

ATTACHMENT C

Air Quality Recommendations

1. Recommendation: Prior to approval of the special use permit, we recommend the BOCC require Antero to [d]emonstrate that the low emissions flow back technology Antero is developing is effective in reducing air emissions. Antero should pilot test the system and monitor air emissions using EPA methods with detection limits adequate for the assessment of human exposure and prevention of human health effects. An effective demonstration would show that levels of air pollutants, such as benzene, as measured in 24-hour ambient air samples at 350, 500, 1000, 2000, and 3000 feet and in each cardinal direction, from the well pad perimeter, are not higher than those measured at the Battlement Mesa monitoring station. Antero should make all test results publically available on Garfield County's website and/or on a publicly accessible website approved by the Battlement Mesa Community, three months prior to any drilling within the PUD.

Response:

Antero has voluntarily undertaken best efforts to develop and implement low emissions flow back technology to assist in reducing air emissions (and odors) during well completions, at considerable expense. As currently drafted, Antero's best management practices ("BMPs") include a low emissions flowback process that includes routing the flowback stream to a separator (green completion skid). From this vessel, salable gas will be routed to a gas sales line and the non-salable gas, when practicable, will be routed to a flare equipped with an automatic igniter. Frac/flowback storage tank hatches will be closed and latched until the tanks are prepared to receive flowback water, then the hatches will be closed but unlatched when receiving flowback fluids. Additionally, frac/flowback storage tanks will be equipped with hydrocarbon absorbing blankets when full to control odors. Finally, Antero proposes to maintain a portable meteorological weather station during well drilling and completion operations that includes a data logger to archive wind speed/direction and temperature. Antero utilizes adaptive management as part of its development of its BMPs (i.e., Antero continues to assess the effectiveness of its ongoing BMPs and information regarding new technologies and practices that can be incorporated into its BMPs). Antero does plan to voluntarily collect air monitoring data to evaluate the performance of this control technology as it implements it at various other well pads in and around the Battlement Mesa area.

Instead of allowing Antero to continue developing and testing its proposed methods for voluntarily reducing emissions (and odors) during well completions, the recommendation in the Second Draft Health Impact Assessment ("HIA") would mandate not only that Antero implement (for all of its operations in Battlement Mesa) this specific methodology for reducing emissions during flowback, but that it delay operations until it can demonstrate the effectiveness of the methodology that it currently plans to implement. The recommendation in the Second Draft HIA even purports to establish the level of effectiveness required (i.e., that ambient air as close as 350 feet from the well pad be the same as or less than that measured at the Battlement Mesa monitoring station).

There are numerous problems with the recommendation in the Second Draft HIA. First, there appears to be no basis for requiring implementation of a low emissions flowback process, particularly to the level of effectiveness proposed by the Second Draft HIA. The existing data, existing regulatory framework governing green completions (see Attachment D) and assessments in the Second Draft HIA do not support a requirement that Antero's

operations meet the baseline within 350 feet of the source of emissions. Second, the Second Draft HIA does not identify any health risks, especially immediate health risks, that warrant delaying the proposed oil and gas operations until a low emissions flowback process can be implemented. Finally, the Second Draft HIA provides no explanation for why its recommendation holds merit over Antero's BMPs and contains recommendations inconsistent with Antero's proposed oil and gas operations. For example, the recommendation proposes that Antero take measurements at multiple distances, including 350 feet. However, because Antero has agreed to a 500 foot setback from all residences, there should be no need to take measurements at less than 500 feet. In sum, there is no basis and no need for this recommendation – Antero's BMPs will seek to reduce emissions during well completions.

2. Recommendation: Prior to approval of the special use permit, we recommend the BOCC require Antero to [d]isclose all chemicals that will be used on its well pads within the PUD. We recommend Garfield County to keep a list of these chemicals on its website and/or on a publicly accessible website approved by the Battlement Mesa Community.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the current regulatory scheme addressing disclosure of chemicals adopted by the Colorado Oil and Gas Conservation Commission ("COGCC") (described in Attachment D) and required as part of Antero's reporting obligations under the federal Emergency Planning and Community Right-to-Know Act ("EPCRA"). The Second Draft HIA provides no basis for requiring disclosure of all chemicals, regardless of the volume and manner of use. The likelihood, extent, and possible health implications from chemical use is largely determined by the volume, mode of use, fate and transport characteristics, and toxicity of the individual chemicals. These factors should be considered in selecting chemicals for inclusion in any monitoring program, especially if the inclusion is above and beyond what is already required by regulation. Finally, existing regulations require reporting of chemicals to the appropriate regulatory authority.

3. Recommendation: Prior to approval of the special use permit, we recommend the BOCC require Antero to [e]stablish a system for immediate response to odor complaints that includes options for ceasing operations, notification of affected residents, and temporary relocation of residents until the source of the odor is identified and resolved. We encourage Antero to communicate the timing of well completion activities to Battlement Mesa residents, which could allow for voluntary shutting of windows and air intakes or temporary relocation.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the current regulatory scheme and the assumptions made. Concerns regarding odor are sufficiently covered by existing COGCC and Colorado Department of Public Health and Environment ("CDPHE") regulations, as described in Attachment D, and any additional requirements should be made through the rulemaking process, particularly any requiring cessation of operations related to odors. The recommendation proposes drastic measures in relation to odors – even where no there is no potential for public health

impacts. This recommendation is particularly concerning because the recommendation and the Second Draft HIA presupposes that Antero will be the responsible source for any odors, which is unfounded in light of the many alternative sources of odor in the vicinity of Battlement Mesa, such as other oil and gas operations. Where Antero is not the origin of the odor, requiring Antero to cease operations or take other action will not address the source of the complaint.

4. Recommendation: Prior to approval of the special use permit, we recommend the BOCC require Antero to [s]ubmit a quality assurance project plan (also known as a QAPP) to GCPH and GCOG for review and approval for all monitoring specified in these recommendations to assure monitoring information will be adequate for informing public health decisions prior to any activities in the PUD.

Response:

Antero does not agree with the recommendations that monitoring be mandated. Antero will perform any voluntary air monitoring and odor monitoring, as described in Antero's BMPs, in accordance with established environmental monitoring protocols. There is no basis provided in the Second Draft HIA for requiring monitoring prior to activities in the Planned Unit Development ("PUD") beyond that required by existing COGCC or CDPHE regulations or for requiring Garfield County to approve the monitoring conducted by Antero.

5. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [c]omplete the installation of a fully functional water storage facility and water pipeline network prior to any drilling within the PUD to realize the full air pollution prevention benefit.

Response:

The existing regulatory framework does not require operators to manage exploration and production ("E&P") waste through recycling (see description in Attachment D). In addition, this recommendation is already addressed in Antero's BMPs. Antero currently proposes a water storage pond designed to comply with Reasonably Available Control Technologies, and a buried water pipeline to move water between the storage facility and well pads for drilling and completion operations. These go beyond the requirements of existing regulation at considerable additional cost to Antero. The water storage facility and water pipeline network will eliminate 460 water truck loads per well (92,000-120,000 truck loads for a 200 well development plan), eliminate the associated dust, noise, and air pollution associated with truck traffic, and reduce road damage and traffic impact. Transportation of water will be done by pipeline versus hauling by water truck. While Antero remains committed to installing the water storage facility and water pipeline network (an inherent design parameter that will be included in its application for a special use permit), Antero does not agree that the entire water pipeline should be completed prior to any drilling in the PUD – this is both impractical and inflexible. Antero will install the buried pipeline system for a particular well pad prior to drilling and completing wells on that well pad.

6. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [u]se permitted tanks rather than a pond at the centralized water storage facility. See recommendations for Water and Soil Assessment for further details of water storage facility recommendations.

Response:

Existing regulations do not require use of permitted tanks in lieu of ponds. The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary, and also does not seem to have considered the practical implications arising from such action. In order to replace the planned storage pond, which is expected to store approximately 200,000 barrels of water, Antero would need to install six large tanks which would stand roughly twenty-five feet high and over ninety-eight feet in diameter. This is not only impractical, it creates a detrimental visual impact to the area that was not considered in the Second Draft HIA assessment. Additionally, Antero's BMPs for the centralized water storage facility include covering the pond. By covering the pond, Antero will reduce potential air pollution and prevent exposure to wildlife and pets.

7. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [u]se an effective and validated low emissions flow back process for all well completions within the PUD.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is necessary given the current COGCC regulatory scheme regarding green completions. See Response to Air Quality Recommendation No. 1 for a more detailed discussion on Antero's proposed well completion process for specific response on this recommendation.

8. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [r]oute production tank venting emissions through a VOC combustor operated with auto-igniters on all well pads within the PUD.

Response:

This recommendation exceeds the requirements in existing COGCC and CDPHE regulations. In addition, this recommendation is already addressed in Antero's BMPs, which include routing all production tank venting emissions to a VOC combustor to control VOC emissions from condensate flashing and working and breathing losses. These are BMPs voluntarily undertaken by Antero at additional cost. Additionally, the VOC combustors will operate with auto-igniters to keep VOC combustors lit. T

9. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [u]se vapor recovery technology when available, rather than combustion, to further reduce air pollution.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the practical implications and limited benefit. The recommended technology is impractical and lacks sufficient benefit to justify the additional costs. The

emissions to be captured by a vapor recovery unit are relatively small. Further, the vapor recovery unit (which uses an engine that runs on natural gas) could release more emissions than would be recovered. In addition, because the control efficiencies for combustors are extremely high (over 95%), the level of additional reductions in VOC emissions from any vapor recovery unit is extremely small. The recommendation assumes that vapor recovery is 100% effective – an assumption that has been invalidated in practice. The Second Draft HIA fails to consider these practical implications and proposes this recommendation without evaluating the estimated emissions and emissions reductions from a vapor recovery unit versus a combustor. Antero notes that CDPHE does not require implementation of vapor recovery units to reduce VOC emissions.

10. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [o]btain an emissions permit from CDPHE for each well pad production tank within the PUD, per COGCC rules. The COGCC rules require permitting for production tanks within ¼ mile of an occupied structure with the capacity for 5 tons per year of VOC emissions, which is the case for most of Antero's proposed well pads. Our recommendation may be beyond the COGCC rule at one or two well pads. This recommendation is necessary, however, for the protection of public health because odors have been noticed up to ½ mile from the Watson Ranch pad. The ¼ mile distance in the rule is not based on a health-based air pollution standard, and the permit provides a mechanism for the establishment of inspection and monitoring requirements.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the current regulatory scheme. In this situation, there are already CDPHE and COGCC regulations in place (described in Attachment D), requiring CDPHE permitting for emissions sources exceeding the thresholds established within either the COGCC or CDPHE regulations. The Second Draft HIA assessment has provided insufficient explanation for why more stringent requirements are necessary in order to protect the public health. Specifically, the Second Draft HIA does not provide any basis for determining that Antero's operations require permitting at levels below those established by COGCC or CDPHE for all sources. That said, Antero anticipates that many, if not all, of the pads will require air quality permitting by CDPHE. The Second Draft HIA provides no basis for concluding that the presence of odors correlates with public health impact warranting significant additional requirements above and beyond existing regulations. Specifically, at Watson Ranch all reports of odors were found to be unsubstantiated after investigation.

11. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [w]ork with GCPH to implement an air monitoring program for all well completion activities within the PUD and at the centralized water storage facility. At a minimum, this program should include collection of 24-ambient air samples and grab samples, real-time VOC monitoring, odor monitoring, and collection of grab samples when odors are noticed.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the practical implications. Air monitoring is not required by CDPHE or COGCC regulations. Even if monitoring were appropriate and if the Board had authority to

require it, ordinary protocol provides for air monitoring to be done on a representative scale -- all oil and gas operations do not need to be monitored. But there is no showing in the Second Draft HIA why monitoring is appropriate. There is no discussion of the objective of this recommended air monitoring program, which should drive the scope of the program, the methodology for collecting data and the type of data collected. Finally, Antero has BMPs for odor monitoring, well pad telemetry/remote monitoring, and monitoring.

12. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [a]nnually disclose all chemicals and volumes used on its well pads within the PUD and include any chemicals that are VOCs in the air monitoring program. We recommend Garfield County to keep a list of these chemicals on its website and/or a publicly accessible website approved by the Battlement Mesa Community.

Response:

See Response to Air Quality Recommendation No. 2 above.

13. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [i]mplement the system for immediate response to odor complaints that includes options for ceasing operations. Implement a system for notification of affected residents, and temporary relocation of residents until the source of the odor is identified and resolved. We encourage Antero to communicate the timing of well completion activities to Battlement Mesa residents, which could allow for voluntary shutting of windows and air intakes or temporary relocation.

Response:

See Response to Air Quality Recommendation No. 3 above.

14. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [m]ake all air monitoring results within the PUD publically available for posting on the Garfield County website and/or a publicly accessible website approved by the Battlement Mesa Community, no later than 60-days following the collection of samples.

Response:

Antero voluntarily conducts air monitoring in association with certain of its oil and gas operations. Its current air monitoring data has been made available to CDPHE, Garfield County, and the HIA authors in a timely manner. Through these entities, members of the public can obtain results from Antero-conducted air monitoring.

15. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [c]omply with COGCC green completion practices and EPA's natural gas STAR program to reduce VOC emissions to the lowest level technically possible at all well pads within the PUD.

Response:

This recommendation is superfluous given the current regulatory scheme, which requires compliance with COGCC green completion practices. The Board does not have legal authority to enforce COGCC regulations, and no reason has been stated for assuming that COGCC will not enforce its regulations. The EPA Natural Gas STAR program is a voluntary program with significant consequences and commitments. The Board does not have authority to require compliance with the program and commit Antero to obligations under that program. In addition, the recommendation is not necessary because Antero closely follows the recommendations developed by those participating in the EPA Natural Gas Star Program and has implemented (through its BMPs) many of the practices that the program recommends. Antero is considering becoming an EPA Natural Gas Star member, but does not agree that its membership should be mandated. In addition, the Second Draft HIA provides no basis for requiring that VOC emissions achieve the “lowest level technically possible.” As noted throughout Antero’s Comments on the Second Draft HIA, the Second Draft HIA does not demonstrate the potential for significant public health impacts associated with Antero’s proposed oil and gas operations, and thus provides no basis for requiring Antero to achieve the lowest level technically possible with respect to VOC emissions. Finally, existing COGCC and CDPHE regulations require many of the VOC emission sources at oil and gas operations to achieve a 90 or 95 percent control efficiency.

16. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [s]pecify where in the PUD Antero will use electric grid power for drilling and/or other operations.

Response:

The availability of and ability to ensure electric grid power for Antero’s operations has constraints and should not be a part of the special use permit. Antero does not control the ability of XCEL and Holy Cross to deliver grid power to Antero, which makes specifications for electricity use difficult, if not impossible.

17. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [a]dhere to dust control measures and traffic measures specified in the Special [sic] [Surface] Use Agreement.

Response:

Antero has an independent obligation to comply with the terms of its Surface Use Agreement and those terms and conditions should not be incorporated into its regulatory permits. The Board does not have authority to enforce private agreements, and there is no showing why public enforcement is necessary. Not only is Antero legally obligated to comply with its obligations under the Surface Use Agreement, but as described in Attachment D, dust control and traffic measures are addressed by existing COGCC, CDPHE and local regulations – making adherence to the Surface Use Agreement irrelevant for purposes of reducing fugitive dust emissions and addressing traffic concerns. To the extent the recommendation goes above and beyond what current regulations require, the Second Draft HIA has provided no explanation regarding why current regulatory requirements are

insufficient. Furthermore, Antero's BMPs include working with Garfield County on traffic measures, as indicated in its BMPs. The BMPs for fugitive dust control measures include graveling pad locations and access roads, using dust suppressants, investigating joint industry effort to pave selected roads, developing long-term plans to provide for buried water lines, limiting vehicle speeds during pad site access, and sweeping the roads. The BMPs for traffic measures include additional signage to direct and control Antero truck traffic, additional flagmen and crossing guards, roadway improvements to eliminate sharp turns, blind corners and driveways, roadway improvements to alleviate potential traffic congested points, truck convey policy, and designated truck route entry points which avoid the "front door" to Battlement Mesa. The existing regulations, Antero's BMPs and Antero's legal obligation to comply with its surface use agreement are sufficient to address the concerns raised by this recommendation.

18. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [e]stablish and implement a plan that ensures all trucks used for its plan within the PUD meet emission standards specified in the Clean Fuel Vehicles (heavy trucks) for the Clean Fuel Fleet Program ([CFR Part 88.105-94](#)) to reduce VOC, PAH, and PM emissions. This will reduce air pollution in the PUD.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary. The Clean Fuel Fleet Program applies only to vehicles in fleets that operate in ozone or carbon monoxide nonattainment areas. In addition, the Clean Fuel Fleet Program applies only to fleets of at least 10 or more vehicles owned or operated, leased or otherwise controlled by a single person and, even then, the Clean Fuel Fleet Program applies only to non-exempt vehicles in certain circumstances. The HIA authors make no attempt to determine if Antero's operations would meet the criteria of the Clean Fuel Fleet Program and fail to provide a justification for requiring compliance with a program that, by its own definitions, is not applicable. Furthermore, the Second Draft HIA provides no explanation regarding why this recommendation should be applied solely to Antero, rather than pursued along the proper regulatory pathways, if and when appropriate.

19. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [p]revent the idling of trucks on well pads and along roads in the PUD for longer than 10 minutes.

Response:

The Second Draft HIA provides no analysis or indication that truck idling represents a significant concern to air quality or public health impacts. Accordingly, the recommendation is not supported by the analysis within the HIA. That said, Antero has no incentive to allow or encourage the idling of trucks on well pads and along roads in the PUD and in fact agrees with discouraging such activities. However, a prohibition against idling for longer than 10 minutes would be impractical and extremely difficult to police and enforce. In many instances, truck idling may be necessary to ensure the safety of the workers (i.e., conditions of severe weather and cold).

20. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [e]nsure truckloads of dirt, sand, aggregate materials, drilling cuttings, and similar materials are covered to reduce dust and PM emissions.

Response:

The Second Draft HIA does not provide a basis for this recommendation. In fact, the Second Draft HIA does not analyze fugitive dust emissions to any significant extent or any potential impacts from fugitive dust emissions on human health. As such, Antero does not understand the basis for this recommendation. In addition, existing regulations (more thoroughly described in Attachment D) address minimization of fugitive dust emissions during oil and gas operations.

21. Recommendation: We recommend that the BOCC [a]ssign a county inspector to monitor Antero's compliance with the special use permit and that the special use permit contain provisions for regulatory action if Antero is found to be in non-compliance.

Response:

This recommendation requires action by Garfield County. Antero does not agree that it should be singled out among the numerous special use permit holders in Garfield County for special monitoring and enforcement. As described in Attachment D, Garfield County employs enforcement officials who are available to address instances of noncompliance. In addition, existing COGCC regulations authorize the Director of COGCC (or an authorized deputy) to inspect any oil and gas property to determine compliance with the COGCC rules and to require corrective action as necessary. Because the existing COGCC rules address a significant number of the recommendations contained within the Second Draft HIA, there is no need or basis to incorporate these recommendations into the special use permit or to establish a dedicated county inspector to monitor compliance with requirements that other agencies or parties are already requiring.

22. Recommendation: We recommend that the BOCC [a]ssign an independent observer acting on their behalf, to participate in the demonstration of the low emission flow back tank described in recommendation 1. The independent observer would be responsible for confirming sample locations and timing as well as monitoring for odors. The independent observer would collect grab samples if odors are noticed during the demonstration for evaluation of possible short-term peak exposures.

Response:

This recommendation requires action by Garfield County. The Second Draft HIA has demonstrated no basis for requiring an independent observer to participate in the low emission flow back tank process or indeed for any other practices required of Antero or voluntarily implemented by Antero. Antero has a strong incentive to ensure the accuracy and validity of its pilot testing with respect to its low emissions flow back process and will ensure the accuracy and validity of the results.

23. Recommendation: We strongly encourage Antero to [u]se all its [BMPs] for reduction of air pollution in the PUD during the next phase of drilling and well completions at the Watson Ranch pad

and/or other pads outside the PUD, to conduct rigorous air and odor monitoring, and to make all results publically available. This is an ideal opportunity for Antero to show the BOCC and the residents of Battlement [sic] that it can effectively control air emissions and address community concerns.

Response:

Antero has invested significant efforts and funds in developing and implementing its BMPs associated with reductions in air emissions and odors and in conducting air and odor monitoring to develop data on which it can make better-informed decisions. Antero does not agree that these voluntary and extraordinary efforts are appropriate in all circumstances, but intends to continue using appropriate BMPs, including monitoring, where they are technically feasible and cost effective and serve a useful purpose.

Water and Soil Quality Recommendations

1. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [d]isclose all chemicals that will be used on its well pads within the PUD.

Response:

See Response to Air Quality Recommendation No. 2.

2. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [c]haracterize the geology and hydrogeology within the Battlement Mesa PUD and the primary and secondary domestic water supplies, according to the specifications in COGCC rule 908.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is necessary or appropriate given the current regulatory scheme. No regulation by any regulatory authority having jurisdiction requires such broad analysis. A recommendation requiring compliance with state regulations is superfluous because Antero's compliance is legally required. The Board does not have independent authority to enforce COGCC rules. To the extent this recommendation exceeds the requirements in COGCC Rule 908, the Second Draft HIA provides no basis for it – particularly in light of the limited impacts and low likelihood of routine oil and gas operations negatively impacting public health through the hydrogeology of the area. This was confirmed by the recent report of the Battlement Mesa Metro District staff, which investigated the potential for Antero's operations to threaten Battlement Mesa's primary water supply drawn directly from the Colorado River and the community's secondary source of water from nearby groundwater wells. After careful consideration of location and manner of drilling and completion of Antero's wells, the staff concluded that the possibility of Antero's operations adversely affecting the primary drinking water supply was "quite low." Memorandum from BMMD Staff to the Board of Directors, Battlement Mesa Metro District, *Oil & Gas Development Assessment Report* (March 24, 2011) at 5. The report of the investigation also concluded that the likelihood that the secondary source (groundwater wells) would ever be used was "extremely low" and

recommended testing of the wells both before, after and during oil and gas development and prior to any use of the wells for potable purposes. *Id.* Battlement Mesa Metro District staff did not recommend Antero conduct a study to characterize the geology or hydrogeology of the area.

3. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [s]ubmit a quality assurance project plan (also known as a QAPP) to GCPH and GCOG for review and approval for all sampling and monitoring specified in these recommendations to assure monitoring information will be adequate for informing public health decisions.

Response:

See Response to Air Quality Recommendation No. 4.

4. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [c]omplete the installation of a fully functional water management facility and water pipeline network prior to any drilling within the PUD to decrease potential of contamination of soil and surface water on individual well pads and decrease potential for truck accidents to contaminate surface waters and soils in case of an accident.

Response:

See Response to Air Quality Recommendation No. 5.

5. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [c]omply with COGCC rule 908, which pertains to non-commercial centralized E&P waste management facilities, for the centralized water storage facility, which will be handling E&P waste (i.e., recycling water used in well completions). One of the [BMPs] Antero has proposed for its Battlement Mesa project is a centralized water storage pond, which will allow for pit-less drilling on the pads, the recycling of water used in well completions, and reduced potential for water and soil contamination at the well sites. We have recommended that this facility be installed prior to any drilling. COGCC rule 908 requires permitting, a hydrogeological characterization, groundwater, soil, and surface water testing for centralized E&P waste management facilities.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the current regulatory scheme. A recommendation requiring compliance with state regulations is superfluous because Antero's compliance is legally required. The Board does not have independent authority to enforce COGCC rules. Additionally, the recommendation itself acknowledges that the projected use of a centralized water storage pond is a BMP proposed by Antero, going beyond the requirements of existing regulation at considerable expense. As previously noted, Antero does not agree that the entire pipeline system needs to be installed prior to any drilling. The pipeline system for a particular well pad will be installed prior to drilling and completing wells on that well pad.

6. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [u]se permitted tanks, rather than a storage pond for water storage at the

centralized water storage facility. While tanks are not required by COGCC, the use of tanks reduces the potential for water and pollution that could occur if a pond/pit liner was compromised or if a pond/pit overflowed. Tanks also have the added advantage of reducing air pollution and reducing inadvertent wildlife and pet exposures.

Response:

See Response to Air Quality Recommendation No. 6.

7. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [l]ocate the centralized water storage facility at least a mile from any residential structure or school as a condition of approval of the special use permit. This is because the water storage facility will be handling E&P waste (i.e. recycled water from well completions).

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given its impracticability and Antero's current plan, which identified a practical solution to citizen concerns regarding truck traffic and impacts associated with that truck traffic. First, the recommendation would not be consistent with Antero's agreement with the surface owner. Second, the one-mile minimum is excessive and not based upon any findings in the Second Draft HIA. Specifically, this recommendation does not take into account the relevant characteristics of the site and project, but rather establishes an arbitrary distance despite the lack of analysis. Finally, COGCC regulations do not require a mile setback for centralized E&P waste management facilities. In fact, for centralized E&P waste facilities, COGCC regulations, as described in greater detail in Attachment D, require only a 500-foot setback from an educational facility – not a mile and not from all occupied structures. Antero's centralized water storage facility will meet applicable regulatory requirements for lining and leak detection, surface water run-off and run-on control systems, and site-specific groundwater monitoring wells. Additionally, the centralized water storage facility pits will be fully covered and compliant with Regulation No. 7, Reasonably Available Control Technology requirements. These practices control potential emissions from the ponds, and the Second Draft HIA has provided no explanation for why the controls would not be sufficient to protect the public health.

8. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [a]nnually disclose all chemicals and volumes used on its well pads within the PUD and include any chemicals that are VOCs in the water monitoring program as a condition of the special use permit. We recommend Garfield County to keep a list of these chemicals on its website.

Response:

See Response to Air Quality Recommendation No. 2.

9. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [i]nstall at least one up-gradient and two down-gradient groundwater monitoring wells at each well pad as well as at the centralized water storage facility, in addition to the voluntary water well testing program specified in Antero's BMPs. Antero should also conduct baseline

sampling for, at a minimum, the following: all major cations and anions, total dissolved solids, iron, manganese, nitrates, nitrites, selenium, benzene, toluene, ethylbenzene, xylenes, methane, pH, specific conductance, and any chemical identified in the full disclosure of chemicals of potential concern. This monitoring will ensure that drilling, hydraulic fracturing and other operations do not compromise ground water.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the extensive current regulatory scheme, which prohibits Antero from contaminating groundwater. See Attachment D. The COGCC rules authorize the Director to require monitoring as part of conditions of approval to Form 2As or other approvals. Any additional monitoring requirements deemed necessary to address specific public health issues identified – above and beyond those currently required by rule - should be recommended by CDPHE through its consultations with COGCC. Finally, even without specific requirements to conduct groundwater monitoring, Antero's BMPs involve sampling water wells located within ½ mile of well pads prior to drilling and completion activities as well as after drilling and completion activities.

10. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [c]onduct monthly monitoring of the well site groundwater wells for the parameters specified in the proceeding recommendation during well drilling and completion activities, followed by annual monitoring for the duration of Antero's project. All results of this monitoring should be made available to the public within 60 days of sample collection and posted on Garfield County's website. If (1) benzene, ethylbenzene, toluene, or xylenes are detected at levels greater than the concentration levels specified in Table 910-1 of the COGCC rules; (2) any cations, anions, metals, or total dissolved solids exceed 1.25 times background concentrations; (3) methane or any chemical identified as a concern from the full disclosure of chemicals exceeds 1.25 background concentrations; or (4) if pH or specific conductance exceeds the limits specified in COGCC Table 910-1, the BOCC should require Antero to remediate as a condition of the special use permit. This type of monitoring is the best way to ensure pollution control measures are effective in protecting the groundwater resource.

Response:

See Response to Water Quality Recommendation No. 9 above with respect to monitoring.

With respect to the recommended remediation requirement, COGCC rules already require prevention of contamination above Table 910-1 standards and require remediation of any such contamination (see Attachment D). The Board does not have independent authority to enforce COGCC rules. Further, the Board does not have the technical expertise to determine whether remediation is warranted and that concentration increases are not simply the result of natural variations and/or one-time sampling issues. The Second Draft HIA has not sufficiently explained why an independent Board remediation requirement would provide better protection of public health than the remediation already required under existing law.

11. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [c]onduct baseline soil and surface water testing at all well pad locations and at the

location of the centralized water facility for the parameters specified in COGCC Table 910-1, in addition to the wetland/drainage survey and mapping specified in Antero's BMPs

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary. COGCC rules require collection and analysis of representative soil samples if soil contamination is suspected or known to exist as a result of spill/releases. See Attachment D. Baseline soil testing is not currently required and the Second Draft HIA provides no basis for requiring baseline soil and surface water testing at all well pad locations. Existing COGCC rules, as described in Attachment D, govern protection of surface water supply areas and provide the appropriate mechanisms through which protections of those surface waters are addressed. In addition, Antero's BMPs include a voluntary program that would test water wells within ½ mile radius of the surface-hole location for each well on a pad. There would be a follow-up test within the next year on the pre-test wells or when all wells are drilled and completed on a well pad. The Second Draft HIA does not state why these regulations and BMPs do not provide adequate means to address public health concerns.

12. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [p]erform monthly monitoring of any surface water bodies that are located within ½ mile of a well pad or the centralized water storage facility using the same parameters specified for the groundwater monitoring during well drilling and completion activities, followed by annual monitoring for the duration of the project. This type of monitoring is the best way to ensure pollution control measures are preventing exposures through contamination of surface water.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the current regulatory scheme. No explanation is provided regarding why the frequencies specified in the recommendation are optimal or appropriate for preventing exposures through impacts to surface water. This explanation would be critical given monthly routine surface water monitoring is excessive and impractical, and well beyond current COGCC regulatory requirements (see Attachment D). COGCC Rule 317B requires monitoring of surface water for wells adjacent to drinking water supply systems, and Rules 317B and 906 require monitoring of surface water in response to spill or release incidents. Additionally, the assessment in the Second Draft HIA does not address the numerous other sources which have a higher probability of impacting surface water than Antero's proposed oil and gas operations.

13. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [c]onduct soil testing at all well pad locations and at the centralized water facility during reclamation activities. All results of this monitoring should be made available to the public within 60 days of sample collection and posted on a publicly accessible website approved by the Battlement Mesa Community website. If (1) benzene, ethylbenzene, toluene, or xylenes are detected at levels greater than the concentration levels specified in Table 910-1 of the COGCC rules; (2) any cations, anions, metals, or total dissolved solids exceed 1.25 times background concentrations; (3) methane or any chemical identified as a concern from the full disclosure of chemicals exceeds 1.25

background concentrations; or (4) if pH or specific conductance exceeds the limits specified in COGCC Table 910-1, the BOCC should require Antero to remediate as a condition of the special use permit. This type of monitoring is the best way to ensure pollution control measures are preventing exposures through contamination of soil.

Response:

See response to Water Quality Recommendation No. 10 above with respect to remediation.

With respect to reclamation, the Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the current regulatory scheme. COGCC rules provide detailed requirements for interim and final reclamation as well as closure of centralized E&P waste management facilities (see Attachment D).

14. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [a]dhere to COGCC Rules 317B, 603, 904, and 908, including provisions in these rules that are at the discretion of the director, and identify any variances or exceptions to these rules and make any variances or exceptions publically available (as posted on Garfield County website and/or a publicly accessible website approved by the Battlement Mesa Community) 2 months prior to submission of the special use permit.

Response:

The Second Draft HIA does not provide a basis for why this recommendation is reasonable or necessary given the current regulatory scheme. The Board has no independent authority to enforce COGCC regulations or to direct the COGCC director in the exercise of his discretion or to make any decision based on whether the Director has granted a variance as permitted by COGCC rules.

15. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [d]evelop and implement plans to ensure removal of mud from vehicles leaving the well pads and access roads to prevent tracking of mud onto Battlement Mesa and Garfield County roads.

Response:

This recommendation suggests that the Second Draft HIA may not fully take into account alternative but effective methods to accomplish the same task or existing COGCC regulations requiring control of mud tracking. See Attachment D. The Second Draft HIA also does not provide a basis for why its suggested course of action is a better option than the ones already presented by Antero's BMPs. Antero's BMPs include control of fugitive dust emissions through the use of dust suppressants, graveled access roads, road brushing and washing, and other measures to minimize mud deposited on public roads due to Antero truck traffic.

16. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [a]dhere to all its BMPs in Appendix E for spill prevention, control, and storm water control, and groundwater and surface water resources [sic].

Response:

COGCC rules already require adequate stormwater management programs, spill prevention, and protection of water resources. See Attachment D. To the extent Antero proposes not to go beyond existing requirements in its BMPs, the Board has no legal authority to require them and they may not always be appropriate. BMPs by their very nature are intended to be flexible, whose utility must be technically effective and economically feasible, and their use continually changes as operators assess their effectiveness and adapt new data and technology.

17. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [c]reate a berm for all down gradient well pad perimeters and surface water diversion ditches to prevent pollution of water and soil.

Response:

This recommendation is already incorporated in existing COGCC regulations and Antero's BMPs. As described in Attachment D, COGCC and federal rules require berms around crude oil, condensate and produced water storage tanks in high density areas. Antero's BMPs exceed these requirements and propose to include a downgradient pad perimeter berm that provides an adequate measure of fluid containment.

18. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [c]onduct monthly inspection of water and gas pipeline for leaks to prevent water and soil pollution and that the results of the inspections be posted on the Garfield County Website.

Response:

The Second Draft HIA has not provided a basis for why this recommendation is reasonable or necessary given the current regulatory scheme. As described in Attachment D, COGCC already requires annual inspection of water and gas pipelines for leaks, and the Board does not have independent legal authority to enforce or vary COGCC rules. COGCC's rules prohibit contamination of water and soil from oil and gas operations. Moreover, Antero's BMPs exceed the regulatory requirements because the BMPs include quarterly testing of water flow lines near rivers and other water bodies and quarterly and semi-annual testing of the other water lines.

19. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [i]mmediately Report to GCOG (in addition to COGCC) any spill of one or more barrels. Notification should take place within 24 hours and keep records of spill quantities, clean-up activities and preventive measures taken to avoid future spills. Notification should be immediate if water sources are impacted.

Response:

The Second Draft HIA has not provided a basis for why this recommendation is necessary given the current state and federal regulatory scheme for preventing water and soil

contamination from oil and gas operations. As described in Attachment D, COGCC rules require reporting of certain spills and releases as does Antero's Spill Prevention, Control and Countermeasures plan. Federal law also requires the reporting of certain discharges into waters under the jurisdiction of the United States. The Board does not have independent authority to enforce or vary these rules. The Second Draft HIA provides no basis for recommending that all spills above one barrel, regardless of size, content or potential to impact the environment or the public, should be reported. The regulatory agencies with authority and expertise over protecting the environment and public from spills from oil and gas operations have established the existing thresholds and requirements. The Second Draft HIA provides no reason or basis for mandating more stringent requirements.

20. Recommendation: Before approval of the special use permit, we recommend that the BOCC require Antero to [c]over all drill cuttings when stored on well pads to prevent wind transport and soil pollution.

Response:

The Second Draft HIA has not provided a basis for why this recommendation is reasonable or necessary, and has failed to consider practical implications. COGCC rules do not contain this requirement. Covering all drill cuttings when stored on well pads is impractical over significant periods of time because Antero would be actively adding to the drill cuttings as drilling occurs. In addition, Antero BMPs address appropriate measures to control emissions of fugitive dust from the well pads as previously described herein. Additionally, the BMPs indicate that the drilling system itself will be a closed loop (pitless) system, which means there would be no construction of reserve, drill cuttings, or fracturing/flow back pits.

21. Recommendation: We recommend that the BOCC [a]ssign a Garfield County inspector to monitor Antero's compliance with the special use permit and that the special use permit contain provisions for regulatory action if Antero is found to be in non-compliance of the special use permit.

Response:

See Response to Air Quality Recommendation No. 21.

Traffic and Transportation Recommendations

1. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [i]nstall a fully functional water storage facility and pipeline network before any development of well pads in the Battlement Mesa.

Response:

See Response to Air Quality Recommendation No. 5.

2. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [d]evelop industrial haul routes outside the PUD to remove natural gas development and production-associated traffic from residential roads prior to any well pad

construction within the PUD. Industrial traffic should be diverted from Stone Quarry Road to industrial haul routes at locations where homes are backed along the road.

Response:

The Second Draft HIA does not provide a basis or a need for this recommendation, and does not address practical implications of this recommendation. In this case, it would be impossible to avoid using at least some number of haul routes within the PUD. However, Antero's BMPs include using haul routes outside the PUD to the extent possible. Second, constructing additional roads where others already exist is excessive and infeasible. New home construction would generate more heavy truck traffic than the Antero project when other BMPs are taken into account (such as the pipeline for the transfer of water).

3. Recommendation: If industrial haul routes outside the PUD are not constructed then, [we recommend that as a condition of the special use permit, the BOCC require Antero to] [c]ommunicate and coordinate with the local school district to develop a plan for transportation and safety needs of all children going to and from school by car, bus, bicycle and walking during and outside of school zone hours to prevent injury to school children.

Response:

The Second Draft HIA does not provide a need for this recommendation, given existing land use regulations, standards for oil and gas operations in the Battlement Mesa PUD and Antero's BMPs, which include working with the Garfield County Road and Bridge Department in designating haul routes located within the PUD to avoid school zones and scheduling heavy equipment movement to avoid school bus operation hours. Antero is committed to working with the community to maximize safety of school children, indeed of all Battlement Mesa citizens.

4. Recommendation: If industrial haul routes outside the PUD are not constructed then, [we recommend that as a condition of the special use permit, the BOCC require Antero to] [e]nforce truck speed limits to 20 mph within the PUD for all areas for all truck traffic associated with the project to reduce the severity of injury should an accident occur.

Response:

The Second Draft HIA does not indicate a need for this recommendation, or a basis for its determination that a 20 miles per hour speed limit is appropriate, especially given Antero's commitment to limit vehicle speeds during pad site access. There is no mechanism through which Antero (or any other third party) can enforce the traffic rules, particularly with respect to non-Antero related or operated vehicles. Additionally, the Second Draft HIA ignores practical implications of implementing the recommended action, such as an increase in the rate of accidents on public highways, and increased stress and frustration of resident drivers.

5. Recommendation: If industrial haul routes outside the PUD are not constructed then, [we recommend that as a condition of the special use permit, the BOCC require Antero to] [m]ark pedestrian/bike high use routes and establish safe crossing zones where they intersect Battlement Mesa Parkway or other haul routes to alert drivers of potential pedestrians and bicyclers.

Response:

The Second Draft HIA does not provide a sufficient basis for this recommendation. This recommendation is especially unnecessary given that Antero's BMPs include additional signage to direct and control Antero truck traffic, additional flagmen and crossing guards, and roadway improvements to eliminate sharp turns, blind corners and driveways.

6. Recommendation: If industrial haul routes outside the PUD are not constructed then, [we recommend that as a condition of the special use permit, the BOCC require Antero to] [i]ninstall safety measures (ie, signaled cross walks, elevated sidewalks, green space buffers) for pedestrians/bikes where established walking/biking routes overlap/run along haul routes to prevent accidents.

Response:

The Second Draft HIA does not provide a sufficient basis for this recommendation. Antero's BMPs include additional signage to direct and control Antero truck traffic, additional flagmen and crossing guards, and roadway improvements to eliminate sharp turns, blind corners and driveways.

7. Recommendation: If industrial haul routes outside the PUD are not constructed then, [we recommend that as a condition of the special use permit, the BOCC require Antero to] [r]equire safe driver training for workers and subcontractors and Antero implement penalty system for unsafe workers, to encourage safe driving.

Response:

Antero's BMPs will include a Safe Driving Program for Antero's employees. In addition, Antero will strongly encourage – through written requests and other correspondence – that each of its contractors also require safe driving training for the contractors' employees and subcontractors.

8. Recommendation: If industrial haul routes outside the PUD are not constructed then, [we recommend that as a condition of the special use permit, the BOCC require Antero to] [i]mplement a system to identify and remove unsafe drivers to prevent accidents and injuries.

Response:

Antero's BMPs will include a Safe Driving Program for Antero's employees. In addition, Antero will strongly encourage – through written requests and other correspondence – that each of its contractors also require safe driving training for the contractors' employees and subcontractors.

9. Recommendation: We recommend that Garfield County [p]rovide Sheriff's Auxiliary Unit with authority to log speeding and unsafe driving incidents and complaints within the PUD. Information about incidents involving the Antero workers or subcontractors can be provided to Antero, subcontractors and the Sheriff's department so that problems and unsafe conditions can be resolved.

Response:

Antero's BMPs will include a Safe Driving Program for Antero's employees. In addition, Antero will strongly encourage – through request – that each of its contractors also require safe driving training for the contractors' employees and subcontractors.

10. Recommendation: We recommend that Garfield County [r]equest that the Garfield County Sheriff's Department or other qualified entity review Antero's Traffic Impact Analysis and request feedback on possible safety mitigations and traffic hot spots to ensure the plan is protective of public health.

Response:

This recommendation requires action by Garfield County. Antero's BMPs currently include additional signage to direct and control Antero truck traffic, additional flagmen and crossing guards, roadway improvements to eliminate sharp turns, blind corners and driveways, roadway improvements to alleviate potential traffic congested points, and a truck convoy policy.

11. Recommendation: We recommend that Antero [c]onsider speed control measures on worker ingress and egress routes within the PUD (ie [sic] decreased speed limits, signage, real time speed measurement signs, photo speed ticket vans, speed bumps or other measures) to prevent speeding.

Response:

This recommendation requires action by Garfield County because the roads are within the County's jurisdiction. Antero's BMPs include additional signage to direct and control Antero truck traffic, additional flagmen and crossing guards, roadway improvements to eliminate sharp turns, blind corners and driveways, roadway improvements to alleviate potential traffic congested points, and a truck convoy policy. There will also be reduced vehicle speeds and designated truck route entry points which avoid the front door to the Battlement Mesa area.

Noise, Vibration, and Light Recommendations

1. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [i]mprove sound mitigation to achieve noise levels below 55 dBA in the day and 50 dBA at night during all well development and production activities at the distance of 350 feet from the noise source on the well pad. Require Antero to monitor noise and to use best mitigation technology available to maintain these levels throughout the development period.

Response:

The Second Draft HIA does not provide a basis for recommending sound levels below 55 dBA during the day or 50 dBA during the night. As described in greater detail in Attachment D, current COGCC regulations permit noise levels up to 80 dBA during the day and 75 dBA during the night for well development and production activities, and the Second Draft HIA does not provide sufficient explanation for the deviation from these established standards. Imposing more stringent noise levels would require a change in state regulations,

and the requirements would need to be applicable to operators and other industrial developers – not just Antero. Additionally, ambient noise levels in Battlement Mesa have been measured higher than 55 dBA. Antero has committed to dawn to dusk operations for completion operations in order to ensure no noise occurs at night from completion operations.

2. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [r]equire best available noise reduction technology for heavy equipment, including trucks and truck brakes, to reduce noise levels.

Response:

The Second Draft HIA does not provide a basis for requiring the best available noise reduction technology when that is above and beyond the requirements of current regulation established by the COGCC (see Attachment D for more detail). In the absence of or in excess of state-wide standards, BMPs, not mandatory requirements, are appropriate for noise mitigation. Antero's BMPs include a number of noise mitigation BMPs, including using noise deadening blankets for drilling rig components, using electricity instead of diesel engines for drilling where practicable, using hospital-grade mufflers on high noise output machinery, using low noise exhaust mufflers on drilling rig generators, using sound-proofed generator skids, using sound-proofed mud pumps, using disk brakes on the drilling rigs instead of noisier drum brakes, and using top drive to reduce pipe handling noise on the drilling rig. In addition, the BMPs include inspecting truck exhausts pre-trip, limiting the use of jake brakes on trucks, locating and orienting stationary engines and exhausts to direct noise away from the homes closest to well pad locations, and housing any wellhead compression with a high level of noise suppression equipment.

3. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [d]evelop and implement Community Advisory Board which can address the Battlement Mesa resident's concerns about noise. This can help prevent long-term nuisance noise levels, in cooperation with Battlement Mesa residents and Garfield County. For further details regarding the recommendation for a Community Advisory Board, see recommendation for Community Wellness Assessment.

Response:

The Second Draft HIA does not provide a basis for recommending establishment of a community advisory board, especially given the current existence of Garfield County's Energy Advisory Board (EAB). The EAB's mission is to provide "a forum for the oil and gas industry, the public, impacted landowners and local government to prevent or minimize conflict associated with oil and gas development through positive and proactive communication and actions that encourage responsible and balanced development of these resources within Garfield County." The EAB structure would allow for the fulfillment of the primary purpose of the community advisory board (facilitating communication between the community and Antero) without creating a duplicative and superfluous advisory body.

4. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [a]lert residents of anticipated noise, including time, duration, decibel levels, and machinery to be used to protect public health.

Response:

Antero intends to disseminate this type of information periodically at public meetings, but this information would not involve discussion of the machine type. It is not practical on any real time basis to alert residents of anticipated noise regarding time, duration, decibel levels and machine type due to the diversity of operations that might be ongoing at any particular point in time. The Second Draft HIA offers no explanation why providing the machine type would further protect public health if the anticipated noise levels, time and duration would already be provided.

5. Recommendation: As a condition of the special use permit, we recommend that the BOCC require Antero to [d]evelop industrial haul routes to remove truck traffic from the PUD and away from the homes on Stone Quarry Road.

Response:

See Response to Traffic and Transportation Recommendation No. 2.

6. Recommendation: If industrial haul routes are not developed then, [we recommend that the BOCC require Antero as a condition of the special use permit to] [r]educe speed limits for trucks within the PUD to 20 miles per hour to reduce noise and vibration levels.

Response:

See Response to Traffic and Transportation Recommendation No. 4.

7. Recommendation: If industrial haul routes are not developed then, [we recommend that the BOCC require Antero as a condition of the special use permit to] [c]onsider installation of traffic noise barriers near the St. John Elementary School and/or Grand Valley Middle School to reduce noise levels at schools if school staff indicates that there are noise impacts at the school.

Response:

The Second Draft HIA does not indicate a need for this recommendation given Antero's noise abatement BMPs, including dawn to dusk operations for completion operations to ensure no noise at night for hydraulic fracturing, limiting the use of jake brakes on trucks, and pre-trip inspections of truck exhausts. Additionally, Antero's BMPs address designating haul routes within the PUD which would avoid school zones, as practicable. Antero remains committed to implementing noise reduction measures, including administrative and physical types, in order to minimize noise generated from our operations.

8. Recommendation: If industrial haul routes are not developed then, [we recommend that the BOCC require Antero as a condition of the special use permit to] [i]nstall permanent/semi-permanent noise mitigation structures (sound walls) along haul routes CR300 and other routes where trucks are anticipated to be passing throughout the development period to reduce noise levels.

Response:

The Second Draft HIA does not indicate a need for this recommendation given Antero's noise abatement BMPs, including dawn to dusk operations for completion operations to ensure no noise at night for hydraulic fracturing, limiting the use of jake brakes on trucks, and pre-trip inspections of truck exhausts. Antero will consider all alternatives including sound walls to reduce noise to acceptable levels which are attributable to its operations.

Community Wellness Recommendations

1. **Recommendation:** We recommend that Antero, Battlement Mesa Citizens, and Garfield County [e]stablish a Community Advisory Board to facilitate on-going community engagement between Antero, Garfield County officials, Battlement Mesa Company and residents of Battlement Mesa for early identification of impacts to community wellness. A Community Advisory Board can provide direct and frequent interactive communication between these groups. It can provide an ongoing mechanism for citizens to report problems and concerns to Antero and can allow Antero to address concerns in a timely manner. It can also provide feedback to the County regarding success of residential natural gas development. A Community Advisory Board can also provide an opportunity for Antero to apprise the residents of current activities and changes to plans, which can help reduce uncertainty for residents and may decrease anxiety. The Community Advisory Board can also provide input regarding the use of the one million dollar donation to ensure that the use of this money supports community and physical health.

Response:

See Response to Noise, Vibration, and Light Recommendation No. 3.

2. **Recommendation:** We recommend that Garfield County [r]eview sexually transmitted infection clinic access, outreach and education, with particular attention to immigrant workforce to reduce spread of sexually transmitted infections within the community.

Response:

This recommendation requires action by Garfield County. No basis in the Second Draft HIA is stated for this recommendation other than a generalized concern with increased activity levels. This recommendation is inappropriately invasive, inappropriately singles out certain members of the community, and is not appropriately a subject for consideration in connection with the County's land use permitting responsibility.

3. **Recommendation:** We recommend that Garfield County [i]dentify operators and subcontractors that have implemented drug and alcohol free work-place programs and encourage Antero to do so and subcontract to companies that also do so. Provide Antero with contacts to those that educate employers regarding benefits of such programs.

Response:

This recommendation requires action by Garfield County. The information provided in the Second Draft HIA does not support the need to implement such programs. Antero has a drug, alcohol and firearm standard to which compliance is expected from its employees and

contractors. No basis in the Second Draft HIA is stated for this recommendation other than a generalized concern with the well-known dangers of workplace substance abuse. This recommendation is not appropriately a subject for consideration in connection with the County's land use permitting responsibility.

4. Recommendation: We recommend that Garfield County and Antero [s]upport baseline and ongoing studies to determine the impact of residential natural gas development on community health and the effects on individual health. This information will provide direct feedback to the Antero-Battlement Mesa project, allowing for improvements in community aspects as the project continues. It will also provide valuable information for other communities experiencing or anticipating residential natural gas development. These studies should include measurements related to lifestyle and social cohesion, education, crime, sexually transmitted infection, mental health and suicide, and substance abuse.

Response:

The Second Draft HIA does not provide a basis for this recommendation, nor does it take into account practical implications. It is not clear whether such studies are even warranted. Even if they were warranted, the studies envisioned by the Second Draft HIA are severely flawed. ENVIRON has set forth a detailed response to this recommendation which is summarized below.

- Based on the Second Draft HIA, the studies would not include characterization of the contribution of non-Antero activities to the health impact endpoints proposed for study. This creates a significant likelihood for potential health impacts to be misattributed to Antero activities, as well as creates substantial problems with mitigation activities given the impact origin would not be accurately identified.
- Additionally, the Second Draft HIA is implicitly validating links between natural gas development and the health endpoints which are subjective, unquantifiable or indeterminable, and not based in science.
- Furthermore, developing sound scientific studies would be a long-term and complex process that would not be amenable to providing the direct feedback desired by the Second Draft HIA.
- Mental health status (one of the endpoints of interest) is affected by a number of social and biological factors, including socioeconomic status and past and present access to health care. In a state and county with dynamic growth in both population and in energy-sector jobs, it would be difficult – and potentially impossible – to separate out any impacts of Antero's relatively small operations on mental health status from impacts due to other sources.
- To properly design and conduct and evaluate scientific studies of the type proposed here is both a long-term and complex process that is not likely to provide the direct feedback noted in the recommendation and deemed desirable by the Second Draft HIA. To assess any impacts of Antero's operations on community and/or individual

health will require, for each endpoint, the determination of a measurement metric, establishment of a true and accurate baseline, the identification of measurement methods, an assessment strategy, and identification of both geographic and temporal domains. While such challenges are not insurmountable, they require considerable time and resources if they are to yield scientifically meaningful results.

- There is a serious question as to whether such studies are even warranted, in that the perceived need for such studies is based on several flawed premises. Given these concerns, we believe that the community might receive the greatest and most immediate benefit if Antero's monetary donation to Battlement Mesa be allocated to establishing community programs or other activities selected by the community to best address their specific concerns. Allocation of Antero's donated funds in this manner is also consistent with Community Wellness Recommendation No.7.

This recommendation is not appropriately a subject for consideration in connection with the County's land use permitting responsibility.

5. Recommendation: We recommend that Garfield County and Antero [e]nsure recommendations to mitigate other concerns (air quality, traffic, and noise) are implemented.

Response:

This recommendation requires action by Garfield County. Because Antero does not agree that most of the recommendations (and the recommendation to mandate compliance with proposed mitigation measures) in the Second Draft HIA are warranted or legally supportable, Antero does not agree that Garfield County should expend additional resources beyond those currently expended in ensuring compliance with the terms of any special use permit for Antero's operations. Similarly, Antero does not agree that its operations should be singled out among other Garfield County operations (oil and gas or otherwise) requiring a land change permit.

6. Recommendation: We recommend that Garfield County [e]ncourage use of local business, especially those that enhance community cohesion, such as local restaurants and coffee shops.

Response:

This recommendation requires action by Garfield County. While Antero does not include this recommendation in its current plans, Antero would be open to discussion on encouraging the support of the local economy.

7. Recommendation: We recommend that Garfield County [u]tilize Antero's one million dollar donation to enhance community cohesion.

Response:

The Second Draft HIA does not provide the basis for assuming that Garfield County will be the recipient of and have control over Antero's one million dollar donation. The Battlement

Mesa Service Association was provided with the authority to determine how best to utilize the donation, and may have already identified acceptable uses.

Economic and Employment Recommendations

1. **Recommendation:** We recommend that before the project starts, the BOCC [r]equire that Antero develop a reasonable and specific timeline for all activities associated with development and maintenance of the wells. Require that Antero communicate changes to the plans at the earliest possible time before any changes in the plans occur. This would address some concerns in the real estate market. If sellers and buyers can confidently anticipate the steps and timing of the well development process, the real estate market may react less unfavorably to the project.

Response:

Antero currently communicates information regarding timelines of activities and changes to those timelines to the community through periodic community meetings. There is no basis for assuming that these efforts will not be sufficient to inform members of the public regarding operational plans.

The recommendation, if adopted, may result in disputes regarding Antero's compliance with recommendation, as the recommendation is extremely vague and contains several terms subject to interpretation. Specifically, the term "reasonable" opens Garfield County and Antero open to significant debate as to the timeframe for their proposed operations – resulting in Antero defending operational and business decisions often dependent upon capital, availability of work force and other factors that are inappropriate for involvement by Garfield County or the citizens of Battlement Mesa. Similarly, the term "specific" raises the question of how specific (or detailed) the timeline must be and the precise activities associated with development and maintenance Antero must specify in its timeline. The Second Draft HIA fails to understand that many maintenance activities are not predictable and thus cannot reasonably be incorporated into a timeline.

While Antero understands that information is important to the citizens of Battlement Mesa for many reasons, the Second Draft HIA has not demonstrated that the real estate market has reacted or will react unfavorably to Antero's proposed oil and gas operations such that this formalized communication is necessary. No basis in the Second Draft HIA is stated for this recommendation other than a generalized concern over real estate values, a notoriously speculative subject. This recommendation is not appropriately a subject for singling out Antero among all the operators or all the activities in the county that could impact local property values.

2. **Recommendation:** We recommend that Antero, Battlement Mesa Citizens, and Garfield County do the following before the Project starts [e]stablish a Community Advisory Board that meets regularly and frequently with Antero (at least every month). Garfield County, citizens, Antero and the Battlement Mesa Company should be a part of this board. The Community Advisory Board can actively interact with Antero to facilitate communication to and from the residents and the County. Establish clear and timely communications methods to facilitate information regarding changes to the timeline and activities. Provide the Community Advisory Board with sufficient powers to allow for resident input, which can demonstrate that residents can voice their concerns.

Response:

See Response to Noise, Vibration and Light Recommendation No. 3.

3. Recommendation: We recommend that Antero, Battlement Mesa Citizens, and Garfield County do the following before the Project starts: [c]onsider multiple methods of communication to residents regarding development and maintenance activities.

Response:

This recommendation is already addressed by Antero's current practices. Antero has held over twenty public meetings related to its proposed operations in and around Battlement Mesa and participates frequently in the Battlement Mesa Oil and Gas Committee meetings (which are held monthly). Formalizing Antero's current communications into a specific requirement will not demonstrably improve the communication process, although Antero has always been open to considering any appropriate means for effectively communicating with and responding to the Battlement Mesa community. The Second Draft HIA provides no evidence that Antero's current practice is insufficient to provide adequate information to the Battlement Mesa citizens. Formalizing the method of communication actually may inhibit appropriate dissemination of information on an as needed basis.

4. Recommendation: We recommend that Garfield County [c]ontinue to consider public health as a high level priority when judging uses of local government revenues derived from the natural gas development and production to maximize protection of public health.

Response:

This recommendation is directed to and requires action by Garfield County. Antero has no comments as to Garfield County's prioritization of local government revenues derived from natural gas development and production; however, Antero believes that public health protection is not the only factor that must be considered and prioritized in Garfield County's use of local government revenues from natural gas development and production.

5. Recommendation: We recommend that Garfield County [e]nsure recommendations to mitigate other concerns (air quality, traffic, noise and community wellness) are implemented.

Response:

See Response to Community Wellness Recommendation No. 5.

6. Recommendation: We recommend that Garfield County [s]upport local educational institutions that provide training for industry related jobs during the development period and retraining for when industry jobs end after the development period.

Response:

This recommendation is directed to and requires action by Garfield County. Antero has no comments on this recommendation.

Health Care Recommendations

1. **Recommendation:** We recommend that Garfield County [m]onitor which companies, including Antero and subcontracting companies, provide health insurance to employees to determine how the natural gas industry contributes to health care infrastructure.

Response:

This recommendation is directed to and requires action by Garfield County, not Antero. Importantly, the Second Draft HIA does not specify the other companies that should be monitored in addition to Antero and its subcontracting companies. Although Antero assumes that the recommendation is directed at oil and gas companies, the Second Draft HIA does not provide a basis for excluding other industries from any such monitoring and analysis.

2. **Recommendation:** We recommend that Garfield County [m]onitor health care utilization in Garfield County to determine if rates of uncompensated care are associated natural gas industry cycles.

Response:

This recommendation is directed to and requires action by Garfield County. Any assessment of whether uncompensated care is associated with natural gas industry cycles must contain more than anecdotal information and supposition in order to have any claim to validity.

3. **Recommendation:** We recommend that Garfield County [e]nsure that county revenues continue to meet changes in county services, including public health services.

Response:

This recommendation is directed to and requires action by Garfield County. Antero has no comments on this recommendation.

Accidents and Malfunctions Recommendations

1. **Recommendation:** We recommend that as a condition of the special use permit the BOCC require Antero to [w]ork with emergency responders in Battlement Mesa (e.g., the sheriff and fire departments) and Battlement Mesa residents to establish a comprehensive emergency response plan that includes notification and communication systems, evacuation routes, plans for evacuating schools, the assisted living facility, and capacity of local emergency responders hospitals, and sheltering in place, accurate maps of pipelines, shut-off valves, and well pads, as well as identifying air intakes at the schools, assisted living facility, and recreation center prior to any activity in the PUD. We recommend that the copies of the emergency response plan be kept at the sheriff department, fire department, all responding hospitals, and on a Garfield County website and /or a publicly accessible website approved by the Battlement Mesa Community.

Response:

The Second Draft HIA provides no basis for requiring this emergency preparedness plan in light of Antero's BMPs. As Antero's BMPs indicate, Antero proposes to utilize an Emergency Response Plan utilizing a standardized, on-scene, all-hazard incident management concept (the Incident Command System), allowing users to adopt an integrated organizational structure to match the complexities and demands of single or multiple incidents without being hindered by jurisdictional boundaries. Additionally, the Emergency Response Plan includes annual review and evaluation of the plan, including review of the plan itself, training undertaken, and emergency exercises conducted. The annual review will also include consideration of updates or revisions based on legislative changes, industry trends, experience and best practice. Further, a plan addressing hazards specific to Battlement Mesa will be developed and incorporated into the overarching Piceance Basin plan.

Additional mandates with respect to the parameters of an emergency response plan are not necessary. Antero will, as it has always done, work with emergency responders in Battlement Mesa to develop any necessary emergency protocols and response plans.

2. Recommendation: We recommend that as a condition of the special use permit the BOCC require Antero to [t]est the emergency response plan in cooperation with emergency responders by performing a drill prior to any natural gas operations commence in the PUD and annual drills thereafter, as well as annual reviews and updates of the emergency response plan.

Response:

As Antero's BMPs indicate, the Emergency Response Plan includes annual review and evaluation of the plan, including review of the plan itself, training undertaken, and emergency exercises conducted. The annual review will also include consideration of update or revision based on legislative changes, industry trends, experience and best practice.

3. Recommendation: We recommend that as a condition of the special use permit the BOCC require Antero to [a]nnually disclose all chemicals used on its well pads within the PUD and include a list of these chemicals in the emergency response plan.

Response:

See Response to Air Quality Recommendation No. 2.

4. Recommendation: We recommend that as a condition of the special use permit the BOCC require Antero to [n]otify the sheriff and fire department one week prior to well drilling, hydraulic fracturing, flow back, and pipeline pigging activities.

Response:

While the Second Draft HIA does not indicate a need for this recommendation, Antero is willing to work with the sheriff and fire department to develop appropriate and practical notification procedures.

5. Recommendation: We recommend that as a condition of the special use permit the BOCC require Antero to [i]mplement the emergency response provisions provided in Antero's best management practices submitted as comments to the September 2010 Draft HIA.

Response:

Antero's BMPs for emergency response include an emergency response plan and an equipped emergency response trailer to be located in the Battlement Mesa Area. Because the Second Draft HIA does not demonstrate a need for this recommendation, Antero remains committed to implementing the emergency response provisions contained within its BMPs. Because emergency response plans benefit from the practice of adaptive management, Antero proposes to keep its current emergency response provisions fluid so that it may continue to work with emergency responders to adapt and modify the emergency response plans as appropriate.

6. Recommendation: We recommend that as a condition of the special use permit the BOCC require Antero to [i]mplement the well site and facility security provisions provided in Antero's BMPs submitted as comments to the September 2010 Draft HIA.

Response:

Antero intends to incorporate BMPs for well site and facility security to the greatest extent practicable, which include well site fencing, signage placed at all well locations with emergency number and location information, enclosed and secured surface production equipment, lock-out systems, and 24-hour security cameras with remote viewing and file storage capabilities.

7. Recommendation: We recommend that as a condition of the special use permit the BOCC require Antero to [a]dhere to its BMPs for pipelines and all COGCC rules throughout the life of the project as a condition of the special use permit.

Response:

Antero intends to adhere to its BMPs for pipelines and all COGCC rules throughout the life of the project.

8. Recommendation: We recommend that as a condition of the special use permit the BOCC require Antero to [i]nstitute mechanism for reporting safety concerns, near-misses, and minor incidents to the appropriate designated county agency or department to reduce accidents and malfunctions. Reports of these concerns and incidents should also be made to the Community Advisory Board, along with plans for preventive and corrective actions.

Response:

The Second Draft HIA does not provide a basis for this recommendation given the existing requirements for accident notifications or other notifications regarding safety concerns. Antero has already committed to an OSHA Accident Notification plan which would require verbal and/or written notification be made to OSHA within 8 hours of a fatality, the immediate

hospitalization of three or more employees due to an injury or exposure, or the hospitalization of three or more employees within a one month period after an injury or exposure has occurred. In addition, COGCC rules require an operator to give immediate notice to the COGCC Director when public health or safety is in jeopardy and requires employees to report unsafe and potentially dangerous conditions immediately to a supervisor (see Attachment D). These notices are available to the general public from the respective agency.

9. Recommendation: We recommend that as a condition of the special use permit the BOCC require Antero to [d]evelop an ongoing fire prevention program in coordination with the local fire department's community fire prevention program. This program should include routine inspection and implementation of wildfire mitigation plans (for example, all areas surrounding well pads are kept clear of vegetation that could contribute to spreading).

Response:

Many of the aspects of a fire prevention program are addressed by existing COGCC rules (see Attachment D). Antero has an operational fire prevention standard and plans to work with local fire departments to further enhance its effectiveness.

10. Recommendation: We recommend that Garfield County [c]learly mark primary and secondary evacuation routes from Battlement Mesa.

Response:

This recommendation requires action by Garfield County. Antero has no comments on this recommendation.

11. Recommendation: We recommend that Garfield County [p]erform quarterly tests of emergency notification systems within Battlement Mesa (e.g., sirens and reverse 911).

Response:

This recommendation requires action by Garfield County. Antero has no comments on this recommendation.

12. Recommendation: We recommend that Garfield County [r]equest the Battlement Mesa fire department to inspect all proposed well pad locations and make recommendations for the prevention of well pad fires spreading from the pads up to relocation of pads and that these recommendations are incorporated into the special use permit.

Response:

This recommendation requires action by Garfield County, but Antero does not believe the Second Draft HIA indicates the need for this recommendation. COGCC Rules address fire prevention in connection with the location and conduct of oil and gas operations, and the County has no authority to impose different or more stringent standards than required by the COGCC. See Attachment D. It appears that this recommendation has been incorporated

based solely upon a concern expressed during the public comment period, for which no further analysis was conducted to determine the validity of the comment and recommendation. Antero notes that the proposed pad locations have already been determined and relayed to the fire department. Antero is open to allowing the fire department to inspect the proposed well pad locations and make recommendations for the prevention of well pad fires spreading from the pads, but does not agree that the fire department should have any role in determining the location of the pads within the PUD. Siting determinations are determined by the COGCC as part of its Form 2A approval process. The Battlement Mesa fire department will have an opportunity to present its recommendations either during the referral period of the land use change process or during the public comment on the land use change application. The Board would then have the opportunity to review those recommendations during its deliberations on the land use change permit. The local fire department has stated that it is not overly concerned that Antero's operations will significantly increase the potential fire hazard to the community.

13. Recommendation: We recommend that Garfield County [r]equire all gas pipelines to follow established truck haul routes and allow no gas pipelines through the center of the PUD.

Response:

This recommendation requires action by Garfield County, but Antero does not believe it takes into account the practical implications of the request. There are already established, existing pipelines within the PUD. Requiring all gas pipelines to follow established truck haul routes and allowing no gas pipelines through the center of the PUD would not utilize existing right-of-way corridors and could require installation of pipelines in previously undisturbed areas. Additionally, as explained previously, the truck haul routes will unavoidably need to go through the PUD. Thus, even were all gas pipelines to follow the established truck haul routes they may run through the center of the PUD.

14. Recommendation: We recommend that Garfield County [a]ssign a county inspector to oversee and inspect all pipeline construction and maintenance in the PUD.

Response:

This recommendation requires action by Garfield County. Antero does not agree that operations within the PUD should be singled out for enforcement and inspection.