident Rate (LTIR) of 0.089 and a combined employee and contractor Total Recordable Incident Rate (TRIR) of 0.56, which outperforms the 2017 Upstream Onshore Oil and Gas ISN Benchmark averages of 0.36 for LTIR and 1.19 for TRIR. We believe our success is due to continuous incident and risk evaluation, improvements to our safety management programs and system, and through empowering everyone on any job site with Stop Work Authority.

We believe our sustainability programs, encompassing environmental, social, and governance aspects, strengthen our business and inspires confidence in our employees, investors, creditors and contractors, as well as with regulatory agencies and communities in which we operate. We take a proactive approach to develop and implement work practices and technologies to deliver natural gas, natural gas





liquids and oil to the market in the most ethical, environmentally and socially responsible way. Antero implements beyond-compliance measures to minimize exposure for our employees and the public, and to health, safety, security and environmental (HSSE) risks. We invest heavily in communities where we live and operate because we are grateful for the opportunity and believe sharing our success is the right thing to do.

We recognize the growing concern with climate change and are dutifully committed in our efforts to manage and reduce greenhouse gas emissions including methane emissions. Our greenhouse gas emissions intensity decreased from 0.75 thousand metrics tons CO<sub>2</sub>e in 2017 to 0.44 thousand metric tons CO<sub>2</sub>e in 2018 even though we saw growth in our operations. We participate as active members in industry-leading partnerships to reduce

greenhouse gas and methane emissions such as ONE Future, The Environmental Partnership, and the U.S. EPA Natural Gas STAR program. Our methane leak loss rate is 0.06%, well below the industry target of 1.00%. We continually research, evaluate and implement technology to further reduce our environmental footprint as part of our business strategy.

Antero's Health, Safety, Security and Environmental (HSSE) management system guides us toward our goal of Zero Incidents, Zero Harm and Zero Compromise. Our employees and contractors have the duty of employing Stop Work Authority when HSSE concerns are discovered. We regularly engage state and federal regulatory agencies by voluntarily sponsoring emergency preparedness programs and donating emergency response equipment. Through our Enterprise Risk Management System, we identify risks and invest in







mitigation efforts related to HSSE exposure. Our HSSE performance speaks for itself and exemplifies our unwavering commitment to make every effort to do the right thing, take accountability for our actions, and maintain our position as a world-class sustainable energy producer, partner and employer of choice.

We are dedicated to leading and operating our company in an ethical and responsible way. This commitment is evident in our performance and leadership, while we actively care for our employees, contractors, the public, and the environment.

Sincerely,

**PAUL M. RADY**  
Chairman and CEO  
Co-Founder

**GLEN C. WARREN, JR.**  
President, CFO and Director  
Co-Founder





## STAKEHOLDER ENGAGEMENT

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Antero values our local communities and the relationships we have with our stakeholders. We believe a high level of engagement with our investors, customers, employees, contractors, local communities, regulatory agencies, surface and mineral owners, and peers is critical to our success. The open dialogue that we have with our stakeholders about issues that matter the most creates opportunities for information sharing and problem-solving. The following are ways we maintain and build relationships.

Antero makes readily available to investors, via their website, financial presentations and information, SEC filings, and press releases. Additionally, Antero holds analyst conferences, meetings with institutional investors and communicates to investors interested in sustainability issues. Antero's Investor Relations team maintains contact with investors on an ongoing basis. Antero's Marketing department maintains contact with its customers on an ongoing basis. Antero also responds to customer requests for sustainability information.



Antero engages employees in various ways including through the intranet website where everyone has access to the safety management system and the environmental management system; through formal training on sustainability issues; lunch-and-learn programs, wellness programs, the monthly company newsletter, HSSE bulletins, volunteer opportunities, leadership programs, performance management, weekly meetings and recognition programs. Employees are empowered to make a difference and drive performance towards our commitment to health, safety, security and the environment. Anyone on an Antero location has Stop Work Authority.

Antero engages contractors through daily tailgate meetings, empowerment with Stop Work Authority, site orientations, recognition programs, training, and performance management through a vendor management service. Antero

holds an annual Contractor HSSE conference where relevant training and recognition is provided. Antero held a hands-on Environmental workshop for its contractors in 2019 to focus on sustainability and regulatory compliance issues.

Local communities include emergency management agencies (EMAs), residents, and elected officials. We meet regularly with EMAs to discuss emergency preparedness plans and conduct drills. Antero has donated emergency response equipment to EMAs. Antero employees volunteer time and donate generously to the causes that matter to the community. We have a 24/7 hotline that is directed to our Community Relations team where concerns will be understood and addressed.







Antero meets with local, state and federal regulatory agencies regularly. Our engagement includes discussing regulatory issues, sharing lessons learned and industry perspectives on what works, and receiving feedback.

Antero takes seriously its duty to minimize disruptions in the lives of those who live close to our operations. A cornerstone of this effort is a tracking system which dedicated employees painstakingly manage. The community relations hotline is a telephone and email system which collects reports of issues such as noise, dust, speeding, and property damage. We distribute the phone numbers and email addresses broadly at community events and to our vendors so that they may disseminate the information to landowners in the field. Every resident who leaves a message gets a call back within 24 hours and a follow-up site visit if needed.

Our community relations staff has broad authority to address problems and dedicate resources to such when needed.

An example of Antero's responsiveness to community concerns can be seen in road repair investments. Since 2013 Antero has spent more than \$200 million on road maintenance and upgrades.

Many oil and gas companies actively support local charities in the communities in which they operate, and, of course, Antero does too. In fact, the company has contributed \$400,000 to charitable organizations over the past five years. But what has had an even greater impact on our communities is the "sweat equity" that is earned when employees voluntarily show up and keep parks beautiful and rivers clean. Each year, Antero employees volunteer hundreds of hours on these types of projects. Antero provides a platform for all our partners to come





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together and raise tens of thousands of dollars for charity. Our Derby party and Dodgeball tournament provide support for children and family advocacy in the areas in which we operate. Our vendors support Antero in these efforts, and the non-profit organizations are the recipients of that generosity.

Antero's economic impact in North Central West Virginia is significant. With 264 direct employees and more than three-thousand contract personnel, the company is a dominant part of the local landscape. Antero paid \$393 million in royalty and bonus in 2017, and \$88 million in taxes in 2017 – enabling state government to provide needed services to West Virginians.

Antero is committed to our royalty owners who have access to our Owner Relations department via the Antero website and hotlines. Payments are made to royalty owners on a monthly basis.

Antero meets with peer companies and participates by serving on committees in industry associations to share lessons learned and work towards sustainable solutions for the industry. Antero lends voluntary support in responding to emergencies if they have resources nearby and if requested either by a regulatory agency or by a peer company.





## HEALTH, SAFETY, SECURITY & ENVIRONMENT (HSSE)

A focus on health, safety, security and preservation of the environment (HSSE) puts people and the community first and is the right thing to do. It also makes good business sense. A strong safety culture and dedicated environmental stewardship reduces risk, enhances productivity and builds a strong reputation in the communities in which we operate. We have earned a reputation as a safe and environmentally responsible operator through continuous improvement in our HSSE performance. This makes us an employer of choice for current and prospective employees.

We invest in HSSE training and coaching, promote risk assessments and encourage visible HSSE leadership. We sponsor emergency preparedness programs, conduct regular audits to assess our performance and celebrate our successes through the annual contractor HSSE conference where we acknowledge employees and contractors alike who have exhibited strong HSSE leadership during the course of the year. These many efforts combine to create a culture of HSSE Excellence throughout the company and provide a positive influence to our contractor community.

Antero holds periodic Contractor HSSE Meetings to review HSSE performance, collaboratively solve problems, address public concerns, provide an open forum, and most importantly, to recognize the dedication and commitment to the HSSE Antero Ideals that are being upheld by Antero's contractors.

**On-Site In-Field HSSE Representatives**—Antero has HSSE representatives who are continuously on site 24/7 during every significant operation, including drilling, completions, flowbacks, and pipeline start-ups.





## HEALTH, SAFETY, SECURITY & ENVIRONMENT

# HSSE LEADERSHIP

HSSE leadership at Antero starts at the very top of the organization, with executives and senior management engaging in efforts that drive the HSSE culture of the company, which, in turn, ensure behaviors that assist all employees and contractors in achieving our HSSE goals.

Antero's senior management is active in several committees such as the Corporate Sustainability Steering Committee (CSST) and the Field Safety Committee (FSC). The CSST consists of the Chief Administrative Officer/SVP of Appalachian Region, SVP of Production (Antero Resources), VP of Operations (Antero Midstream), VP of Operations (Antero Resources), VP of HSSE along with other key senior staff. The CSST committee reviews many HSSE initiatives and provides feedback that drives the regular updating of our evolving safe work practices for employees and contractors.

The FSC is comprised of thirty key senior staff in the field reviewing and updating new programs and updating technology to ensure Antero is committed to achieving the best safety practices in the industry. This Antero committee meets once a quarter to review relevant items from Antero's safe work practices, safety data systems and key leading and lagging indicators. The FSC will present new initiatives to the CSST for approval.

All corporate and field senior staff members, including the Chairman/CEO and President/CFO for Antero Resources and Antero Midstream, congregate weekly in an Antero operations meeting, which begins with key reviews of Antero HSSE incidents and incident rates.





## RISK ASSESSMENT & HAZARD RECOGNITION

Risk assessments and hazard recognition programs are critical components of the Antero HSSE management system. Antero has developed comprehensive risk registers, which outline the potential risks associated with each phase of operation needed to bring a project to completion from a HSSE perspective. Antero utilizes a proprietary risk matrix to quantify any potential risks and impacts to our employees and contractors.

Antero expects that a Job Safety Analysis (JSA) is completed and documented prior to the start of key tasks on our locations and facilities. Further, Antero expects that each worker involved in the task, whether an employee or a contractor, be fully briefed on any hazards and acknowledge them by signing the JSA. Every contractor and service provider is expected to have their own JSA program that is compliant with relevant health and safety laws and regulations in place prior to performing work for Antero.



# DON'T OVERLOOK SAFETY



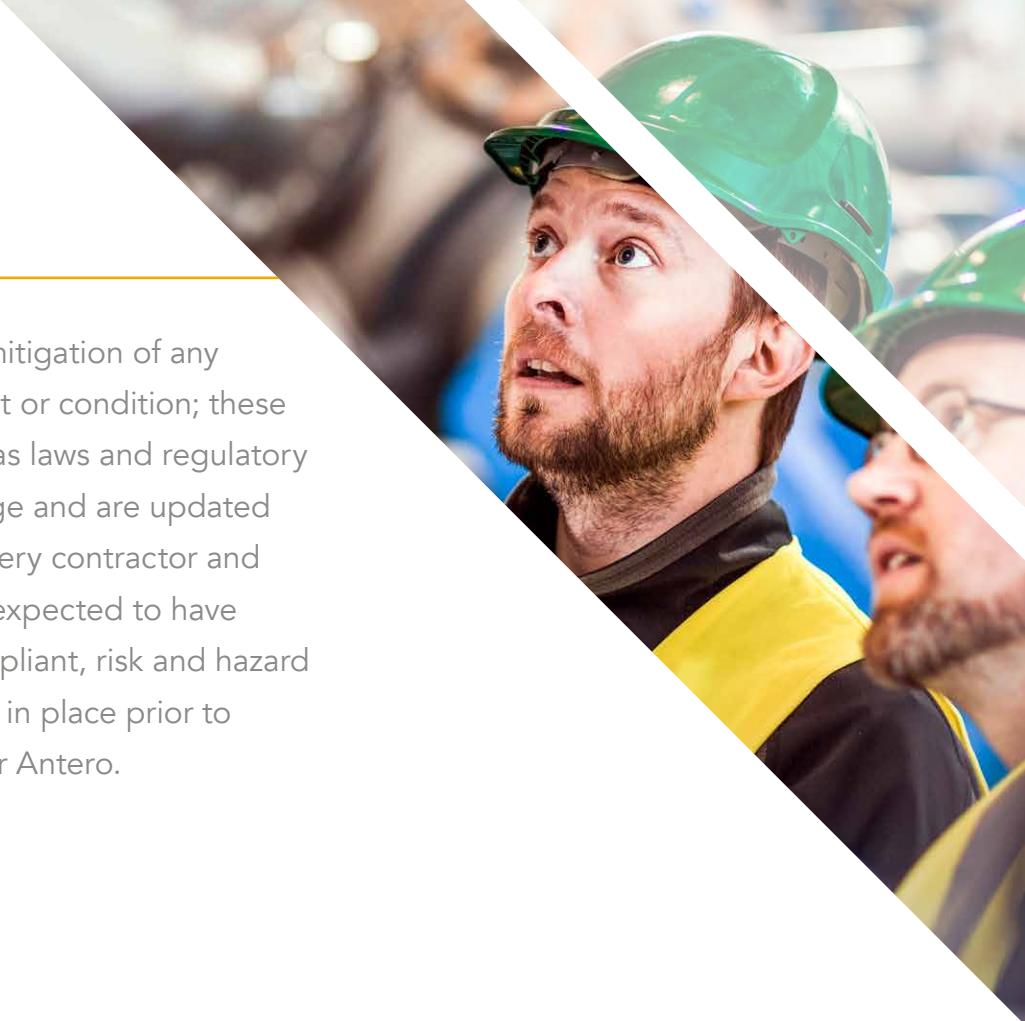


At the core of Antero's risk assessment and hazard recognition program is Stop Work Authority (SWA). SWA establishes the responsibility and authority of every worker on our locations and facilities to stop work when any unsafe act or condition is discovered. Every contractor and service provider is expected to have their own SWA program that is fully compliant with relevant health and safety laws in place prior to performing work for Antero.

Antero expects any identified risk or hazard to be fully mitigated to a level as low as reasonably practical (ALARP) before beginning or resuming any work on our locations and facilities. To assist our contractors and service providers, Antero has developed a robust library of safe work practices to guide our

contractors in the mitigation of any identified unsafe act or condition; these documents evolve as laws and regulatory requirements change and are updated when necessary. Every contractor and service provider is expected to have their own, fully compliant, risk and hazard mitigation program in place prior to performing work for Antero.

### SWA Steps







## INCIDENT REPORTING SYSTEM

Antero facilitates data collection, investigations, and information tracking on any incident that occurs on our sites. Every contractor is expected to have its own, fully compliant incident investigation program in place prior to performing work for Antero. The program is expected to identify any factors that contributed to the incident and a comprehensive plan to help prevent reoccurrence. We use incidents as learning opportunities to create HSSE Alerts, Bulletins, and Reminders for distribution to our contractors.

Antero defines a 'Near-Miss' as an unplanned event that did not result in injury, illness, damage, or spill, but under slightly different circumstances had the potential to do so. Near-miss incidents are to be reported to the Antero operations or HSSE teams verbally or in writing. Once reported, near-miss incidents are tracked within Enablon, Antero's incident management system, and subsequently as part of Antero's performance metrics.

Once logged into Enablon, near-miss incidents are categorized using Antero's HSSE Risk Matrix, and investigated. The goal of the investigation is to identify Safety Management System, Environmental Management System or other issues that contributed to the near-miss incidents, and reduce and where possible eliminate factors that lead to incidents or near-misses in the future.



After completing the near-miss incident investigation, Antero will determine contributing factors and root causes that led to the near-miss incident. Antero will then develop and assign corrective actions to prevent reoccurrence. Corrective actions go through a RACI (responsible, accountable, consulted, informed) process that includes representatives from all related operational groups to ensure viability.

As a whole, the HSSE team combined with operations reviews near-miss incidents for trends, such as frequency, location, phase of operation and cause and will implement corrective and preventive actions to avoid reoccurrence. A HSSE alert is often created to communicate the incident and findings to other operational groups to improve awareness, and when appropriate, to other industry parties, regulatory agencies, and first responders.

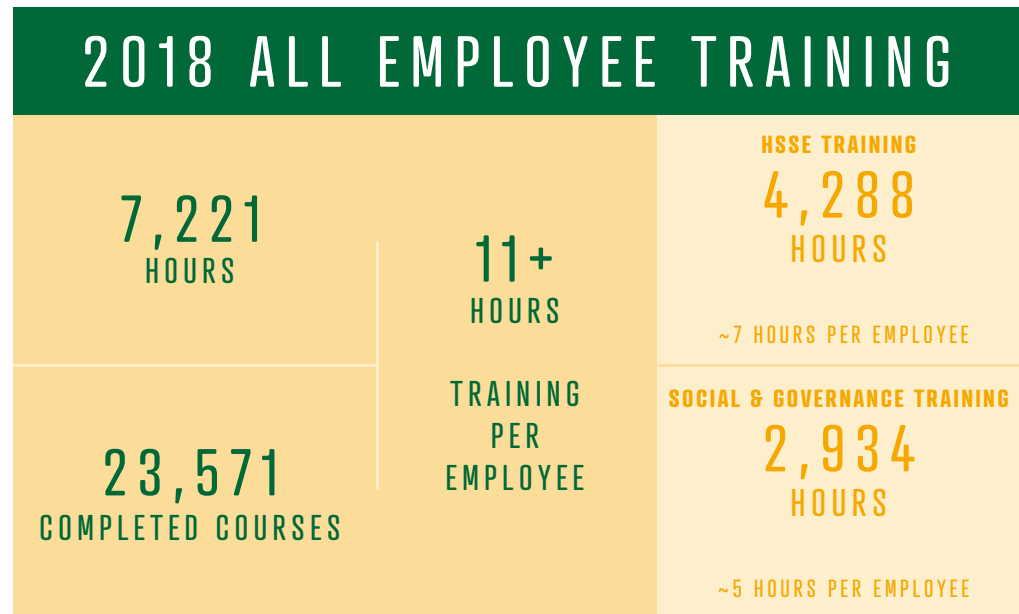
For near-miss incidents involving service providers and contractors, the process is the same as above, with the exception that the contractor completes the investigation, identify the root cause(s) and subsequent corrective actions, Antero then verifies completion of corrective actions.





# HEALTH & SAFETY TRAINING & COMPETENCY

Antero requires employees and contractors to successfully complete applicable HSSE training in order to perform their jobs in a safe and healthy, environmentally responsible manner. HSSE training may include task-specific, regulatory-required, and Antero policy training. Contractor’s HSSE training must meet or exceed Antero’s minimum expectations, as outlined in Antero’s policies. Antero employees’ HSSE training is based on the Antero job description training expectations and any other hazard-specific training appropriate for an upcoming duty or task assignment.







## HEALTH, SAFETY, SECURITY & ENVIRONMENT

# EMERGENCY PREPAREDNESS

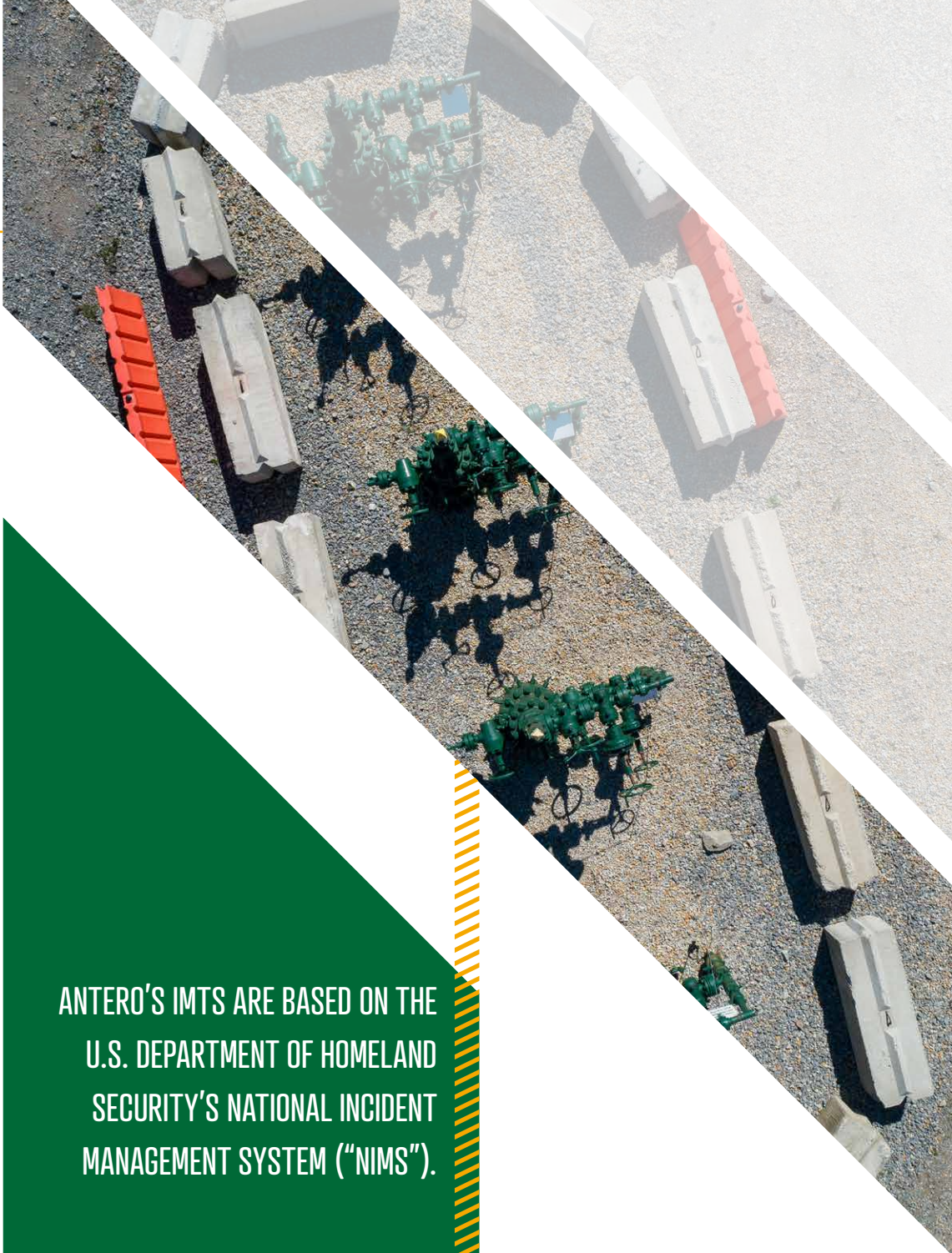
Antero's approach to incident response includes Crisis and Field Incident Management Teams ("IMT") within Antero. Antero's IMTs are based on the U.S. Department of Homeland Security's National Incident Management System ("NIMS"). The NIMS incorporates many existing best practices into a comprehensive national approach to domestic incident management, which is applicable at all jurisdictional levels and across all functional disciplines.

NIMS represents a core set of doctrine, principles, terminology, and organizational processes to enable effective, efficient, and collaborative incident management at all levels. It provides the framework for interoperability and compatibility, based on a balance between flexibility and standardization. This flexibility applies across all phases of incident management: prevention, mitigation, preparedness, response, recovery, and resumption.

Antero uses the Incident Command System ("ICS") designed by the NIMS. Antero's model of ICS allows for a rapid, flexible, and efficient response to incidents. The ICS is modular and scalable, allowing the response to escalate uniformly with the incident. Conversely as the incident de-escalates, the response can de-escalate without loss of command continuity.



Antero's IMTs are comprised of a Crisis Commander—Corporate Activities ("CC"), Incident Commander—Field Activities ("IC"), Command Staff, and General Staff. The CC and IC are responsible for overall management of the response, including the coordination of Command and General Staff activities. The Command Staff includes the Public Information Officer, Safety Officer, Legal Officer, Liaison Officer, and Security/Information and Intelligence Officer.



ANTERO'S IMTs ARE BASED ON THE  
U.S. DEPARTMENT OF HOMELAND  
SECURITY'S NATIONAL INCIDENT  
MANAGEMENT SYSTEM ("NIMS").





# CONTRACTOR SAFETY MANAGEMENT

Antero's Contractor Safety Management Program strives to go "beyond the desk" and verify that work performed at Antero sites meets Antero HSSE minimum expectations. Antero provides health and safety resources on every active project to ensure complete coverage of our operations. From onboarding to boots on the ground, Antero's Contractor Safety Management Program is designed to maintain our peer leading growth and performance.

Antero partners with a leading data management service (ISNetworld™) to collect and evaluate health and safety information from our contractors. Antero applies our unique risk profile and grading specifications to the collected data, to review whether contractors meet Antero's minimum expectations.





## HEALTH, SAFETY, SECURITY & ENVIRONMENT

# OCCUPATIONAL HEALTH

Antero's Occupational Health Program plays an important role in the Company's overall strategy to help protect the health of our employees. In commitment to this effort, Antero has adopted an Occupational Health Surveillance Program ("OHSP") that provides a framework for evaluating impacts on Antero employees' health. Occupational Safety and Health Administration ("OSHA") regulation 29 C.F.R. § 1910.1000 contains the Z Tables that list analytics or agents that have specific regulations that mandate baseline evaluation or monitored health surveillance requirements.

### **The Antero OHSP details the current Antero protocols for, but not limited to:**

- + Antero's Case Management and Safe Return-to-Work (Fit-for-Duty Clearance Reports) and (Physician Written Evaluations)
- + Antero's Hearing Conservation Program
- + Antero's Employee Safe Return-to-Work Program Including Antero's Blood Borne Pathogens Program
- + Pre-employment DOT Physical Screening Exams





# HEALTH, SAFETY, SECURITY & ENVIRONMENT PERFORMANCE MEASUREMENT

Data is at the core of Antero’s Safety Management System. We continually track, trend, and analyze not only our health and safety performance, but the health and safety performance of our contractors. We use leading and lagging indicators to pinpoint opportunities for improvement and continually strive for health and safety excellence.

## Health & Safety Performance Metrics

	2016	2017	2018
<b>Fatalities</b>			
Employee	0	0	0
Contractor	0	1	0
Total	0	1	0
<b>Lost Time Incident Rate (LTIR)</b>			
Employee Rate	0.000	0.000	0.000
Employee Hours Worked	1,113,228	1,250,667	1,343,680
Contractor Rate	0.161	0.033	0.099
Contractor Hours Worked	9,968,768	11,994,549	12,073,628
Combined Rate	0.144	0.030	0.089
<b>Total Recordable Incident Rate (TRIR)</b>			
Employee Rate	0.719	0.640	0.149
Employee Hours Worked	1,113,228	1,250,667	1,343,680
Contractor Rate	0.700	0.584	0.613
Contractor Hours Worked	10,001,362	11,994,549	12,073,628
Combined Rate	0.702	0.589	0.566



# SECURITY

Antero Resources is committed to the safety and security of our organization and the communities in which we operate. We strive to plan, prepare, prevent, and recover from negative security incidents that could injure, harm, disrupt, or impact our workers, our sites, our business, and our communities. Through strategic alignment with our business and operational teams, we are able to efficiently and swiftly identify and direct resources to preserve and safeguard our assets; both tangible and intangible.

## Cyber Security:

The traditional model for information technology security has changed. The Confidentiality, Integrity, and Availability (CIA) Triad has evolved to include Safety (CIAS). Antero leverages information technology in significant ways; traditionally, in the areas of Operational Technology (OT), and the Internet of Things (IoT). As the company's use of technology continues to advance, so do our cybersecurity strategies. Our commitment to sustainable governance and security best practices helps us navigate the ever-changing threat landscape.

We take a comprehensive, holistic approach to our cybersecurity efforts. This approach incorporates our people, processes, and technology to prevent, mitigate and remediate issues effectively.



## MANAGEMENT SYSTEMS & PERFORMANCE

Antero is implementing an Environmental Management System (EMS) based on the ISO 14001:2015 standard to efficiently address environmental risks, minimize environmental impacts, and ensure compliance with all legal requirements. Antero has a long history of giving back to the communities in which we operate; it is our history, and we want to live up to it by continuously improving our environmental stewardship. The EMS is a constantly evolving tool for Antero.

The underlying principles of Antero's EMS has been adopted throughout the company and has the support of management and employees. Clear and effective practices are in place, and compliance with those practices, and regulatory standards, define how Antero does business. Through the EMS, the identification of environmental risks that may impact our communities are paired with the goal of bringing the best return for our stakeholders, ensuring that Antero has in place the necessary resources for projects and integrates environmental matters into our business planning.

In 2018, Antero focused on reformulating several compliance workflows, updating environmental compliance Standard Operating Procedures (SOPs), and improving inspection programs and operational controls to ensure regulatory compliance.

This year, Antero will continue to make improvements to the EMS by focusing our efforts on measuring overall environmental performance. We are developing a robust set of metrics to measure environmental performance where it matters and will use that information to set targets established by Antero's Senior Management.



# METHANE & CLIMATE

Antero puts forth significant effort to manage methane emissions and goes above and beyond to reduce our climate-related risks in our business, strategy, and financial planning. Antero is committed to producing an annual Corporate Social Responsibility (CSR) report, participating in voluntary emission reduction programs, being transparent by reporting our emissions of greenhouse gases (GHGs), including methane, and continuously evaluating emission control technologies that could be implemented across our operations.



## Voluntary Programs:

Antero demonstrates our commitment to methane mitigation and reducing climate change risks by actively participating in voluntary programs that are committed to reducing emissions: EPA Natural Gas STAR Program, ONE Future, and API's Environmental Partnership.







Antero joined the EPA Natural Gas STAR Program in 2017. By joining the EPA program, Antero expanded our commitment to evaluate and implement methane reduction projects. We transparently report our voluntary reductions of methane emissions and participate in information sharing and technology transfer by working with our peers to keep up with industry trends.





# ONE

OUR NATION'S ENERGY

# FUTURE

In 2018, Antero Resources became a member of ONE Future. ONE Future is an industry collective focused on voluntarily reducing methane emissions across the natural gas supply chain, with a goal to lower emissions to 1% or less of total natural gas production by 2025. ONE Future's target is a science-based methane emission intensity target. The target seeks to ensure that fuel switching to natural gas will create GHG reduction benefits. Antero's methane leak intensity was at 0.055% in 2018, which is well ahead of the ONE Future cumulative industry goal of 1% and the gas production and gathering segment goal of 0.36%. Antero continuously strives to reduce our methane intensity target.

ONE Future has also partnered with the US Department of Energy's National Energy Technology Laboratory (NETL) to improve operational efficiency and mitigate methane emissions. As a member company, we provide our emissions data to NETL by way of ONE Future for them to characterize ONE Future's supply chain GHG emissions and evaluate opportunities for improvement. The key finding of phase one of the project shows that, through best practices and capital investments, ONE Future participants have improved the overall efficiency of their systems. Therefore, the strategies employed by ONE Future participants set a benchmark for other operators to follow. Phase two of the project is scheduled to be kicked off in the spring of 2019.

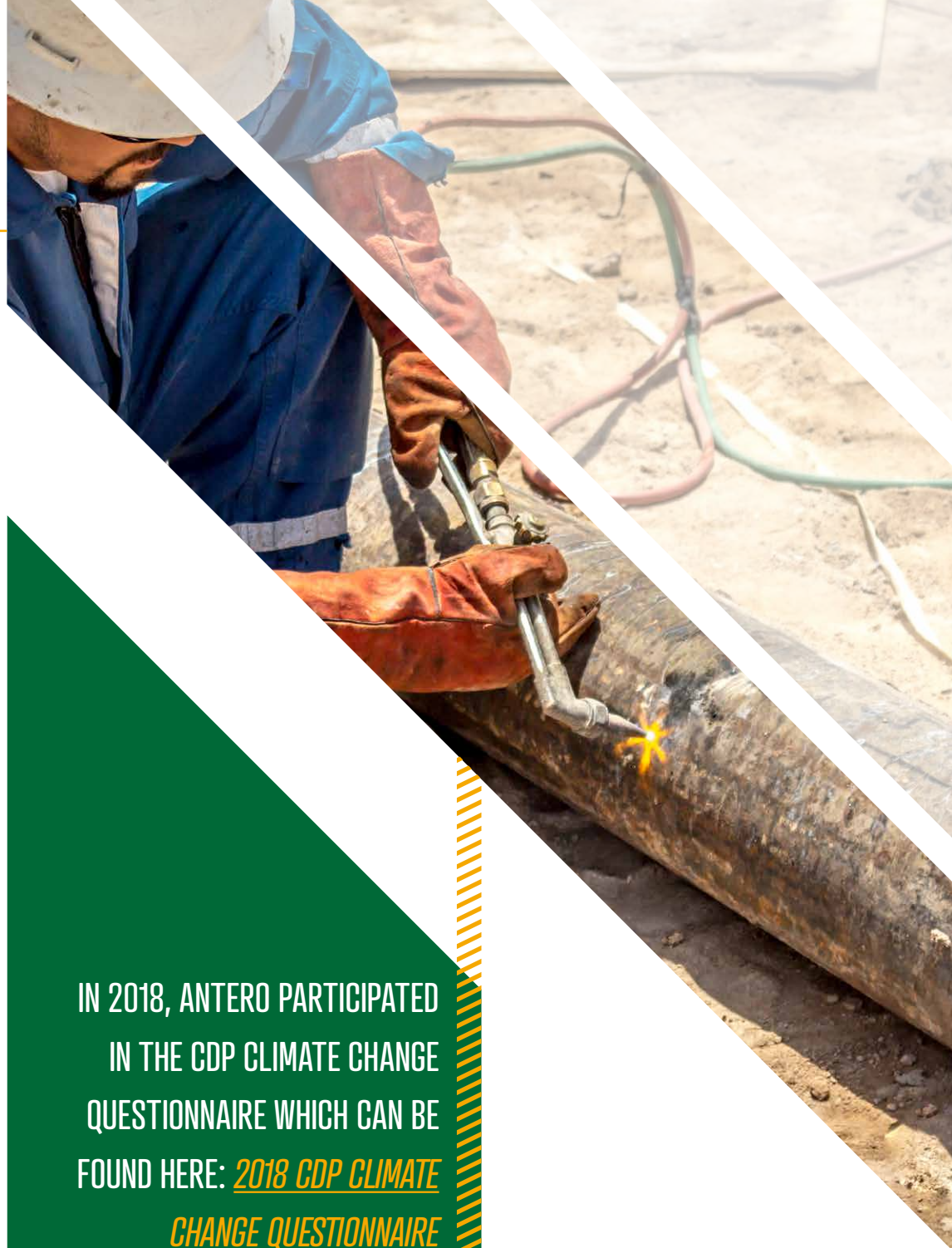




## THE ENVIRONMENTAL PARTNERSHIP

An Initiative of the U.S. Natural Gas and Oil Industry

In 2018, Antero Resources also joined API's Environmental Partnership. Their mission is to "continuously improve the industry's environmental performance by taking action, learning about best practices and technologies, and fostering collaboration in order to responsibly develop our nation's essential natural gas and oil resources." To meet this commitment, Antero conducts Leak Detection and Repair inspections at all permitted sites. In addition, as a participant in the Partnership, Antero has committed to submit annual reporting to track the progress of our emission reductions. Ultimately, an annual report will be developed to document the Partnership's efforts and will be made available to the public for review.



IN 2018, ANTERO PARTICIPATED  
IN THE CDP CLIMATE CHANGE  
QUESTIONNAIRE WHICH CAN BE  
FOUND HERE: [\*2018 CDP CLIMATE  
CHANGE QUESTIONNAIRE\*](#)





## METHANE & CLIMATE

# GHG EMISSIONS

On the following page, Antero provides our direct GHG emissions, GHG emission intensity, total methane emissions and methane leak/loss rate for the previous three years. Antero is proud to point out that although we saw growth in our operations from 2017 to 2018, Antero Resources saw a reduction in their GHG intensity. We believe this is a direct result of our continued commitment to GHG emission reduction practices.







### Antero Resources Greenhouse Gas (GHG) Emissions

	2016	2017	2018
<b>Total GHG Emissions</b> <sup>1</sup> <i>thousand metric tons CO<sub>2</sub>e</i>			
	424	506	478.5
<b>GHG Emissions Intensity</b> <sup>2</sup> <i>kg CO<sub>2</sub>e/MMBTU</i>			
	0.73	0.75	0.62
<b>GHG Emissions Intensity</b> <i>kg CO<sub>2</sub>e/BOE</i> <sup>3</sup>			
	3.79	3.85	3.07
<b>Total Methane Emissions</b> <i>thousand metric tons</i>			
	5.34	6.53	8.14
<b>Methane Leak/Loss Rate</b> <sup>3</sup> %			
	0.06%	0.05%	0.06%

1. Total GHG emissions are based on emissions reported to the EPA under Subpart W of the Greenhouse Gas Reporting Rule Program (GHGRP).  
 2. The GHG intensity ratio is calculated by dividing the kg of CO<sub>2</sub>e reported to the EPA under subpart W by MMBTU produced.  
 3. The methane leak/loss rate is calculated by dividing methane emitted by the methane produced.

### Antero Midstream Greenhouse Gas (GHG) Emissions

	2016	2017	2018
<b>Total GHG Emissions</b> <sup>1</sup> <i>thousand metric tons</i>			
	429	767	1,031
<b>GHG Emissions Intensity</b> <sup>2,3</sup> <i>kg CO<sub>2</sub>e/MMBTU</i>			
	0.78	1.17	1.26
<b>GHG Emissions Intensity</b> <i>metric tons CO<sub>2</sub>e/MBOE</i>			
	3.83	5.84	6.21
<b>GHG Emissions Intensity</b> <i>metric tons CO<sub>2</sub>e/MMscf sold</i>			
	1.65	1.81	1.57
<b>Total Methane Emissions</b> <i>thousand metric tons</i>			
	0.79	1.13	1.42
<b>Methane Leak/Loss Rate</b> <sup>3,4</sup> %			
		0.02%	0.02%

1. Total GHG emissions are based on emissions reported to the EPA under Subpart W of the Greenhouse Gas Reporting Rule Program (GHGRP).  
 2. The GHG intensity ratio is calculated by dividing the kg of CO<sub>2</sub>e reported to the EPA under subpart W by MMBTU produced.  
 3. Value does not include emissions from the Antero Clearwater Facility.  
 4. The methane leak/loss rate is calculated by dividing methane emitted by the methane produced.





METHANE & CLIMATE

## GHG MITIGATION EFFORTS

### Leak Detection and Repair (LDAR):

Our methane and air emission controls include a robust LDAR program. Any detected leaks found during periodic inspections are repaired promptly to minimize emissions. Our LDAR program meets or exceeds federal and state (WV and OH) requirements. The LDAR program inspections utilize a state-of-the-art Optical Gas Imaging (OGI) Forward Looking Infrared Radar (FLIR) camera to identify leaks. We employ four full-time technicians to conduct and record the results of the LDAR inspections. These technicians have successfully completed FLIR camera training and are certified OGI camera operators. Inspections are conducted jointly by LDAR inspectors and operations personnel. Any detected leaks are typically repaired during the inspection. If the repair cannot occur during the inspection, the issue is tracked in our maintenance ticketing software and is fixed as soon as practicable, but no later than 30 days unless there is justification for placement on our Delay of Repair (DOR) list. 100% of Antero's permitted facilities undergo LDAR inspections.



## Practices to Reduce Flaring/Gas Combustion:

Antero reduces the amount of gas that requires combustion by flares or similar devices by using multiple stages of separation along with vapor recovery units and vapor recovery towers. This engineering control minimizes the amount of waste gas that is generated at the tanks. The remaining waste gas generated is either captured by a vapor recovery system and sent into the pipeline, burned in an enclosed combustion devices (ECD) with a control efficiency of at least 98%, or a combination of both.

To minimize flaring emissions during completion activities, Antero utilizes balanced drill outs. This technique limits the amount of gas that reaches the surface during completions. Since the amount of gas that reaches the surface is very minimal, the amount of gas that is

required to be flared is also very minimal. The minimal gas that does reach the surface is not of a saleable quality, so it is destroyed by a flare with a control efficiency of at least 98%.



**TO MINIMIZE FLARING EMISSIONS DURING COMPLETION ACTIVITIES, ANTERO UTILIZES BALANCED DRILL OUTS. THIS TECHNIQUE LIMITS THE AMOUNT OF GAS THAT REACHES THE SURFACE DURING COMPLETIONS.**





## Additional GHG Mitigation Efforts:

In addition to the efforts outlined above, Antero has completed or initiated the following methane emissions reduction activities:

- 🌿 We operate burner management systems with three stages of pressure control to optimize combustor efficiency on storage tanks and to minimize methane emissions.
- 🌿 We use weighted thief hatches on all new tanks to reduce tank emissions.
- 🌿 We utilize green completions/balanced drill outs for all well completions to reduce emissions.
- 🌿 We test pressure relief valves on a routine basis and repair or replace valves as necessary, reducing the amount of incidentally released methane.
- 🌿 We switched to air-actuated pneumatic controllers at most compressor stations to eliminate the methane emissions that occur with gas-operated controllers. We do not utilize high-bleed controllers at any of our midstream facilities.
- 🌿 We completed the transition from intermittent bleed to low bleed pneumatics at all of our new production facilities to further reduce associated methane emissions.
- 🌿 We replaced gas-operated compressor engine starters with air or electric starters at select compressor stations to eliminate the methane emissions that occur with gas-operated starters.
- 🌿 During construction, we implemented the use of hot taps when making a connection to an active line to prevent the need for blowing down long segments of pipe.
- 🌿 Optimized glycol recirculation rates are utilized with flash tank separators on glycol dehydration units.
- 🌿 Facility LDAR inspections were conducted at twice the frequency required by regulations during 2018.







Antero has formed a GHG/Methane Reduction team that meets quarterly to review, analyze and determine if we can implement emerging methane detection and quantification technologies applicable to E&P and Midstream operations. The team is currently investigating the following methane reduction technologies and practices:

- ⊗ Developing a plug and abandonment plan for certain older vertical wells that were acquired in conjunction with property acquisitions. Plugging and abandoning older, low producing wells should reduce methane emissions.
- ⊗ Reviewing options to recover gas from Midstream pigging operations.
- ⊗ The replacement of TEG dehydrators with desiccant dehydrators where feasible.
- ⊗ Installing electric driven centrifugal pumps on dehydration units that allow for Antero to fine tune the circulation rates, which in turn reduces flash emissions.
- ⊗ Injecting blowdown gas into fuel systems at new stations to eliminate associated venting emissions.
- ⊗ Utilizing technologies to assist with pipeline pump downs prior to maintenance and pigging to reduce gas venting.
- ⊗ Utilizing electric compression at our new compressor stations to minimize emissions caused by gas combustion where feasible.
- ⊗ Evaluating switching to air-actuated pneumatic controllers at the remainder of our compressor stations and at new production facilities to eliminate the methane emissions that occur with gas-operated controllers.





## REGULATORY PROGRAMS

Antero reports under the EPA's Greenhouse Gas Reporting Program (GHGRP). As part of the requirement, Antero discloses all Scope 1 direct GHG emissions at a basin wide level (Appalachian Basin and Appalachian Basin Eastern Overthrust) to EPA. Antero also discloses methane emissions as part of total organic compounds released to the Ohio EPA (OEPA). GHG emissions are calculated using a combination of actual measurements, engineering calculations, and emission factors as required by each reporting program.

Currently Antero discloses quantitative information on criteria and hazardous air pollutant emissions for our operations in Ohio, as well as all sites with a Title V air permit. Antero is working to compile these emissions for all sites and aims to disclose that information in the near future.

Antero does not disclose the percentage of our air emissions in or near areas of dense population, because Antero does not operate in or near areas of dense population. For this analysis Antero reviewed the counties in which we operate with counties defined as part of a metropolitan statistical areas as defined by the Office of Management and Budget and there is no overlap (at the time of that analysis).



## METHANE & CLIMATE

# RISKS & OPPORTUNITIES

Antero has formed a GHG/Methane reduction team comprised of company leaders who meet quarterly to review emission reduction opportunities. The results of risk management procedures with regard to climate change risks and opportunities are reported to our management and periodically at corporate board meetings. Having executive oversight demonstrates our over-and-above commitment to methane emission reductions and climate change risk-mitigation. This will also be reinforced in our Climate Policy, which is under development.



**WE TAKE A PROACTIVE APPROACH TO DEVELOP AND IMPLEMENT WORK PRACTICES AND TECHNOLOGIES TO DELIVER NATURAL GAS, NATURAL GAS LIQUIDS AND OIL TO THE MARKET IN THE MOST ETHICAL, ENVIRONMENTAL AND SOCIALLY RESPONSIBLE WAY.**







## METHANE & CLIMATE ENERGY USE

Antero is working to make our operations more efficient while providing a clean source of energy to our customers. Overall, Antero Resources drilling and producing operations used 0.246 GJ/Tonne of oil and gas produced for 2017 and 0.226 GJ/Tonne for 2018, an 8% reduction from 2017 to 2018. Overall, Antero Midstream operations used 0.682 GJ/Tonne of oil and gas transported for 2017 and 0.695 GJ/Tonne for 2018. Antero Midstream increased overall energy usage for oil and gas transportation slightly (2%) from 2017 to 2018. Antero utilizes a combination of energy sources including electricity, natural gas, and diesel for drilling, production, compression, treatment, and transportation operations. Antero Midstream also produced 47.7 GWh of electricity using natural gas micro turbines for transportation operations in 2018. Antero tracks the mileage and fuel usage of our vehicle fleet in West Virginia and Ohio. Antero also provides company paid transit passes for our employees in Denver, CO to encourage the use of energy saving mass transit.







## Antero Resources Energy Use

	2018	
<b>Total Energy Use (GJ)</b>	<b>5,097,704</b>	
Non-Renewable	5,096,070	99.97%
Renewable	1,634	0.03%
<b>Total Electrical Use (kWh)</b>	<b>9,456,476</b>	
Non-Renewable	9,002,565	95.2%
Coal		49.8%
Gas		16.7%
Oil		0.4%
Other Fossil		0.7%
Nuclear		27.6%
Unknown or Purchased Fuel		0.1%
Renewable	453,911	4.8%
Biomass		0.6%
Wind		3.2%
Solar		0.1%
Hydro		0.9%
<b>Normalized Total Electrical Use</b>	<b>0.0015 GJ/Tonne</b>	
<b>Consumed Energy from the grid</b>	<b>0.67%</b>	





## Antero Midstream Energy Use

	2018	
<b>Total Energy Use (GJ)</b>	<b>15,651,047</b>	
Non-Renewable	15,640,726	99.93%
Renewable	10,321	0.07%
<b>Total Electrical Use (kWh)</b>	<b>107,438,723</b>	
Non-Renewable	104,571,685	97.3%
Coal		27.7%
Gas		53.7%
Oil		0.2%
Other Fossil		0.4%
Nuclear		15.3%
Unknown or Purchased Fuel		0.06%
Renewable	2,867,038	2.7%
Biomass		0.3%
Wind		1.8%
Solar		0.1%
Hydro		0.5%
<b>Normalized Total Electrical Use</b>	<b>0.017 GJ/Tonne</b>	
<b>Consumed Energy from the grid</b>	<b>1.37%</b>	









# NATURAL RESOURCES & BIODIVERSITY





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Antero values and strives to maintain the important cultural resources and healthy and diverse ecosystems and communities in which we operate. Our biodiversity policy outlines our approach and framework for assessing projects in areas of high ecological and cultural importance. We are committed to minimizing impacts on the diverse ecological systems that exist where we operate, in accordance with the applicable regulatory requirements and through implementation of one or more of the following approaches:

-  Avoidance – Evaluate avoidance options by working with the surface owner(s), design and construction teams to consider primary and alternative locations and scope and/or timing of project construction to avoid impacts to a vulnerable species and/or sensitive ecosystems and medium to high probability cultural sites, when possible.
-  Minimization – Evaluate minimization options by working with the landowner, design and construction teams to consider primary and alternative locations and scope and/or timing of project construction to avoid impacts to a vulnerable species and/or sensitive ecosystems and medium to high probability cultural sites, when possible.
-  Restoration – Work with the surface owner(s) to conduct on-site restoration, reestablish an ecosystem’s composition, structure, and function to a healthy state.
-  Mitigation – When necessary, develop and achieve measurable conservation outcomes that can mitigate residual impacts after appropriate avoidance, minimization and restoration measures have been applied.



In the planning, development, and construction process, Antero takes measures to:

-  Understand and comply with laws and regulations intended to protect and preserve the ecosystems in which we operate, including the requirements to conduct baseline studies and impact assessments;
-  Train employees on the importance of environmental protection and provide information on the species or habitat sensitivities on the location or project which they are working;
-  Engage with stakeholders on biodiversity issues pertaining to our proposed, new and ongoing operations; and
-  Implement industry best practices and lessons learned from prior projects.







Antero evaluates the impacts of projects in critical habitats or other areas with recognized high biodiversity value and High Conservation Value (HCV) areas. Our framework for project review considers avoidance and minimization measures during initial permitting strategy development and in preliminary field investigations.

At the start of a project, Antero performs extensive desktop analyses utilizing the projects limits of disturbance (LOD) and documents the results using a desktop analysis checklist.

**WE ARE COMMITTED TO MINIMIZING  
IMPACTS ON THE DIVERSE  
ECOLOGICAL SYSTEMS THAT EXIST  
WHERE WE OPERATE.**



Performing desktop analyses in the early planning stages utilizing tools, regulations and guidance provided by the US Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), US Fish and Wildlife Service (USFWS), West Virginia and Ohio State Historic Preservation Office (WV/OH SHPO), OH Environmental Protection Agency (OH EPA), WV Department of Natural Resources (WV DNR), WV Department of Environmental Protection (WV DEP), WV DNR Office of Land and Streams (OLS) and county floodplain ordinances, allows for consideration and evaluation of the following:

- 🌱 Preliminary investigation of the jurisdictional aquatic features and hydric soils, utilizing the USFWS National Wetland Inventory (NWI) and Natural Resources Conservation Service (NRCS) Soil Web Soil Survey (WSS), occurring within an expanded area of interest (AOI);
- 🌱 Preliminary investigation of threatened, endangered or protected species and their designated critical habitat as defined in our Protected Species Matrix utilizing the USFWS Information for Planning and Consultation online tool (IPaC) and our environmental viewer, an internal environmental mapping tool displaying state protected aquatic species habitat locations, occurring within an expanded AOI;
- 🌱 Preliminary investigation of known cultural resources finds and other medium and high probability sites for historic properties utilizing state SHPO viewers and considering topography and project sites characteristics;
- 🌱 Utilizing Federal Emergency Management Agency (FEMA) data to determine if the project LOD is in a floodplain;
- 🌱 Evaluating stormwater flow data and whether the project LOD occurs in a Total Maximum Daily Load (TMDL) watershed;
- 🌱 Evaluation of state protected waters; and
- 🌱 Consideration of any other sensitive areas or sites of concern identified during this stage of project planning.

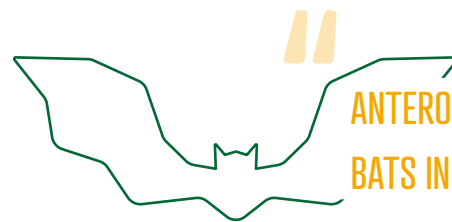


Following the desktop analyses and once all landowner permissions are obtained, a field assessment is performed to further investigate and evaluate the aforementioned resources. During this subsequent investigation, a Qualified Wetland Professional (and if applicable, a protected species and habitat specialist and cultural resources specialist) conduct a field assessment of the project area, which includes an expanded area of interest (e.g., 150 feet in both directions from the outer limits of disturbance on linear projects and 150 feet from the outer limits of disturbance of non-linear projects). We maintain past project data in our internal environmental mapping system, which allows us to better plan for future project construction in the areas in which we operate.

When impacts cannot be avoided, the appropriate state and federal agencies (USACE, USFWS, WV DNR, OH EPA,

WV SHPO, OH SHPO, WV DEP and county floodplain agencies) are consulted on permitting strategy and how to best minimize, restore, and offset impacts.

Through our thorough review process and associated conservation efforts, Antero has conserved 443 acres of habitat for endangered bats in West Virginia and Ohio, installed 266 bat boxes (man-made habitats for bats) on Antero sites to provide habitat for threatened and endangered bats, and performed large scale data collection efforts throughout our operating areas to determine absence of those bats.



**ANTERO HAS CONSERVED 443 ACRES OF HABITAT FOR ENDANGERED BATS IN WEST VIRGINIA AND OHIO, INSTALLED 266 BAT BOXES...**



In addition to efforts protecting threatened and endangered species, Antero implements best management practices in all of our construction and development activities. For example, when trees are cut for projects, they are stacked strategically to enhance wildlife habitat. Right of ways are stabilized and reseeded with seed mixes that provide wildlife habitat and food sources. During the initial assessment and before construction, all aquatic features are marked with biodegradable flagging. Antero also believes in reducing our impact beyond our projects. The corporate headquarters in Denver, CO are LEED Certified and all Antero buildings have an extensive recycling program.

Antero understands and believes in the importance of cultural resources. During the desktop analysis the area is reviewed for potential known historical sites or structures using historical aerial photographs, US Geological Survey maps,

our internal GIS viewer (which shows habitat types and floodplain areas more likely to have a high probability of cultural finds) and state cultural databases. If it is determined that sites exist within our project area of investigation or that there is potential for sites to exist, a field survey is performed by a third party, cultural expert. We then work with the State Historic Preservation Office (SHPO) to first avoid, then minimize and offset any impacts to cultural resources.

Currently, Antero is working with the West Virginia SHPO on a categorical exclusion agreement that establishes an expanded level of effort associated with our cultural resources investigations. Antero's inadvertent discovery plan details what to do if cultural resources are found during construction. This includes halting all work immediately, bringing in a cultural expert to determine if the resources are historic, and consulting with the State Historic Preservation Office if needed.





Often, Antero goes beyond what is required by performing voluntary due diligence on projects. At several sites, we have documented historic properties through local interviews, architectural drawings and written accounts. We understand the importance of a community's history and help to document and preserve that history where we live and work. Further, all artifacts found during Antero cultural surveys are documented and then returned to the landowners where they were found. If the owner does not want the artifacts, Antero curates and donates them to West Virginia's Grave Creek Mound Archeological Complex or the Ohio History Connection for permanent curation.

Antero has evaluated the CDP - Forest questionnaire and has determined that it is not applicable to our operations.

**ANTERO IS WORKING WITH THE WV SHPO ON A CATEGORICAL EXCLUSION AGREEMENT THAT ESTABLISHES AN EXPANDED LEVEL OF EFFORT ASSOCIATED WITH OUR CULTURAL RESOURCES INVESTIGATIONS.**



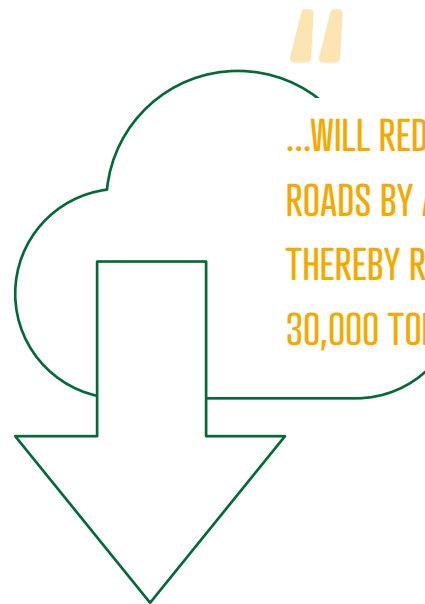
## WATER MANAGEMENT

Antero has built an extensive network of freshwater pipelines and impoundments across its acreage to provide a reliable source of freshwater to our active locations and reduce the number of water trucks traversing local roads in and around the communities where Antero operates.

According to the World Resources Institute (WRI) Aqueduct Water Risk Assessment for Oil and Gas, Antero's drilling operations and water withdrawals in West Virginia and Ohio have an overall low to medium water risk based on location and mapping. Although freshwater is an abundant resource in the Appalachian Basin, Antero is committed to reducing the use of freshwater throughout all of our operations through an active recycling wastewater program. Similarly, Antero has an extensive program to reduce exposure of truck traffic and spills during operations, through a large network of freshwater pipelines and impoundments across our acreage to provide a reliable source of freshwater. Antero's freshwater infrastructure consists of 351 miles of fresh water pipelines and 37 fresh water impoundments delivering approximately 197 MBbl/day of fresh water. **The freshwater pipelines reduce water truck traffic by approximately 4,500-4,750 truckloads per well.**



Additionally, at the center of our fresh water infrastructure is the Antero Clearwater Facility (ACF), an industry-leading advanced water treatment plant. The ACF provides an innovative and alternative solution to address Antero's water demands by reducing demands for freshwater in Antero's operations. The ACF recycles wastewater that would otherwise be placed in wastewater injection wells, the most prevalent disposal method of oil and gas brine. The addition of the ACF to our existing freshwater infrastructure will nearly eliminate Antero's use of wastewater disposal wells and will reduce the deployment of trucks on local roads by an estimated 10 million miles annually thereby reducing greenhouse gas (GHG) emissions by 30,000 tons of carbon dioxide equivalent per year. In addition to the ACF, Antero uses mobile treatment facilities to treat brine and flowback water to a quality where it can be re-used in downhole operations.



“  
...WILL REDUCE THE DEPLOYMENT OF TRUCKS ON LOCAL  
ROADS BY AN ESTIMATED 10 MILLION MILES ANNUALLY  
THEREBY REDUCING GREENHOUSE GAS (GHG) EMISSIONS BY  
30,000 TONS OF CARBON DIOXIDE EQUIVALENT PER YEAR.  
”



## WATER QUALITY

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The protection of water quality within all areas of Antero operations is of the utmost importance. Antero assesses groundwater quality prior to drilling by sampling (with landowner permission) domestic water wells, springs, ponds, or streams within a 2,000-foot radius of the wellpad in West Virginia and within a 2,500-foot radius in Ohio. Water samples are collected by third party environmental consultants and analyzed at state-certified laboratories. Water samples are analyzed for a list of parameters that goes above and beyond the parameters required by regulation in both WV and OH. Sample results are shared with the landowners, state regulators, and archived electronically by Antero.

In Ohio, following the completion of all wells on a pad, Antero conducts post-completion sampling of all water sources previously sampled during the pre-drill program. While not required in West Virginia, post-completion samples may be collected following a landowner request or to fulfill contractual terms of a lease or surface use agreement.

Antero takes complaints of water degradation very seriously. To that end, Antero maintains a dedicated community relations hotline. Antero's practice is to respond to all water degradation complaints by phone within 24 hours, and to then schedule and perform an on-site investigation at the landowner's earliest convenience. When necessary, Antero will conduct additional sampling of the water supply using a third party environmental consultant and a state-certified laboratory.





# WATER USE

By utilizing freshwater systems during completions, Antero has reduced our use of certain chemicals related to scale reduction and biocide control (by decreasing use of treated water during completions activities). The water produced during this process is then subject to Antero’s water recycling and water management programs.

### Antero Resources Water Used (thousand barrels)

	2017		2018	
<b>West Virginia</b>	<b>46,932</b>		<b>62,336</b>	
Freshwater*	46,180	98%	61,794	99%
Treated Water	752	2%	542	1%
<b>Ohio</b>	<b>12,120</b>		<b>10,466</b>	
Freshwater*	11,991	99%	10,466	100%
Treated Water	129	1%	—	0%

\*Freshwater includes surface water, municipal, and Antero Clearwater Facility

### Antero Midstream Water Used (thousand barrels)

	2017		2018	
<b>West Virginia</b>	<b>108</b>		<b>214</b>	
Freshwater*	108	100%	214	100%
Treated Water	—	0%	—	0%
<b>Ohio</b>	<b>34</b>		<b>77</b>	
Freshwater*	34	100%	77	100%
Treated Water	—	0%	—	0%

\*Freshwater includes surface water, municipal, and Antero Clearwater Facility



## SPILL PREVENTION & MANAGEMENT

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Antero is committed to environmental stewardship. Adherence to local, state, and federal regulations is a core value at Antero. Additionally, Antero establishes internal environmental programs which often exceed regulatory standards. Antero utilizes best management practices (BMPs) during all phases of operation beginning with land acquisition and carrying through gas transportation. Taking a proactive approach in identifying and reducing environmental risks and hazards is Antero's first step towards protecting the environment. A robust spill response program and a vast network of spill response contractors ensure that environmental incidents are fully remediated in a timely manner. By being both proactive and highly responsive, Antero strives for Zero Incidents, Zero Harm, and Zero Compromise.












The programs which Antero utilizes to achieve operational excellence include:

- 🍃 Developing SPCC plans in accordance with federal regulations to help prevent and minimize the impacts of spills
- 🍃 Utilizing secondary and tertiary containment systems such as:
  - Polyethylene liners for drilling and completion activities
  - Berms and valve controlled sumps at pad locations
  - Lined secondary containments for storage tanks and equipment
  - Double-walled tanks
  - Catchments at load out areas
  - Fluid recovery systems for pigging operations
  - Skid mounted compressors with skids capable of catching potential spills
- 🍃 Strategically placed Antero spill response trailers for large scale incident response
- 🍃 Creating Emergency Response Plans to streamline interactions with first responders and emergency services during large scale incidences
- 🍃 Providing training to pertinent personnel on regulatory and internal environmental programs
- 🍃 Setting goals and creating initiatives to reduce environmental incident rates
- 🍃 Using web-based programs to track environmental incidents and generate metrics which can be utilized for continuous improvement





When spills occur, Antero responds by determining the source and type of the spill and utilizes the following corrective actions:

-  Safely isolating and controlling the source of the spill
-  Containing spilled material to prevent migration
-  Initiating remediation activities such as removal or treatment of contaminated material
-  Analytical testing of soil/water when necessary to verify completion of spill remediation
-  Reporting spills to agencies in accordance with local, state, and federal regulations
-  Disposal of contaminated materials in accordance with local, state, and federal regulations
-  Internal documentation of incidents in web-based programs for reporting and metric trending

Antero is dedicated to spill response and prevention. Worker training reinforces a culture of environmental awareness, while a mix of proactive and responsive programs provide the workers with the tools and information necessary to achieve environmental excellence.

Antero defines reportable spills as any spill, release, or discharge to the environment that must be reported to a state or federal agency per the regulations. Antero's spill rate is defined as volume of reportable spills over the total barrels of fluid handled.





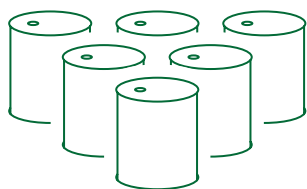


## Antero Resources Reportable Spills

	2017	2018
<b>Total Spills</b>	<b>35</b>	<b>13</b>
Produced Water	11	3
Hydrocarbons	16	7
Other	8	2
<b>Volume of Reportable Spills (barrels)</b>	<b>138.8</b>	<b>48.3</b>
Produced Water	99.8	46.0
Hydrocarbons	20.3	1.8
Other	18.7	0.5

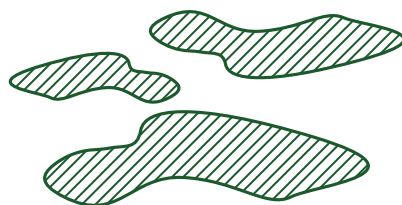


### Total Barrels Handled



112,456,557

### Total Number of Spills



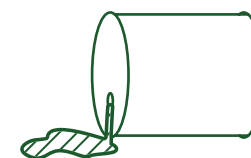
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### Total Volume of Spills (barrels)



48.3

### Spill Rate



0.00004%

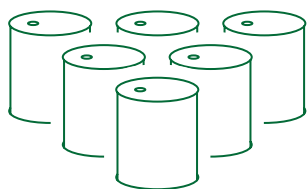


### Antero Midstream Reportable Spills

	2017	2018
<b>Total Spills</b>	<b>10</b>	<b>18</b>
Produced Water	4	13
Hydrocarbons	3	3
Other	3	2
<b>Volume of Reportable Spills (barrels)</b>	<b>74.8</b>	<b>396.5</b>
Produced Water	72.4	272.7
Hydrocarbons	0.3	4.6
Other	2.1	119.2

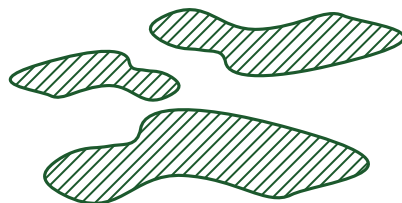


#### Total Barrels Handled



38,141,142

#### Total Number of Spills



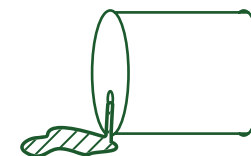
18

#### Total Volume of Spills (barrels)



396.5

#### Spill Rate



0.00104%



# WASTE

Within all of Antero's operational processes, best management practices are utilized to ensure responsible environmental stewardship.

Antero's waste program is led by the Senior Environmental and Regulatory Manager of Midstream, Water and Waste. Special permits, mandates, and company responsibilities related to waste are developed at the corporate level. Waste program details, such as Standard Operating Procedures (SOPs), regulatory compliance, Safe Work Practices and vendor (e.g. supplier and contractors) audits, are developed at the field-level and approved at the corporate level to guarantee quality and consistency. The inclusion of field level operational staff promotes a well-balanced platform to monitor and regulate waste on a day-to-day basis.

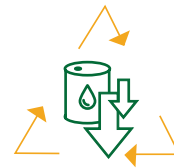
The typical waste hierarchy involves four steps: Identification & Source Reduction, Recycle/Reuse, Treatment, and Disposal. Each department takes its own steps to eliminate, minimize or recycle their waste streams with oversight provided by Antero's Environmental Department and data is collected and reported at the corporate level.

## The waste hierarchy involves four steps:

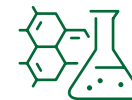
Identification & Source Reduction



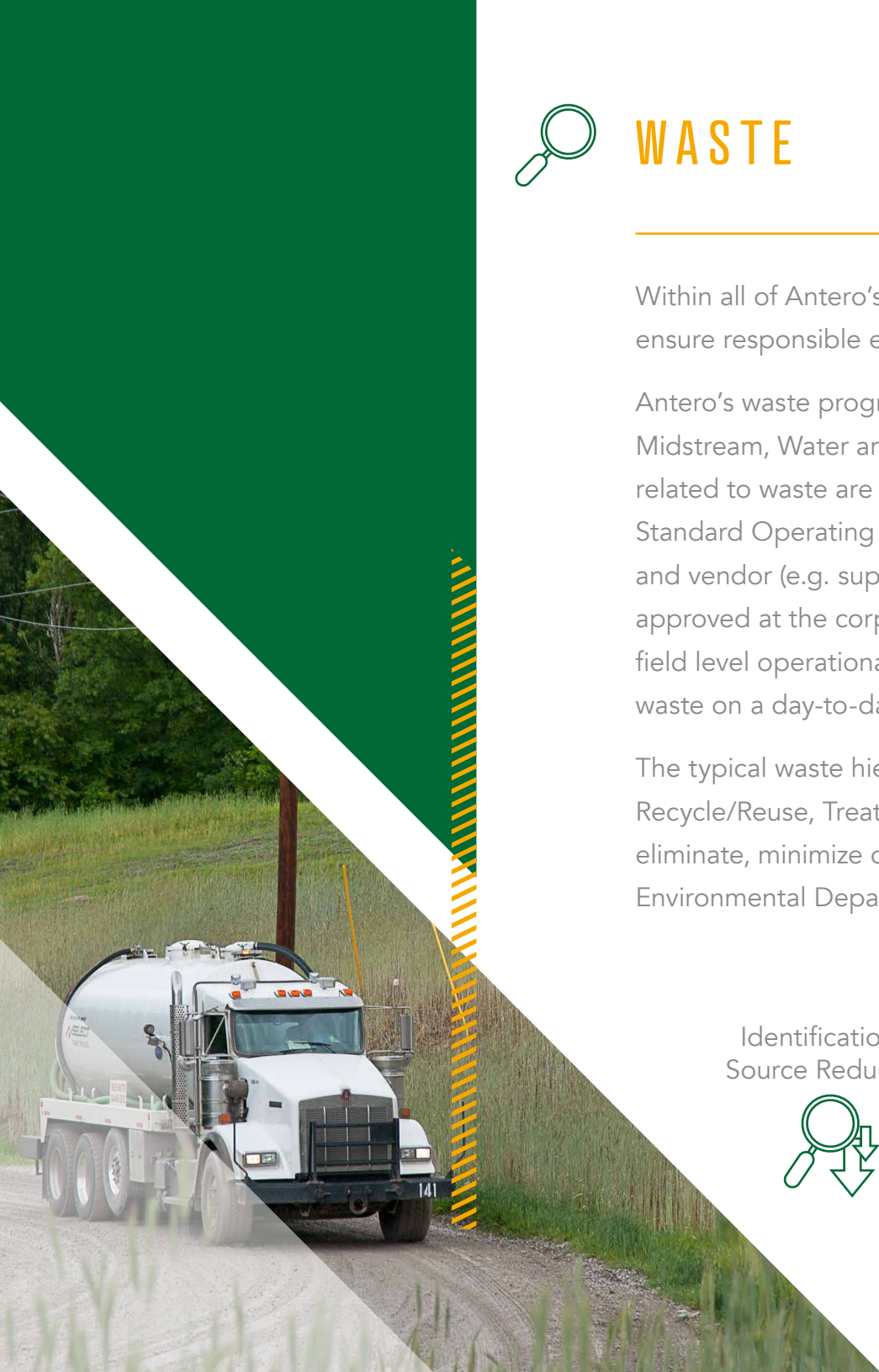
Recycle/Reuse



Treatment



Disposal





Waste generated from all of Antero's operations are characterized and managed according to their final destination. Antero waste streams are primarily treated, recycled, or disposed of within the Appalachian Basin; West Virginia (WV), Ohio (OH), and Pennsylvania (PA). Each state's regulatory requirements dictate the organization and direction of the disposal process. The only instances whereby waste is disposed of outside of these three states has been for NORM/TENORM waste that exceeds the acceptance criteria for oil and gas waste as defined by state-specific regulations. These NORM/TENORM wastes are disposed of at approved facilities out of area.

All disposal facilities, regardless of waste type, must meet Antero's environmental and regulatory compliance standards. Prior to use, facilities are pre-approved by performing regulatory record audits prior

to onboarding, and their approval status is maintained by routine site visits and audits from Antero representatives.

Tracking waste from cradle to grave, regardless of operational origin and characterization, is the responsibility of Antero's Environmental Department. Non-hazardous waste manifests are generated at the point of origin and signed by Antero representatives. Manifests identify the type and quantity of waste, transportation company, final disposal facility, and require signatures to identify the responsible parties. For production and flowback waters, "Bill of Lading" are used to track the same information as the non-hazardous waste manifest. Antero's permanent facilities at well locations are equipped with electronic metering devices that send live data from the well sites to confirm wastewater volumes leaving the site. The non-hazardous waste manifests and Bills







of Lading are returned to Antero when the disposal facility submits its invoices. These documents are filed within a database at Antero.

Antero's HSSE Department has developed and implemented a safe work practice as part of Antero's identification and management of NORM/TENORMs associated with our operations such as wastewater pit cleanouts and tank cleaning operations. The safe work practice requires Antero's contractors and subcontractors who perform or supervise work-related functions involving NORM/TENORM on Antero's assets to have a Radiation Protection Program (RPP) in place. At a minimum their RPP shall comply with worker and members of the public regulatory occupational dose limits, outline as low as reasonably achievable (ALARA) principles, and provide for audits to verify compliance. The level of NORM/TENORM is generally

ascertained through either a dose rate survey of activity ( $\mu\text{R/hr}$  or  $\text{mR/hr}$ ) or lab analytical samples of radionuclide concentration ( $\text{pCi/g}$ ). Based on these results, Antero and our contractors will determine the most appropriate means of transport, treatment and/or disposal. In addition to the SWP, Antero maintains a Radiation Safety Officer (RSO) who is a trained, full-time employee who ensures radiation activities are performed safely and in accordance with regulatory requirements, ALARA principles, and Antero's policies and procedures.





Antero's waste streams associated with the exploration, development or production of natural gas are considered non-hazardous in accordance with EPA's RCRA Exclusion for Oil and Gas E&P Waste. There are certain activities, such as production tank cleanings, that may cause waste to be classified as a hazardous material under current U.S. Department of Transportation (DOT) regulations. DOT Hazardous Materials require proper packaging, segregation, marking, labeling and placarding for the transport of the material, but does not dictate whether or not the material is a hazardous waste under RCRA regulations.



**ANTERO'S PERMANENT FACILITIES AT WELL LOCATIONS ARE EQUIPPED WITH ELECTRONIC METERING DEVICES THAT SEND LIVE DATA FROM THE WELL SITES TO CONFIRM WASTEWATER VOLUMES LEAVING THE SITE.**



## Antero Resources Waste

	<b>2018</b>
<b>Landfilled Waste (tons)</b>	<b>166,004</b>
Drill cuttings	145,027
WV	131,124
OH	13,903
Construction/E&S Controls/Other	15,652
WV	14,131
OH	1,521

The above numbers do not include completions, production and water from activities such as frac tank, production tank and pit cleanouts and drillouts. Antero started tracking these waste totals in 2018 and will be reporting on them in the future. Antero does not incinerate our waste.

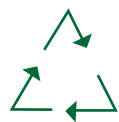
## Antero Midstream Waste

	<b>2018</b>
<b>Landfilled Waste (tons)</b>	<b>140,267</b>
Construction/E&S Controls/Other	5,325
WV	5,062
OH	263
Salt from Clearwater	134,942
<b>Other Byproducts from Clearwater (tons)</b>	<b>18,001</b>
Landfill	17,237
Injection Well	764

1. In accordance with DOT regulations found in 49 CFR 171-177.



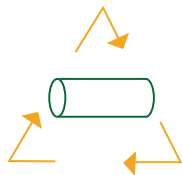




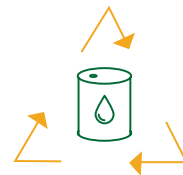
# RECYCLING

Antero strives to reuse or recycle whenever possible. From 2016 to 2017, Antero increased the amount of liner/plastics recycled by 53%. Additionally, metal recycling increased by 750%. Antero continues to research opportunities for improvement in reuse and recycling. In 2018, Antero started recycling poly pipe.

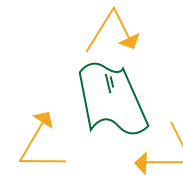
## What Antero Recycles:



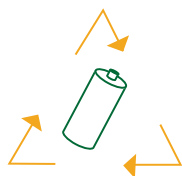
**Plastic water pipelines**



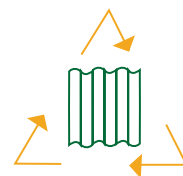
**Wastewater**  
(flowback & produced waters)



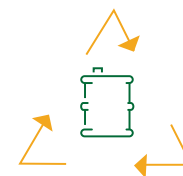
**Plastic liners**



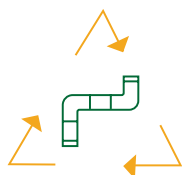
**Batteries both from operations and office use**



**Metal**



**Used oil**



**Steel pipe**

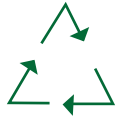


**Office paper and general trash recycling**



**E-waste**  
(Computers, cell phones, electronics)





Total Tons For 2016

200

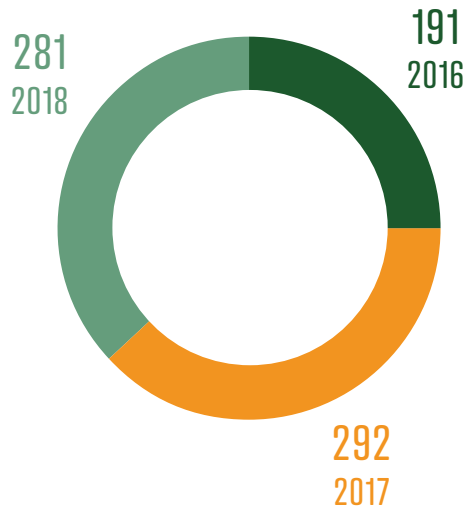
Total Tons For 2017

367

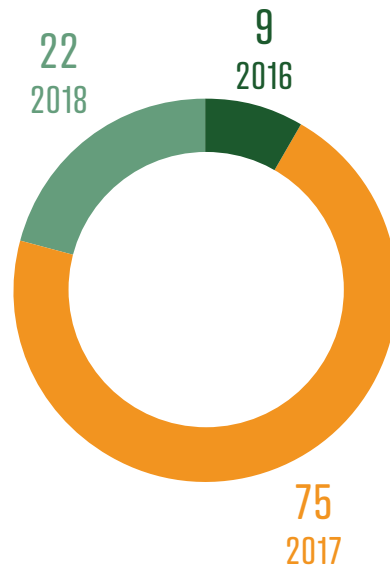
Total Tons For 2018

430

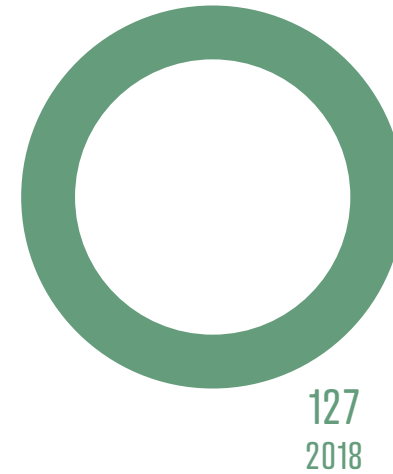
### Liner/Plastics (tons)

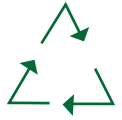


### Metal (tons)



### Poly Pipe (tons)





## Used Oil (bbls)



Total Barrels For 2017    Total Barrels For 2018

**2,940**                      **2,852**

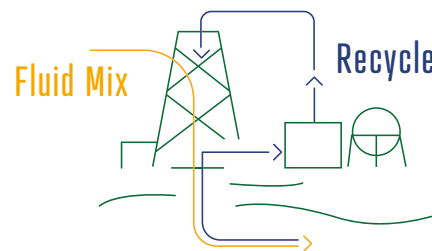


ANTERO CONTINUES TO RESEARCH  
OPPORTUNITIES FOR IMPROVEMENT  
IN REUSE AND RECYCLING.



## WASTE REDUCTION

Antero strives to reduce residual waste from our exploration and production processes whenever possible. An example of waste reduction in drilling and completions is below:



Drilling utilizes a closed loop system for managing our drilling residual waste in both the Marcellus and Utica plays. The closed loop system is used for both the air/mist drilled section and the fluid section. In each section, all water, brine, and oil is processed on location and reused in the drilling process. The drill cuttings are processed using solids controls systems and dryers with the objective of minimizing retention of liquid residue. This reduces the amount of waste sent to the landfill.

Completions implemented the Sand X system in 2017. This system more efficiently separates water from sand, and significantly reduces the amount of water remaining in the sand following completions. As a result, drier sand and less tonnage is sent to an approved landfill. The separated water is utilized as noted in Antero's water management and water recycling programs.



# HYDRAULIC FRACTURING

Hydraulic fracturing is an oil and gas production technique used in tight geologic formations that involves the use of water, sand and chemicals at high pressures to fracture rock and release hydrocarbons.

We address our sustainability efforts in regards to well integrity and inactive wells, chemical disclosure, wastewater management and seismicity.

## Well Integrity:

Antero prioritizes maintaining environmental conditions.

## Chemical Disclosure:

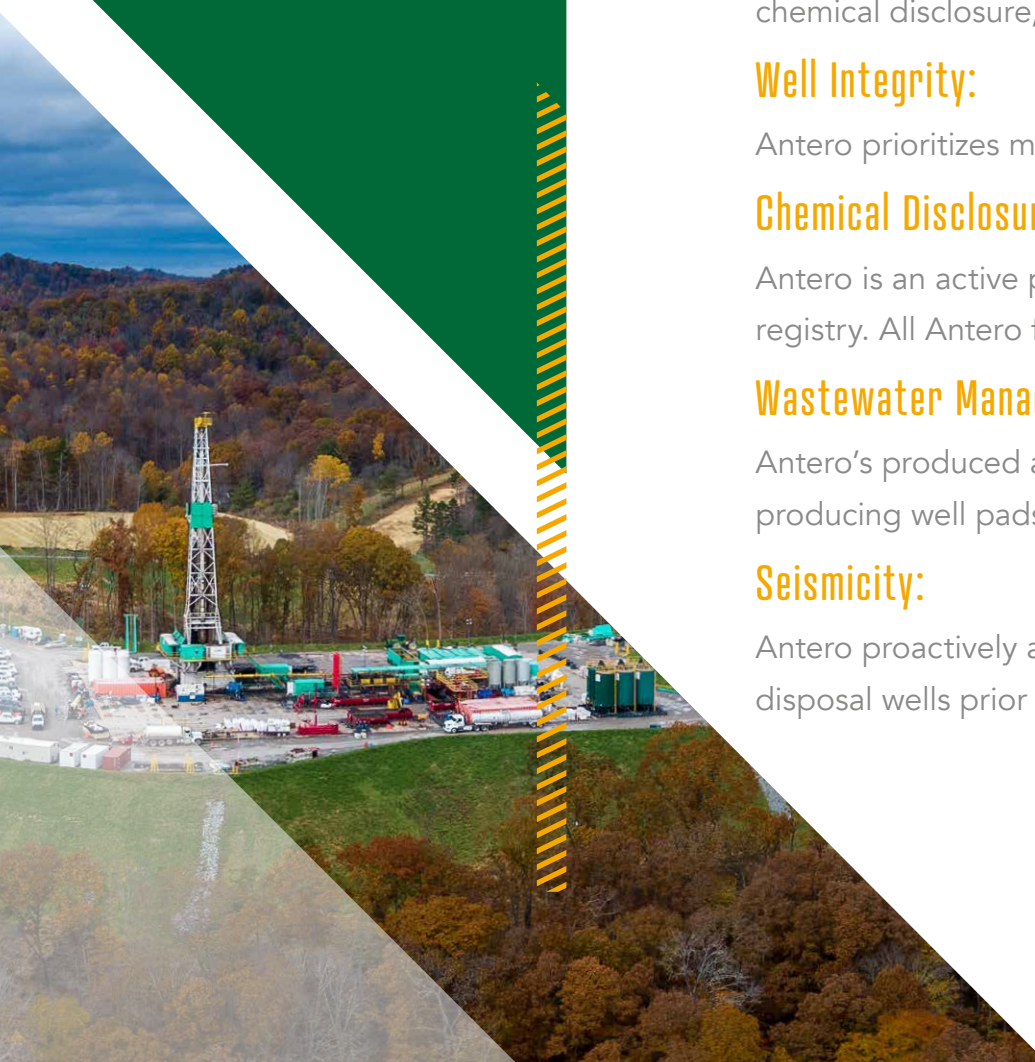
Antero is an active participant in FracFocus, the national hydraulic fracturing chemical registry. All Antero fracture stimulated wells are reported to FracFocus.

## Wastewater Management:

Antero's produced and flowback water is stored in temporary and permanent tanks on producing well pads. Most water is taken directly to treatment or disposal.

## Seismicity:

Antero proactively addresses seismicity issues by carefully evaluating the location of disposal wells prior to use.







## HYDRAULIC FRACTURING WELL INTEGRITY

Antero prioritizes maintaining environmental conditions, and therefore undertakes the following practices to prevent impacts to the environment as a result of communication to nearby oil and gas wells.

During the surface hole portion of drilling, Antero employs a variety of measures to comprehensively prevent and reduce impacts to nearby wells and other environmental receptors such as groundwater resources. These measures include the following:

- ☞ Use of air in lieu of drilling mud to remove cuttings from the wellbore. The use of air during the drilling process significantly mitigates the potential impact to other nearby shallow wells and groundwater resources
- ☞ Utilization of numerous anti-collision measures to prevent the drilling well from colliding with offset wells.
- ☞ Deployment of a casing program engineered to prevent the impact to offsetting wells and formations adjacent to our wellbore. Specifically, the surface casing depth and cement program are designed and permitted so that groundwater resources are protected prior to any drilling in the hydrocarbon bearing intervals. As part of the final wellbore construction, two subsequent casing strings are run and cemented in place. Depending on the phase of operation being performed, the designed casing and cement program creates up to six barriers between Antero's drilling/ completion operations and adjacent rock formations and nearby wells. Several tests are performed to confirm the integrity of these casing strings prior to their use as a protective barrier, including running cement bond logs and pressure testing to maximum anticipated pressures associated with subsequent operations.



During the completion phase of operations, potential communication with nearby wellbores is proactively addressed in several ways including:

- 🔗 Integrity of the casing tubulars, which provide physical barrier between high fracture pressures and the shallower completions of nearby vertical wells and are of paramount importance
- 🔗 Pressure monitoring and testing, as the integrity of the final casing string and its associated cement sheath is crucial to preventing impacts to nearby wells and environmental receptors. Antero's final casing string and cement sheath were engineered to withstand the higher pressures associated with fracture stimulations, and were tested using cement bond logging and hydrostatic pressure testing to the highest expected treating pressures. During pumping operations, relevant pressures are monitored by on-site personnel, and in the event of observed anomalies, operations can be ceased, in order to significantly reduce the potential to impact nearby wells.
- 🔗 In West Virginia, Antero uses a combination of regulatory agency information, our own data, discussions with offset operators and/or landowners, and physical field surveys to identify active, inactive, orphaned, abandoned, and P&A wells located within 1500 feet of new well locations from surface through the entire wellbore length. Antero proactively notifies offset well owner/operators with wells within a 1500-foot radius 2-3 months prior to initiating nearby well completion operations and again at 1 month prior to start of operations, well beyond the 500' regulatory requirement. When applicable, Antero also provides a reminder days before the start of a nearby well completion operation. If agreed upon between parties, Antero works with offset well operators to review existing well conditions including confirming the well's current operating condition and downhole status. Antero alerts regulatory agencies if orphaned wells are discovered. Once any offset wells are located and evaluated, Antero develops and implements a well monitoring plan for those identified wells, if applicable. Local geology is also assessed through reviewing historical data, data from previously drilled wells, and any seismic survey data; the results of this assessment are used to identify faults and mitigate any risks associated with those faults. For both safety and efficiency reasons, Antero relies on technical analysis prior to and during active operations to closely monitor and prevent/mitigate communication between active wells and related potential subsurface issues, however rare those instances may be.
- 🔗 Inspection program of vertical wells assessed as having an elevated risk for being impacted by Antero's operations. One of the latest measures Antero is in the midst of implementing, this inspection program will ensure wellhead and surface equipment at these nearby vertical wells are of adequate integrity. In some instances, Antero will install pressure monitoring devices at these wellheads.



During the post-completion phase of operations, maintaining well integrity is proactively addressed in several ways including:

- ◡◡ Ultrasonic testing of pipe thickness at the well heads and Gas Production Units (GPUs) on high exposure sites.
- ◡◡ Use of semi-permanent sand traps (up to 6 months) to catch produced sand and reduce erosion of equipment.
- ◡◡ Remote and local Emergency Shut Downs (ESDs) on the tubing, casing and GPU.
- ◡◡ Electronic measurement of pressure on the tubing and casing.
- ◡◡ Determination of flow velocities throughout the system to stay below erosional velocity in the tubulars and production equipment.
- ◡◡ Annulus pressure monitoring and reporting that meets or exceeds current state requirements.
- ◡◡ Supervisory Control and Data Acquisition (SCADA) system for local and remote surveillance of pressures, temperatures, flowrates and hydrocarbon gas detection. In addition to 24/7 human monitoring, the system includes automated alarms, reports and notifications.
- ◡◡ Pressure testing of tubulars during remedial well servicing operations.
- ◡◡ Use of eco-meters (acoustic logs) to read liquid levels and verify tubular integrity.
- ◡◡ Use of up-sized wellhead valves and piping to maximize erosional resistance.

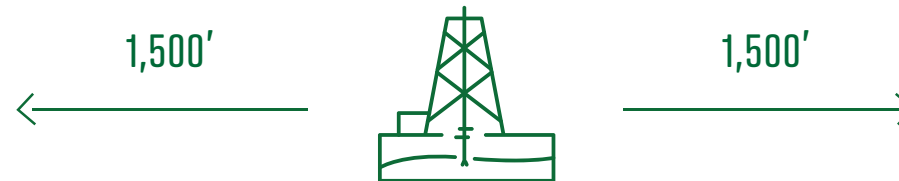




Of the 140 wells completed in 2017, 0% have experienced subsurface well integrity failures that resulted in a release to the environment. Similarly, of the 163 wells completed in 2018, 0% have experienced subsurface well integrity failures that resulted in a release to the environment.

Antero has 1020 producing horizontal wells, 265 producing vertical wells and 113 wells drilling, completing or waiting on completion. Additionally, we have a single well waiting on a sales line, seven horizontal wells have been plugged and abandoned and 14 are under evaluation for further development. We have additionally plugged and abandoned 18 vertical wells over the last two years and have agreements in place with the state of WV to plug and abandon three vertical wells over the next year. We have six additional vertical wells that

are inactive. We evaluate our wells for commerciality and pursue timely plugging and abandonment in accordance with regulations of any wells that are no longer commercial.



“**ANTERO NOTIFIES OPERATORS OF OFFSETTING VERTICAL WELLS WITHIN 1500’ OF ANTERO’S WELLBORES, WHICH IS 1000’ GREATER THAN A NEW REQUIREMENT OF 500’ RECENTLY IMPLEMENTED BY WVDEP.**”





## HYDRAULIC FRACTURING CHEMICAL DISCLOSURE

Antero is an active participant in FracFocus, the national hydraulic fracturing chemical registry. All Antero fracture stimulated wells are reported to FracFocus.

Additionally, Antero seeks vendors committed to environmental sustainability and transparency; however, it is noted that some information may be excluded by our vendors due to confidential business information (CBI). Several of our hydraulic fracturing vendors have stated membership and commitments to the Hydraulic Fracturing Code of Conduct<sup>2</sup> from the Working Energy Commitment. The goal of the Working Energy Commitment is to provide transparency when it comes to chemical disclosure in fracturing operations.

Antero requests that our vendors avoid the use of trade secret or proprietary designations when reporting their chemical disclosures, and to the extent they are unable, provide the relevant contact information for the person seeking trade secret coverage per current FracFocus requirements.

Antero contractors utilize a dry gel on approximately 50% of fracture stimulations.

2. <https://www.psc.ca/wp-content/uploads/WEC-Code.pdf>



## HYDRAULIC FRACTURING

# WASTEWATER MANAGEMENT

Antero's produced and flowback water is stored in temporary and permanent tanks on producing well pads. Most water is taken directly to treatment or disposal. To mitigate spills and leaks, all storage tanks on producing well pads are located within secondary containment and the perimeter of the well pads have an earthen berm to prevent materials from migrating offsite acting as tertiary containment.

Antero also has a limited number of centralized wastewater pits that were designed and built to robust regulatory standards including utilization of a dual liner design. Additionally, all centralized wastewater pits have a leak detection layer within the dual liner system, groundwater monitoring wells which are sampled quarterly for a list of parameters beyond which is required by regulations and a concrete containment with offload manifold to facilitate truck offloading. To reduce hazards to wildlife, all centralized wastewater pits have fencing and bird netting installed in compliance with the North American Migratory Bird Treaty Act (NAMBTA).

Other facilities that generate or receive liquids (ex. compressor stations) utilize closed top tanks and employ secondary containment and perimeter berms to manage liquids onsite and reduce potential impacts to the environment and wildlife.

Emissions from all sources are calculated and reported as required by state and federal laws and regulations.



### Antero Resources Wastewater (thousand barrels)

	2017		2018	
<b>West Virginia</b>	<b>11,458</b>		<b>15,139</b>	
Reuse	2,208	19%	5,398	36%
Offsite Disposal	66	1%	187	1%
UIC	9,184	80%	9,554	63%
<b>Ohio</b>	<b>2,130</b>		<b>2,810</b>	
Reuse	314	15%	74	3%
Offsite Disposal	128	6%	144	5%
UIC	1,688	79%	2,591	92%

### Antero Midstream Wastewater (thousand barrels)

	2017		2018	
<b>West Virginia</b>	<b>249</b>		<b>356</b>	
Reuse	2.4	1%	17	5%
Offsite Disposal	0.8	0%	1	0%
UIC	246	99%	338	95%
<b>Ohio</b>	<b>19</b>		<b>44</b>	
Reuse	0.5	3%	0	0%
Offsite Disposal	0	0%	0.1	0%
UIC	18.5	97%	44	100%







Antero does not currently utilize residuals or waste products from the company's operations for purposes other than hydraulic fracture stimulation and brine generation for downhole use.

Antero does not dispose of our wastewater or flowback from fracture stimulations by discharging to the surface or waterways. All of Antero's wastewater is either treated for re-use downhole, sent for disposal via underground injection wells, or sent for solidification and offsite disposal, and thereby minimizes exposure to human and environmental receptors.

Hydrocarbons are recovered to the extent feasible and sent to a used oil recycler for processing and reuse (e.g. fuel oils, heat recovery, etc.). Additional details of the oil recycling program can be found in our waste summary section.







## HYDRAULIC FRACTURING SEISMICITY

Antero proactively addresses seismicity issues by carefully evaluating the location of disposal wells prior to use. Antero does not own or operate disposal wells but uses properly permitted and operated third-party Class II UIC wells for wastewater disposal. Third-party disposal wells are vetted in a rigorous selection process before any wells are utilized for wastewater disposal. The process begins with locating existing wells in close proximity to Antero's areas of operation. Potential disposal wells undergo a desktop audit first by the HSSE department, and a subsequent audit and assessment by the Geology department. A location that exceeds Antero's risk factors are not authorized for use.

During the Geology department's investigation, the disposal well proximity to any known mapped faults or seismic events, proximity to other wells, and the targeted injection zone are assessed via United States Geological Survey (USGS) datasets. According to the USGS 2014 Seismic Hazard map, Antero's operations are located in very low risk areas, meaning low risk of occurrence of the potential for horizontal acceleration. Per the USGS 2018 Short-term Induced Seismicity model, Antero's area of operations is in the lowest (<1%) chance of potentially minor-damage ground shaking events. Additionally, Antero evaluates company wells within two miles of the third-party disposal well to identify any open zones in common with the disposal well; in case of overlap the company wells are recommended as a candidate for plugging.

Additionally, during this assessment and audit process, Antero evaluates the planned injection interval of the third-party disposal well to understand where Antero wells are stratigraphically in relation to nearby wells and actively



producing zones. If a location is approved by the Geology department, Antero HSSE department conducts follow-up on site audits of the third-party disposal wells during the on-boarding process. Once the onsite audit is conducted and there are no findings of concern, Antero operations is given the authorization to utilize the third party well for wastewater disposal.

In the Utica play there have been reported instances of induced seismicity likely related to basement faults in connection with hydraulic fracturing and wastewater disposal. The Ohio Department of Natural Resources (ODNR) has their own seismic monitoring array in place across the state. In areas where they have identified the potential for seismic activity, they may request operators to install additional monitoring equipment. As part of this program, there is a set of

tiers that determine whether operations can continue, must be modified, or must be halted entirely. Antero has made arrangements with vendors to support this increased monitoring if it is deemed necessary by the ODNR. Monitoring of this nature includes a series of geophones and accelerometers that would be localized around specific completion activity. These sensors gather data constantly and relay it to the vendor to process and manage along with Antero personnel. At this small scale, the resolution of the data is more precise than the statewide array. Although there is no known history of seismic activity across our area of operations in the Marcellus in West Virginia, this monitoring capability is available to us in our operations areas in both West Virginia and Ohio.





## CONTACT US



### ANTERO RESOURCES CORPORATION

📍 1615 Wynkoop Street  
Denver, CO 80202

🌐 [anteroresources.com](http://anteroresources.com)



### ANTERO MIDSTREAM PARTNERS LP

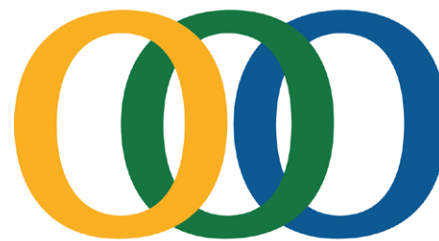
📍 1615 Wynkoop Street  
Denver, CO 80202

🌐 [anteromidstream.com](http://anteromidstream.com)

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**Zero incidents**  
**Zero harm**  
**Zero compromise**

Keeping **you healthy, safe and environmentally responsible**, every day at work!