

**Battlement Mesa HIA
Stakeholder Meeting**
Health Impact Assessment
Update
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Roxana Witter, MD, MSPH

Lisa McKenzie, PhD

Colorado School of Public Health

Overview of HIA

Health Impact Assessment

- identify health implications of proposed project (policy /program)
- advance decisions that support health
- offer recommendations and alternatives before final decisions are made
- proactive
- generate good health and cost savings
- decrease health costs
- decrease costs of remediation and retrofitting
- acknowledges trade-offs
- outlines ways to maximize health gains and minimize adverse effects.

HIA Process

- **Screening**
 - Policy/project
 - Potential to affect health
- **Scoping**
 - Outline for HIA
 - Health effects
 - Stakeholder concerns
- **Assessment/ Analysis**
 - Describe baseline health
 - Describe potential environmental exposures
 - Predict potential effects of policy/project, using best available data
- **Recommendations/ Implementation**
 - Highlight health risks, specific recommendations, health management plans
 - Implementation via education, regulations
- **Reporting**
 - Draft shared with decision makers, stakeholders.
 - Revised report released.
- **Monitoring and Evaluation**
 - Evaluate effectiveness of HIA / decision process
 - Intermediate outcomes (“what decision changes resulted?”)
 - Long term monitoring of outcomes rare in most HIA.

Battlement Concerned Citizens Request	Health Project	Data
Baseline health study	HIA	Existing
Baseline monitoring of air and water	HIA	Existing
Air, water, and soil quality monitoring	EHMS	New
Medical monitoring system	EHMS	New
Full disclosure of materials used in drilling and fracturing	HIA/EHMS	Existing/ New?
Test buffer zone	EHAMS	Existing/New

HIA for Resource Development Projects

- Another way of organizing the potential environmental exposures
- HEAT (Health Effects Assessment Tool)
 - Habitat Health Impact Consulting
 - Providing technical assistance
 - Pew funded
- Organization of mitigation recommendations

HEAT

11 components

- Land acquisition
- Transportation
- Labor and procurement
- Taxes/royalties
- Resource use
- Waste
- Fugitive dust and air emissions
- Chemicals and hazardous materials
- Project infrastructure and equipment
- Project security

HEAT

Common Health Issues

Resource
Development
Project



- Physical injuries/death
- Respiratory health
- Sexually transmitted disease
- Acute/chronic poisonings
- Chronic disease
- Effects on health care capacity

Example: Transportation

Influencing factors

- Type and frequency of local traffic
- Existing high danger spots
- Expected increase in traffic
- Type of vehicles to be used
- Hours/frequency of traffic



Intermediate outcomes

- Traffic accidents
- Noise and dust
- Vehicle emissions

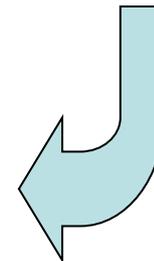
Potential health effects

- Minor to debilitating injury/death
- Respiratory/cardiac effects



Recommendations

- Reduce vehicle trips
- Δ Types of vehicles used
- Δ Routes/days/times for traffic
- Paving/cleaning roads



Visits with Antero

- April 22, Rifle
 - am operations, environmental geologist personnel; introduction of HIA and BM gas project
 - pm site visit tour of 4 gas production sites
 - drilling (Watson Ranch) , frac'ing, flow back, production
 - odors strongest during flow back
- April 27, Denver
 - operations, environmental personnel
 - review of Antero communications with BM
 - more on HIA
- May 5, Denver
 - environmental
 - discussion of air sampling and modeling
 - follow up with e-mails for CDPHE sampling plans and suggestions

EXPOSURE ASSESSMENT

- For human health to be impacted there needs to be a complete exposure pathway
- A chemical may be present – but a person must come in contact with the chemical for there to be a potential risk to health
- If a path way is complete, the amount of risk to health will depend on the amount of exposure
- Risk can be reduced by reducing exposure pathways and amounts.

EXPOSURE ASSESSMENT - DRILLING

Source	Potential Release		Affected Surface Media			Affected Sub-Surface Media				
			Ambient Air	Surface Soil	Surface Water	Shallow Groundwater	Subsurface Soil	Indoor Air	Deep Groundwater	
WELL	➔	Leaks	→	R			X	X	R	X
		Blow-outs	→	R	R	R	X	X	R	X
		Installation Errors	→	R			X	X	R	X
DRILLING MUD	➔	Spills	→	R	R	R	X	X	R	
		Leaks	→	R			X	X	R	X
		Installation Errors	→	R			X	X	R	X
DRILL CUTTINGS	➔	Infiltration	→				X	X	R	
		Surface Run-off	→		R	R				
		Evaporation	→	R						
WASTE WATER	➔	Infiltration	→				X	X	R	
		Surface Run-off	→	R	R	R				
		Evaporation	→	R						
TRUCKS AND GENERATORS	➔	Fuel Spills	→	R	R	R	X	X	R	
		Exhaust	→	R						

EXPOSURE ASSESSMENT FRAC'ING

Source	Potential Release		Affected Surface Media			Affected Sub-Surface Media			
			Ambient Air	Surface Soil	Surface Water	Shallow Groundwater	Subsurface Soil	Indoor Air	Deep Groundwater
WELL	Leaks	→	R			X	X	R	X
	Venting	→	R						
	Blow-outs/ Uncontrolled Releases	→	R	R	R	X	X	R	X
FRAC'ING FLUIDS	Spills	→	R	R	R	X	X	R	
	Leaks	→	R			X	X	R	X
	Venting	→	R						
WASTE WATER/FLUIDS	Infiltration	→				X	X	R	
	Surface Run-off	→	R	R	R				
	Evaporation	→	R						
TRUCKS AND GENERATORS	Fuel Spills	→	R	R	R	X	X	R	
	Exhaust	→	R						

EXPOSURE ASSESSMENT FLOWBACK

Source	Potential Release	Affected Surface Media			Affected Sub-Surface Media			
		Ambient Air	Surface Soil	Surface Water	Shallow Groundwater	Subsurface Soil	Indoor Air	Deep Groundwater
WELL	Leaks	R			X	X	R	X
	Venting	R						
CONDENSERS	Spills	R	R	R	X	X	R	
	Venting	R						
WASTE WATER/FLUIDS	Infiltration				X	X	R	
	Surface Run-off	R	R	R				
	Evaporation	R						
TRUCKS AND GENERATORS	Fuel Spills	R	R	R	X	X	R	
	Exhaust	R						

ACUTE EXPOSURE POTENTIAL

- Ambient Air
 - Flowback
 - Frac'ing
 - Drilling
- Surface Soil and Water
 - Run-off from pits
 - Spills
- Noise
 - Frac'ing
 - Drilling

CHRONIC EXPOSURE POTENTIAL

- Ambient Air
 - Production Activities
- Indoor Air
 - Subsurface infiltration from pits or spills
- Direct contact with groundwater not currently a complete pathway for Battlement Mesa residents – drinking water and irrigation water from Colorado River

CHEMICALS OF POTENTIAL CONCERN FOR HUMAN HEALTH

- Benzene
- Ethylbenzene
- Toluene
- Xylenes
- Alkanes
- Ozone
- Particulate Matter
- PAHs
- Carbonyls
- Chemicals in frac'ing and drilling fluids

Health Outcomes

Outcomes of concern

- Respiratory
 - COPD, asthma
- Cardiovascular
 - heart attack, arrhythmia, stroke
- Nervous system
 - seizure, head ache, nerve damage
- Ear, Nose, Throat (ENT)
 - sinus, upper airway irritation
- Cancer
 - Leukemia, lymphoma



Colorado Hospital Association
Grand River Hospital District?



Colorado Cancer Registry
(CDPHE)

Health Data Collection

- Colorado Hospital Association
 - hospital discharge data
 - CDPHE to provide analyzed data for health outcomes
 - calculate rates of COPD, asthma, etc in the BM/Parachute zip codes (81635, 81636)
- Grand River Hospital District
 - ER, outpatient data?

“Social” Outcomes

- Motor vehicle accidents
- Crime
- Sexually transmitted disease
- Mental Health
- Alcohol and drug abuse
- Schools/Education Impact
- Social services

Social Data Collection

- MV accidents data: Colorado State Patrol
 - Providing GC data from 2006-present
 - Locations by major intersection & “road codes” on state/interstate highways
 - Data as collected by Accident Report Form DR2447 (vehicle type, dui, fatal, hazmat)
- Crime: NIBRS Federal Database
 - Anecdotally utilized by most local law agencies
 - Aggregate city-level data online (1995-2009)
 - Contact at CO State Patrol attempting access raw data

Social Data Collection

- STD's: CDPHE
 - Received zip code level data for Chlamydia, gonorrhea, syphilis, HIV
- Mental Health: Colorado West Counseling
 - Providing emergency admission & outpatient data from 2003-Present
 - Zip code level?
- Alcohol & Drug Abuse: (Potential Sources)
 - Two Rivers Drug Task Force, Glenwood Springs
 - Local law enforcement agencies

Social Data Collection

- Schools/Education Impact: (Potential Sources)
 - CO Dept of Education
 - Literacy Outreach Program (Glenwood Springs)
 - Even Start Family Literacy Program (Glenwood)
 - Roaring Fork Family Resource Center (Basalt, Carbondale, Glenwood)
- Social Services: (Potential Sources)
 - GCPH Programs
 - GC Housing Authority
 - Advocates/Safe House Project (Glenwood)

Battlement Mesa/Parachute Zip Code

- 81635
 - Battlement Mesa and Parachute
 - 81636
 - Contract station used to be located in BM,
 - Battlement Mesa PO boxes
 - Compile Battlement Mesa and Parachute together
- 2000 census data
- Population information
 - Total population
 - Age groups
 - Male/female
 - Race/ethnicity
 - Population changes 2000-2010
 - best information available

Report and Recommendations

- Draft
 - September 15
 - may be in HEAT format
 - linked to BCC requests
 - with presentation
 - solicit comments
 - revise report based on feedback
- Final
 - October 31