

DRAFT MESA COUNTY ENERGY POLICY PLAN –PHASE 1  
Draft Mitigation Measures

07/25/2007

Sensitivity	Mitigation Measure	Description	Recommended or Mandatory
Transportation	Directional/Horizontal Drilling	<p><b>Directional/Horizontal Drilling</b> allows for multiple wells to be drilled from a common well pad.</p> <ul style="list-style-type: none"> <li>• Greatly reduces surface related impacts by minimizing the number of well locations and surface equipment necessary to service greater volumes of production, especially when employed with Consolidated Production Facilities techniques.</li> <li>• The geology and target production zone determines which drilling technology (directional or horizontal) will be employed.</li> <li>• Both technologies mitigate surface related impacts similarly.</li> </ul>	Recommended
Transportation	Three Phase Gathering	<p><b>Three Phase Gathering</b> allows for pipelines to be installed parallel to the natural gas gathering lines to take production liquids to centralized storage points rather than employ storage tanks at all well pad locations.</p> <ul style="list-style-type: none"> <li>• Can be used in conjunction with Consolidated Production Facilities to minimize the amount of production surface equipment in various locations in a specific area.</li> </ul>	Recommended
Transportation	Consolidated Production Facilities	<p><b>Consolidated Production Facilities</b> techniques consolidate production units and appurtenances on one well pad with common storage tanks.</p> <ul style="list-style-type: none"> <li>• Largely employed when directional or horizontal drilling is used to complete multiple wells from a common well pad.</li> <li>• In certain circumstances, even directional well pads may be further consolidated with others to allow for a common production facility to service several well pads.</li> </ul>	Recommended

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Transportation	SCADA/Telemetry	<p><b>Supervisory Control and Data Acquisition (SCADA)/Telemetry</b> systems are used to monitor and/or control processes within facilities remotely.</p> <ul style="list-style-type: none"> <li>• Can be employed at production, gathering and processing facilities to minimize transportation impacts due to typical personnel facility monitoring and control.</li> <li>• Allows for a rapid and remote response in the event of an adverse incident minimizing potential impacts while protecting the community and potential emergency response or company personnel.</li> <li>• Field activities can be better planned and more efficient due to remote monitoring capabilities.</li> <li>• Communication with cell towers, satellites, and other transmitters may limited employing this technology.(NOTE: locating new cell towers may require a Conditional Use Permit)</li> </ul>	Recommended
Transportation	Minimization of access points/driveways	<p><b>Minimization of access points/driveways</b> to County roads and State Highways.</p> <ul style="list-style-type: none"> <li>• Requires access permits from Mesa County or Colorado Dept of Transportation.</li> <li>• Minimizes traffic conflict points (intersections) with public roads.</li> <li>• Minimizes disturbance to private properties.</li> <li>• Minimizes stormwater runoff.</li> <li>• Minimizes potential weed propagation</li> <li>• Minimizes reclamation,</li> </ul>	MANDATORY ACCESS PERMITS REQUIRED

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Visual	Directional/Horizontal Drilling	<p><b>Directional/Horizontal Drilling</b> allows for multiple wells to be drilled from a common well pad.</p> <ul style="list-style-type: none"> <li>• Greatly reduces surface related impacts by minimizing the number of well locations and surface equipment necessary to service greater volumes of production, especially when employed with Consolidated Production Facilities techniques.</li> <li>• The geology and target production zone determines which drilling technology (directional or horizontal) will be employed.</li> <li>• Both technologies mitigate surface related impacts similarly.</li> </ul>	Recommended
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Visual	Color Selection	<p><b>Color Selection of Equipment</b> can mitigate visual impacts by blending in with the natural environment</p> <ul style="list-style-type: none"> <li>• Limited to areas with low to moderate visual impact potential</li> <li>• A minimum requirement for all drilling and conditional use permits to mitigate visual impacts in Mesa County.</li> </ul>	MANDATORY minimum standard
Visual	Camouflage	<p><b>Camouflage</b> techniques include, but are not limited to, constructing fake outbuilding structures around production or pipeline related equipment to blend in with the predominantly rural/agricultural setting.</p> <ul style="list-style-type: none"> <li>• can be employed to minimize scenic impacts in highly sensitive visual resource areas</li> <li>• structures must be designed and built to not only conceal the equipment they are housing but to ensure that the materials used for the construction do not pose a fire or safety risk to personnel, the environment or community.</li> </ul>	REQUIRES ON SITE INSPECTION TO DETERMINE APPLICABILITY

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Visual	Flowback Units	<p><b>Flowback Units</b> are used following the well enhancement or frac operations to remove water and frac sand from the production gas stream prior to tying the well into the gas gathering system.</p> <ul style="list-style-type: none"> <li>• Eliminates the need for open flaring into a flare pit or equivalent.</li> <li>• Allows for the natural gas to be captured rather than vented or flared into the atmosphere.</li> </ul>	Recommended

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Surface Water	SCADA/Telemetry	<p><b>Supervisory Control and Data Acquisition (SCADA)/Telemetry</b> systems are used to monitor and/or control processes within facilities remotely.</p> <ul style="list-style-type: none"> <li>• Can be employed at production, gathering and processing facilities to minimize transportation impacts due to typical personnel facility monitoring and control.</li> <li>• Allows for a rapid and remote response in the event of an adverse incident minimizing potential impacts while protecting the community and potential emergency response or company personnel.</li> <li>• Field activities can be better planned and more efficient due to remote monitoring capabilities.</li> <li>• Communication with cell towers, satellites, and other transmitters may limited employing this technology.(NOTE: locating new cell towers may require a Conditional Use Permit)</li> </ul>	Recommended

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Sensitivity	Mitigation Measure	Description	Recommended or Mandatory
Surface Water	Frac Tracing	<p><b>Frac Tracing</b> allows for the material used in the well frac operations to be traced to ensure that frac materials do not penetrate or impact an unplanned geological zone, especially areas of ground water. Well fracturing is performed in order to stimulate the production of natural gas.</p> <ul style="list-style-type: none"> <li>• Widely used and necessary in much of the Piceance Basin due to the very tight gas sands that contain the natural gas resource</li> <li>• Most applicable in areas highly sensitive to potential ground water impacts.</li> </ul>	Recommended
Surface Water	Lined Reserve Pit	<p><b>Lined Reserve Pits</b> are synthetically lined reserve pits for drilling and production fluids use to minimize potential unforeseen impacts to surface or ground water resources.</p> <ul style="list-style-type: none"> <li>• An additional level of protection compared to common unlined earthen reserve pits.</li> </ul>	MANDATORY minimum standard
Surface Water,	Closed Loop Drilling	<p><b>Closed Loop Drilling</b> eliminates need for a reserve pit for circulation water and drilling mud.</p> <ul style="list-style-type: none"> <li>• Most applicable in areas highly sensitive to potential ground water impacts</li> </ul>	Recommended
Surface Water	Secondary Containment	<p><b>Secondary Containment</b> systems are engineered systems with synthetic liners, used to minimize potential impacts to surface or ground water of possible spill or releases of materials at drilling and operations sites.</p> <ul style="list-style-type: none"> <li>• A standard operating procedure associated with energy development and production activities</li> <li>• Type of secondary containment is optional e.g., properly installed Sioux Steel Containment units or equivalent.</li> </ul>	Recommended

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Surface Water	Loadout Containment	<p><b>Loadout Containment</b> involves capturing residual material that may be left in the loadout lines or hoses used for transferring liquids from storage tanks to a water or condensate truck for site removal.</p> <ul style="list-style-type: none"> <li>• Production, compression and processing facilities generally contain storage tanks for production water and condensate.</li> <li>• Minimizes potential cumulative impacts associated with multiple spill events.</li> </ul>	MANDATORY minimum standard
Surface Water	Baseline Water Quality Surveys	<p><b>Baseline Water Quality Surveys</b> quantify water quality conditions prior to development activities.</p> <ul style="list-style-type: none"> <li>• Water quality surveys serve all parties beneficially to quantify water quality conditions prior to, during and following development activities taking place.</li> </ul>	MANDATORY minimum standard
Surface Water	Reclamation	<p><b>Reclamation</b> using native, weed-free seed mixes should be employed with all surface disturbing activities to prevent the spreading of undesirable or noxious plant species and to minimize visual, wildlife, and stormwater impacts caused from any kind of surface disturbing activity.</p>	MANDATORY minimum standard

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Ground Water	Frac Tracing	<p><b>Frac Tracing</b> allows for the material used in the well frac operations to be traced to ensure that frac materials do not penetrate or impact an unplanned geological zone, especially areas of ground water. Well fracturing is performed in order to stimulate the production of natural gas.</p> <ul style="list-style-type: none"> <li>• Widely used and necessary in much of the Piceance Basin due to the very tight gas sands that contain the natural gas resource</li> <li>• Most applicable in areas highly sensitive to potential ground water impacts.</li> </ul>	MANDATORY minimum standard

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Ground Water	Well Casing	<p><b>Well Casing</b> design and integrity is paramount in the protection of ground water resources.</p> <ul style="list-style-type: none"> <li>• Surface casing should be set at a depth to ensure protection and isolation of ground water resources.</li> <li>• Intermediate casing strings will be used if additional water zones are found to exist during drilling activities to isolate these zones as well from production zones.</li> <li>• Bradenhead gas monitoring of annulus in conjunction with a properly engineered casing ensures the mechanical integrity of well and the isolation of production from other subsurface resources.</li> </ul>	MANDATORY minimum standard
Ground Water	Cement Bond Logs	<p><b>Cement Bond Logs</b> are a written record to validate the integrity of a well cement jobs to protect subsurface resources from production or well completion impacts (muds, fluids, gases, etc.).</p> <ul style="list-style-type: none"> <li>• A proper cement job in conjunction with a properly engineered well casing can essentially eliminate the probability of commingling of resource zones (gas, water, etc.).</li> </ul>	MANDATORY minimum standard
Ground Water	Lined Reserve Pit	<p><b>Lined Reserve Pits</b> are synthetically lined reserve pits for drilling and production fluids use to minimize potential unforeseen impacts to surface or ground water resources.</p> <ul style="list-style-type: none"> <li>• An additional level of protection compared to common unlined earthen reserve pits.</li> </ul>	MANDATORY minimum standard
Ground Water	Closed Loop Drilling	<p><b>Closed Loop Drilling</b> eliminates need for a reserve pit for circulation water and drilling mud.</p> <ul style="list-style-type: none"> <li>• Most applicable in areas highly sensitive to potential ground water impacts</li> </ul>	Recommended

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Ground Water	Loadout Containment	<p><b>Loadout Containment</b> involves capturing residual material that may be left in the loadout lines or hoses used for transferring liquids from storage tanks to a water or condensate truck for site removal.</p> <ul style="list-style-type: none"> <li>• Production, compression and processing facilities generally contain storage tanks for production water and condensate.</li> <li>• Minimizes potential cumulative impacts associated with multiple spill events.</li> </ul>	MANDATORY minimum standard
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Noise	SCADA/Telemetry	<p><b>Supervisory Control and Data Acquisition (SCADA)/Telemetry</b> systems are used to monitor and/or control processes within facilities remotely.</p> <ul style="list-style-type: none"> <li>• Can be employed at production, gathering and processing facilities to minimize transportation impacts due to typical personnel facility monitoring and control.</li> <li>• Allows for a rapid and remote response in the event of an adverse incident minimizing potential impacts while protecting the community and potential emergency response or company personnel.</li> <li>• Field activities can be better planned and more efficient due to remote monitoring capabilities.</li> <li>• Communication with cell towers, satellites, and other transmitters may limited employing this technology.(NOTE: locating new cell towers may require a Conditional Use Permit)</li> </ul>	Recommended
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Noise	Flowback Units	<p><b>Flowback Units</b> are used following the well enhancement or frac operations to remove water and frac sand from the production gas stream prior to tying the well into the gas gathering system.</p> <ul style="list-style-type: none"> <li>• Eliminates the need for open flaring into a flare pit or equivalent.</li> <li>• Allows for the natural gas to be captured rather than vented or flared into the atmosphere.</li> </ul>	Recommended

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Noise	Insulated Enclosures	<p><b>Insulated Buildings or Enclosures</b> muffle noise from compression or processing facilities.</p> <ul style="list-style-type: none"> <li>• Required if a facility which generates noise cannot meet Colorado Oil and Gas Conservation Commission noise levels standards.</li> <li>• Also provides added protection from the elements and can increase equipment service life.</li> </ul>	Required if unable to meet Colorado Oil and Gas Conservation Commission noise levels standards without.
Noise	Hospital Grade Mufflers	<p><b>Hospital Grade Mufflers</b> or equivalent or encouraged to minimize noise impacts to neighboring landowners.</p> <ul style="list-style-type: none"> <li>• Colorado Oil and Gas Conservation Commission applicable noise standards will be strictly enforced.</li> </ul>	Recommended

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Odor	SCADA/Telemetry	<p><b>Supervisory Control and Data Acquisition (SCADA)/Telemetry</b> systems are used to monitor and/or control processes within facilities remotely.</p> <ul style="list-style-type: none"> <li>• Can be employed at production, gathering and processing facilities to minimize transportation impacts due to typical personnel facility monitoring and control.</li> <li>• Allows for a rapid and remote response in the event of an adverse incident minimizing potential impacts while protecting the community and potential emergency response or company personnel.</li> <li>• Field activities can be better planned and more efficient due to remote monitoring capabilities.</li> <li>• Communication with cell towers, satellites, and other transmitters may limited employing this technology.(NOTE: locating new cell towers may require a Conditional Use Permit)</li> </ul>	Recommended

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Odor	Combustion Units	<p><b>Combustion Units</b> are used at production facilities to minimize volatile emissions from locations but also work well at controlling potential odor impacts to nearby surface occupants.</p> <ul style="list-style-type: none"> <li>• Any well location with on-site production units and liquids storage within 1,000-feet of an occupied surface facility should employ this type of device to prevent potential odor related impacts.</li> </ul>	MANDATORY minimum standard

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Geotechnical Hazard Constraints (Steep slopes, mud slides, unstable slopes/soils, faults, earthquake epicenters, etc.)	Relocation of Development Site	<b>Relocation of Development Site</b> is often necessary to avoid geohazard areas.	REQUIRES ON SITE INSPECTION TO APPROPRIATE LOCATION

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Wildfire Hazards	Consultation with State Forest Service	<p><b>Consultation</b> with the Colorado State Forest Service on techniques to minimize the potential for facilities to be ignited by wild fire and for development activities and facilities to ignite surrounding vegetation.</p> <ul style="list-style-type: none"> <li>• Creation of defensible space around development sites and facilities is minimum treatment in most cases.</li> <li>• Applies to all lands rated as medium or higher wildfire hazard areas</li> </ul>	MANDATORY minimum standard

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Wildlife	Consultation with DOW	<b>Consultation</b> with the Colorado Division of Wildlife and/or the US Fish and Wildlife Service is required by the Colorado Oil and Gas Conservation Commission's rules and regulations.	MANDATORY minimum standard
Biological Resources	Consultation with Colorado Natural Heritage Program and/or The Nature Conservancy	<b>Consultation with Colorado Natural Heritage Program and/or The Nature Conservancy</b> is recommended to avoid, minimize or restore important biological resources (plant or animal).	Recommended