

Table of Contents

Executive Summary	I
ES1 Introduction	I
ES2 The HIA Process	III
ES4 Assessment of Health Impacts	V
<i>ES4.1 Summary of Air Quality Assessment</i>	VI
<i>ES4.2 Summary of Water and Soil Quality Assessment</i>	VI
<i>ES4.3 Summary of Traffic Assessment</i>	VII
<i>ES4.4 Summary of Noise, Vibration, and Light Assessment</i>	VII
<i>ES4.5 Summary of Community Wellness Assessment</i>	VIII
<i>ES4.6 Summary of Economic and Employment Assessment</i>	IX
<i>ES4.7 Summary of Health Infrastructure Assessment</i>	IX
<i>ES4.8 Summary of Accidents and Malfunctions Assessment</i>	X
ES6 Next Steps and Conclusions.....	XII
Table of Contents.....	i
Annotated Acronym Definitions.....	v
Part One: Health Impact Assessment.....	1
<i>Preface</i>	1
<i>Regarding Ozone and Human Health</i>	2
<i>Regarding Climate Change and Human Health</i>	2
1 Introduction.....	3
1.1 The Battlement Mesa Community	3
1.1.1 Parachute.....	4
1.1.2 Demography ⁴	4
1.1.3 Economy	5
1.2 Antero’s Plan to Drill Within the Battlement Mesa PUD.....	6
1.3 Community Concerns	7
1.4 Initial Responses to Community Concerns.....	8
2 HIA Methods	9
2.1 Screening.....	9
2.2 Scoping	9
2.3 Assessment.....	9
2.4 Recommendations.....	10
2.5 Reporting.....	10
2.6 Implementation	11
2.7 Evaluation	11
3 Summary of Battlement Mesa Baseline Health Profile	12
3.1 Vulnerable populations	13
3.2 Physical determinants of health	13

3.3	Social determinants of health.....	14
3.4	Limitations	16
4	Assessment of Health Impacts	17
4.1	Assessment of Air Quality on Health in Battlement Mesa	19
4.1.1	Air Quality and Health.....	19
4.1.2	Current Air Quality Conditions	20
4.1.3	Antero Drilling Plans in Battlement Mesa and Air Quality.....	21
4.1.4	Characterization of the Air Quality on Health.....	24
4.1.5	Findings and Recommendations from Air Quality Assessment.....	25
4.2	Assessment of Water and Soil Quality on Health in Battlement Mesa	26
4.2.1	Water and Soil Quality Impacts on Health	26
4.2.2	Current Conditions of Water and Soil Quality	27
4.2.3	Antero Drilling Plans in Battlement Mesa and Water and Soil Quality	28
4.2.4	Characterization of the impact on Water and Soil Quality	31
4.2.5	Findings and Recommendations from Water and Soil Quality Assessment	32
4.3	Assessment of Transportation and Traffic on Health in Battlement Mesa	33
4.3.1	Traffic and Safety	34
4.3.2	Current Traffic Conditions.....	34
4.3.3	Antero Drilling Plans in Battlement Mesa and Traffic.....	35
4.3.4	Characterization of Traffic Impacts on Safety	37
4.3.5	Findings and Recommendations from Traffic and Transportation Assessment...	38
4.4	Assessment of Noise, Vibration, and Light Pollution on Health in Battlement Mesa..	39
4.4.1	Noise, Vibration, Light pollution and Health	40
4.4.2	Current Noise, Vibration, and Light Conditions.....	41
4.4.3	Antero Drilling Plans in Battlement Mesa and Noise/Vibration/Light	41
4.4.4	Characterization of Noise, Vibration and Light Impacts	42
4.4.5	Findings and Recommendations from Noise, Vibration, and Light Assessment .	43
4.5	Assessment of Impacts on Community Wellness.....	44
4.5.1	Current Community Wellness Conditions	44
4.5.2	Antero Drilling Plans in Battlement Mesa and Community Wellness	45
4.5.3	Characterization of Community Wellness Impacts	49
4.5.4	Findings and Recommendations Related to Community Wellness.....	50
4.6	Assessment of Economic and Employment Impacts on Health in Battlement Mesa ...	50
4.6.1	Economy, employment, and health.....	51
4.6.2	Current Economic and Employment Conditions	51
4.6.3	Antero Drilling Plans in Battlement Mesa and Economics and Employment.....	52
4.6.4	Characterization of the Economy and Employment Impacts on Health.....	53
4.6.5	Findings and Recommendations from Economic and Employment Assessment.	54
4.7	Assessment of Impacts to Health Infrastructure in Battlement Mesa.....	55
4.7.1	Private and Public Health Services and Health.....	55
4.7.2	Current Health Infrastructure Conditions	56
4.7.3	Antero Drilling Plans in Battlement Mesa and Healthcare Infrastructure	57
4.7.4	Characterization of Healthcare Infrastructure Impacts	57

4.7.5	Findings and Recommendations Related to Health Care Infrastructure.....	58
4.8	Assessment of Accidents and Malfunctions Impacts on Health.....	59
4.8.1	Accidents, Malfunctions and Health.....	60
4.8.2	Current Conditions for Accidents and Malfunctions.....	61
4.8.3	Antero Drilling Plans in Battlement Mesa and Accidents and Malfunctions.....	61
4.8.4	Characterization of the Impact from Accidents and Malfunctions.....	62
4.8.5	Findings and Recommendations from Assessment of Accidents and Malfunctions 63	
4.9	Summary of Assessments on Health in Battlement Mesa.....	63
5	Next Steps.....	65
6	Conclusions.....	68
7	References.....	71
	Part Two: Supporting Documentation.....	1
	TABLES.....	1
	APPENDICES.....	1
	APPENDIX A: SUMMARY OF THE NATURAL GAS DRILLING PROCESS.....	1
	APPENDIX B: NATURAL GAS DEVELOPMENT IN THE PICEANCE BASIN.....	1
	B1 Geology.....	1
	B2 Energy Development in the Piceance Basin: Past.....	3
	B3 Energy Development in the Piceance Basin: Present.....	3
	B4 Antero’s Plan in Battlement Mesa.....	4
	APPENDIX C: BATTLEMENT MESA BASELINE HEALTH PROFILE.....	1
	C1 Physical Determinants of Health.....	1
	C1.1 Methods.....	1
	C1.1.1 Cancer Data Methods.....	1
	C1.1.2 Inpatient Hospital Diagnoses Data Methods.....	3
	C1.1.3 Mortality Data Methods.....	4
	C1.1.4 Birth Outcomes Data Methods.....	4
	C1.2 Population/Demographics.....	5
	C1.3 Vulnerable populations.....	7
	C1.4 Cancer, Death, Birth, Hospital Inpatient Data.....	8
	C1.4.1 Cancer Data.....	8
	C1.4.2 Inpatient Hospital Diagnoses Data.....	11
	C1.4.3 Mortality Data.....	18
	C1.1.4 Birth Outcome Data.....	24
	C1.5 Health Data Gaps/Limitations.....	25
	C1.5.1 Cancer data.....	25
	C1.5.2 Inpatient hospitalization data.....	25
	C1.5.3 Mortality Data.....	26
	C1.5.4 Birth Data.....	26
	C1.6 Conclusions for Physical Health.....	26
	C2 Social Determinants of Health.....	27
	C2.1 Education/School Enrollment.....	27

C2.2 Crime	29
C2.3 Mental Health, Substance Abuse and Suicide:.....	31
C2.4 Sexually Transmitted Infections.....	33
C2.5 Limitations of Social Determinants of Health.....	37
C2.6 Summary and Conclusions for Social Determinants of Health.....	38
APPENDIX D: HUMAN HEALTH RISK ASSESSMENT	39
Attachments	40