



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8**

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MAY 23 2008

Ref: EPR-N

Ms. Selma Sierra, State Director
Utah State Office, Bureau of Land Management
440 West 200 South, Suite 500
Salt Lake City, Utah 84101

Re: West Tavaputs Plateau Natural Gas Full Field
Development Plan, Draft Environmental Impact
Statement, Carbon County, Utah CEQ #20080028

Dear Ms. Sierra:

In accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA), 42 U.S.C. Section 4332(2)(C), and Section 309 of the Clean Air Act, 42 U.S.C. Section 7609, the U.S. Environmental Protection Agency Region 8 (EPA) has reviewed the West Tavaputs Plateau Natural Gas Full Field Development Plan, Draft Environmental Impact Statement (Draft EIS). The proposed action by the Bureau of Land Management (BLM) is to approve a proposal by Bill Barrett Corporation (Barrett) to drill and develop 807 natural gas wells on 538 well pads including the associated infrastructure needed for this new gas field on approximately 138,000-acre project area in Carbon County, Utah. Each well has the potential to produce natural gas for up to 20 years with the total life of the project expected to be 28 to 30 years. The Project includes a network of roads and pipelines, gas compression stations, and several man-camps needed to provide delivery of the natural gas.

EPA has participated as a cooperating agency in the preparation of this Draft EIS according to the provisions found at 40 CFR 1501.6. We appreciate the opportunity to participate in the development of alternatives, mitigation opportunities, and environmental analysis of the impacts from the proposed activity. We look forward to working with you on the issues we have identified that remain to be resolved before the Final EIS is completed.

While some drilling has occurred on the West Tavaputs Plateau in the past, the proposed action is a greatly expanded natural gas drilling program which will occupy unique and sensitive canyonlands including Nine Mile Canyon, a potential archaeological area of national significance. The project area is bounded on the east by the Desolation Canyon Special Recreational Management Area along the Green River. Drilling is expected to take place in both Jack Canyon and Desolation Canyon wilderness study areas (WSAs). Protecting these irreplaceable and unique resources will likely require a high level of commitment from the BLM to preserve the special character of this wild and remote plateau country.

The Draft EIS considers five alternatives in detail. The Preferred Alternative (Alternative E) includes 807 new wells with up to 540 acres of new surface disturbance per year. The drilling and completions would occur year-round with equipment and transportation access both from the north from Vernal and from the east from Price, Utah. The proponent's Proposed Alternative (Alternative A) is similar to the Preferred Alternative in that it consists of the same project components including these 807 additional wells. However, under the Preferred Alternative there will be more multiple completions resulting in 46 fewer pad locations. The Preferred Alternative would implement additional special protective measures including limiting use of some roads and, where feasible, no surface occupancy within either Jack Canyon or Desolation Canyon WSAs nor within canyon bottoms on Federal lands. In addition to the Proposed Alternative and Preferred Alternative, the Draft EIS considers two other action alternatives that differ primarily in areas where year-round development may occur. The Draft EIS also includes a No Action Alternative, which is based on the State of Utah approving drilling on lands owned by the state and privately-owned lands. As a result, the No Action Alternative would involve drilling 81 natural gas wells on 54 well pads.

EPA Region 8 has reviewed the Draft EIS and has discussed our concerns with BLM. Based on these conversations, it is our understanding that EPA and BLM share the primary concern regarding the lack of adequate air quality information and the potential for air quality impacts, especially ozone. Based upon our discussions with BLM, it is our understanding that BLM agrees that it will conduct additional air quality modeling and assessment. EPA believes that the additional modeling and assessment will resolve our concern and allow for a satisfactory Final EIS. Therefore the rating provided for this Draft EIS should not be construed as a disagreement between EPA and BLM regarding the path forward. The enclosed "Detailed Comments" provides more discussion of our concerns regarding these issues, as well as our comments on the proposal's impacts to visibility, fugitive dust, cultural resources, surface water quality and riparian areas, the adequacy of mitigation measures and information regarding greenhouse gas emissions.

Air Quality Information and Impacts – Ozone

On March 12, 2008, and thus subsequent to the publication of this Draft EIS, EPA changed the national ambient air quality standards (NAAQS) for ground-level ozone. EPA revised the 8-hour primary ozone standard, designed to protect public health, to a level of 0.075 parts per million (ppm). The previous standard, set in 1997, was 0.08 ppm (effectively 0.840 ppm).

Ozone impacts from the proposed action were estimated using the results of the impact analysis performed for the Pinedale Anticline Draft EIS from February 2007. The modeling was performed with the CALGRID photochemical modeling system in combination with one year of meteorological data. The Draft EIS indicates that since emissions resulting from the proposed action would be small compared to the projected county-wide emissions, the contribution of the proposed action would cause a very small portion of ozone increases. This is not necessarily accurate, however, since ozone formation is not directly proportional to the magnitude of

precursor emissions of volatile organic compounds (VOCs) and nitrogen oxides (NO_x). In addition to the quantity of emissions, ozone production is spatially and temporally dependent on the location of the emissions because these precursor emissions are altered by sunlight over time to form ozone. Further, the West Tavaputs-related emissions were not included in the prior CALGRID modeling analysis. Thus, the proposed conclusion that the project would cause very small ozone increases is not technically defensible. In particular, we are concerned there could be exceedances of this new ozone standard, since the modeling that was completed indicates that the fourth highest ozone concentration would be 75-77 ppb, which exceeds the level of the new 8-hour average ozone NAAQS, even without inclusion of the West Tavaputs-related emissions. Additionally, the closest monitor to this area at Vernal, Utah, showed ambient air with 68 ppb as the fourth highest ozone concentration during the summer of 2007. EPA is concerned about this level of air quality given the need to also accommodate additional oil and gas, oil shale, and tar sands cumulative source developments that are likely to occur within the same airshed while the area remains in attainment of the ozone NAAQS. It should also be acknowledged that the BLM in Wyoming produced a revised Supplemental Draft EIS for the Pinedale Anticline Project Area which did not include the CALGRID analysis due to concerns about the inaccuracy of the CALGRID analysis. Therefore, it is inappropriate to use the Pinedale CALGRID analysis to project emissions for the West Tavaputs Project.

EPA's Recommendation

In view of the lack of reliability of the ozone modeling performed for the DEIS, the omission of project-specific data from the model, and the ozone levels modeled and predicted for this proposed action, EPA concludes that additional cumulative and project-specific air impact modeling should be completed. If this additional modeling information indicates that this project would contribute to exceedances of the ozone standard, then EPA recommends additional air quality emissions controls be included in the EIS to mitigate these exceedances. EPA also recommends that BLM prepare a Supplemental Draft EIS that includes modeled demonstrations of both this project and cumulative pollutant emissions sources from other activities in the Uinta Basin demonstrating whether the proposed action will contribute to violations of the ozone NAAQS. EPA Region 8 has been providing comments on the BLM Vernal Field Office's cumulative impacts analysis of air quality in the Uinta Basin, known as the Uinta Basin Air Quality Study (UBAQS), which is slated to be completed in the next few months. (See letter dated February 8, 2008, to Bill Stringer, BLM Vernal Field Office, from Larry Svoboda, EPA Region 8.) If our comments on the UBAQS are adopted, the UBAQS work could be incorporated into the suggested Supplemental Draft EIS to fulfill the NEPA cumulative and project specific air impact modeling requirements for this project.

EPA commends BLM for the ozone mitigation currently proposed in the Draft EIS. It may be appropriate for the BLM to impose specific additional mitigation measures in order to further reduce the project's ozone precursor emissions to assure that this project avoids contributing to the exceedances of the NAAQS necessary to protect public health. Additional emission reductions may be essential to demonstrate

compliance with these standards if the result of the cumulative impacts analysis show modeled exceedances or that this project contributes to such exceedance.

EPA's Rating

EPA and BLM agree that additional air quality modeling will be done in order to provide the necessary information to rate this project. However, as a procedural step, it is EPA's responsibility, pursuant to Section 309 of the Clean Air Act, to provide an independent review and evaluation of the potential environmental impacts of this project based upon the information provided. In accordance with our policies and procedures for reviews under NEPA and Section 309 of the Clean Air Act, EPA is rating this Draft EIS as "Inadequate Information" or "3". This "3" rating indicates that the Draft EIS does not adequately assess the potential air quality impacts of the proposed project and EPA, therefore, is unable to assess the potential environmental impacts of this project. Specifically, the rating of "3" is based on the lack of adequate information from air quality modeling to disclose the predicted ozone concentration under varying emission scenarios. Additional air quality modeling and analysis should be completed and made available for public comment in a Supplemental Draft EIS. Based upon discussions between EPA and BLM, both agencies agree that the path forward will include BLM conducting additional air quality modeling and possibly additional air emission controls to further reduce the project's VOC and NO_x emissions. This additional information will allow EPA to evaluate the environmental impact of the proposed project. If the above issues cannot be resolved, this project could be a potential candidate for referral to the Council on Environmental Quality (CEQ). In addition to EPA's detailed comments on the Draft EIS, a description of EPA's EIS rating system is enclosed.

If you have any questions regarding our comments or this rating, please contact Larry Svoboda, Region 8 NEPA Program Director, at 303-312-6004, or Carol Campbell, Assistant Regional Administrator of Ecosystems, Protection and Remediation at 303-312-6340.

Sincerely,



Robert E. Roberts
Regional Administrator

Enclosures

cc: John Harja, Public Lands and Policy Coordination, Salt Lake City
Rick Sprott, Utah Department of Environmental Quality, Salt Lake City
Bill Stringer, BLM, Vernal
Mike Stiewig, BLM, Price

**Detailed Comments by the Region 8 Environmental Protection Agency for the
Draft Environmental Impact Statement (Draft EIS)
West Tavaputs Plateau Natural Gas Full Field Development Plan
Carbon County, Utah**

Air Quality Impacts – Visibility

The visibility impairment assessment used for this analysis relies on a first-level seasonal screening methodology with the CALPUFF model following the Federal Land Managers' Air Quality Related Workgroup (FLAG 2000) methodology document. EPA is concerned about application of the FLAG screening criteria and which FLAG Method (2 or 6) was used for this analysis. Further, the purpose of the daily refined analysis as referenced in the Draft EIS is not clear. The visibility analysis showed no adverse impacts to Federal Class I areas; however the Preferred Alternative would cause significant visibility impairment to Sensitive Class II areas including the Ouray National Wildlife Refuge (57 days per year) and Dinosaur National Monument (4 days per year).

EPA's Recommendation:

EPA believes the specific FLAG Method should be specified in a Supplemental Draft EIS as well as details associated with the daily refined analysis. Given the relative proximity of Sensitive Class II areas near this project, additional NO_x mitigation beyond the strategies already described in the Draft EIS should be considered to reduce the degree of visibility impairment in the sensitive Class II areas noted above.

Air Quality – Ozone Analysis

The Draft EIS discloses summary results from air modeling (CALGRID) conducted for the proposed Pinedale Anticline project and other cumulative emission sources. This analysis did not use the emissions from this project, but rather used a qualitative comparison of ozone impacts by comparing the size of the West Tavaputs project to the much larger Pinedale Anticline project, thus concluding that the impacts must be less at the West Tavaputs than at Pinedale. With predicted ozone concentrations at or above the new ozone standard and the observation that the Vernal, Utah, air monitoring station indicated ozone concentrations at 0.068 ppm last summer, EPA is concerned with the health impacts associated with the projected 0.075 and 0.077 ppm ozone concentrations with this proposed project.

EPA's Recommendation:

EPA recommends that BLM update the ozone (O₃) analysis using a photochemical grid model such as CAMx or CMAQ. The suggested Supplemental Draft EIS should also include modeled demonstrations that the proposed action will not incrementally contribute to violations of a NAAQS. In view of the ozone levels modeled, predicted and monitored, and depending on the results of the supplemental air quality

modeling, BLM may need to develop additional air quality mitigation to reduce NO_x sources and other ozone forming precursors such as volatile organic compounds (VOCs) and formaldehyde.

The Four Corners Task Force, with input from Industry, Federal, State and local agencies, has summarized several emission control strategies including Best Management Practices (BMPs) that could be incorporated into the suggested Supplemental Draft EIS. For example, it would be appropriate to have the company include EPA's Natural Gas Star BMPs for ozone reduction. These BMPs would include avoiding the use of high-bleed pneumatic devices, as these valves will release VOCs and methane, and the installation of flash tank separators on proposed dehydration systems and produced water separators. In addition, consideration should be given to using lower NO_x emitting drill rig engines (Tier III or Tier IV) and centralized condensate collection systems to reduce mobile source emissions. Applying these BMPs also increases the amount of natural gas obtained from the project and thus is consistent with BLM's objective of assuring maximum hydrocarbon resource recovery from these federally-issued natural gas leases. We commend BLM for requiring vapor recovery at most facilities, and flaring where vapor recovery is not feasible and thus necessary, as mitigation measures to be applied to the proposed action, Alternative E. (Draft EIS at page 2-118.)

Air Quality – Particulate Matter Analysis

The table on Page 5-9 of the Draft EIS displays the near-field air quality conditions due to the project and estimated cumulative impacts. There is concern regarding particulate matter at the 2.5 micron size (PM_{2.5}) because the project modeling indicates that predicted impact from this project would add 9 ug/m³ to the estimated background level of 25 ug/m³. Assuming that the estimated background level is accurate, this would result in a near-field concentration of 34 ug/m³, which would be close to exceeding the NAAQS 24-hour PM_{2.5} limit of 35 ug/m³. EPA is also concerned about the use of and basis for the estimated background level for PM_{2.5}. The remoteness of the area and the large distance to monitoring stations make it extremely difficult to reliably estimate the area's background concentration of particulate matter.

EPA's Recommendation:

EPA recommends BLM update the particulate matter section with more current monitoring data and also identify all background concentration data locations and periods of measurement. The cumulative air quality impact analysis should be re-evaluated for any background data changes. Any adverse impacts to an air quality standard should be addressed with effective mitigation control measures. These control measures may include combustion source emission control, additional road dust abatement and control, or other means as long as those measures are protective of the region's cultural resources.

Impacts to Cultural Resources

Access into to the project area will be through the nationally significant Nine Mile Canyon road, which is a proposed Special Recreational Management Area. This area contains cultural resource properties that BLM has determined are eligible for the National Register of Historic Places managed by the National Park Service. The BLM expects the direct impacts to these unique cultural resources will be avoided by proper road and pipeline location and by compliance with certain pre-construction cultural resource plans.

As noted in the Draft EIS, some rock art panels adjacent to the Nine Mile Canyon Road have become obscured by the accumulation of dust (Draft EIS at page 4-129.) The indirect impacts that result from vehicle-induced dust and the use of dust suppressants on these roads could exacerbate this problem. Heavy vehicle traffic due to energy development is the primary means of pulverizing the otherwise hard surfaces of these roads, releasing fine particles that would not be disturbed by lighter, non-commercial, vehicles. (Appendix G, Dust Study, page 5.)

The Draft EIS does not explain how the impairment of these irreplaceable sites will be avoided or reduced. The Draft EIS lists several road maintenance options: 1) use of fresh water for dust suppression, 2) use of magnesium chloride, 3) the use of dust suppressing enzymes, or 4) the placement of hard surfacing such as asphalt or chip seal (Draft EIS at page 2-37). The Draft EIS, however, does not provide specifics regarding where each of these options might be appropriate and does not acknowledge the shortcomings of certain options.

The rock art dust study concluded that the accumulation of dust on rock art panels adjacent to roads has deleterious effects, not only on the visual aesthetics of these panels, but may also present a potential risk to their physical integrity. Physical integrity may be affected when dust particles cause an increase in moisture leading to additional freeze-thaw micro-erosion on the rock art panel. This dust study indicates that the potential risk to physical integrity may also result from chemical changes caused by magnesium chloride ($MgCl_2$) that has been used for dust suppression in the canyon. Physical integrity of rock panels may be affected by $MgCl_2$ as this salt lowers the freezing point and thus may result in a change in the number of freeze-thaw cycles when both moist dust and salts are deposited on a rock art panel.

It should be noted that EPA's risk assessment of toxicity of dust suppressants involves testing these compounds for effects upon invertebrate aquatic organisms.¹ EPA analyses of dust suppressant products, however, have not been evaluated with respect to potential damage to material properties such as aesthetic or physical changes in cement, marble or granite sculpture, or to rock art in its native setting.

¹ See, for example, "Environmental Technology Verification, Dust Suppressant Products" Midwest Industrial Supply, Inc, January 2006.

EPA's Recommendation:

EPA has no authority regarding cultural resource protection. Section 106 of the National Historic Preservation Act requires that federal agencies consider the effects of federal undertakings on historic properties and resolve adverse effects prior to approving the undertaking. We recommend that BLM consults with the National Park Service regarding the development of a specific dust abatement plan that will protect these cultural resources. Since MgCl₂ could have an additional deleterious effect on the physical integrity of these panels, avoiding the use of this compound appears to be essential.

Because the reference in the Draft EIS to "EPA-approved" dust suppressants may be misleading, the EIS should include information that EPA's approval relates solely to the aquatic toxicity of these products and does not imply that the use of that dust suppressant would not have an adverse effect upon either the aesthetic or physical properties of rock art panels.

Surface Water, Water Quality, and Aquatic Habitat

Protecting the area's streams is particularly vital because Nine Mile Creek serves as habitat for endangered fish species at its confluence with the Green River. With respect to produced-water management, the proposed action would include transport of produced waters to several lined evaporation and storage ponds. Such ponds have a risk of failure due to rapid changes in temperatures affecting the synthetic materials used to line the ponds. Another means of produced-water management would be through the use of underground injection, which is regulated under the Safe Drinking Water Act (42 U.S.C. 300h *et seq.*) Underground injection does not involve a risk of surface failure if properly managed. If properly completed with mechanically sound wells, injection offers a more permanent solution preferable to surface ponding. Rapid response time is critical to effective spill management and contaminant avoidance. Should a spill of diesel fuel, toxic hydraulic fracturing fluid, or produced water occur, prevention of that spilled materials movement into an aquatic habitat is essential, especially in the ecologically-critical Nine Mile Creek.

EPA's Recommendation:

We suggest that certain improvements in produced-water management and spill response measures will help assure this aquatic habitat remains unimpaired during project activities. EPA recommends that the suggested Supplemental Draft EIS describe the suitable receiving aquifers, the relative costs, and environmental risk differences between evaporation ponds and underground injection to manage these produced water wastes. Additional information is needed to identify the anticipated spill response time. This information should also address the feasibility of pre-positioning spill containment materials in the canyon to reduce response time. This analysis should further explain the

company's capabilities on the isolated plateau to effectively respond and clean up any toxic spill should one occur.

Greenhouse Gas Emissions

EPA believes the greenhouse gases section in the EIS should be expanded, keeping in mind that there are currently no EPA regulatory standards directly limiting greenhouse gas emissions.² Methane represents 8 percent of the U.S. greenhouse gas emissions after accounting for it being approximately 20 times more effective as a greenhouse gas than carbon dioxide. Oil and natural gas systems are the biggest contributor to methane emissions in the U.S., accounting for 26 percent of the total. (See: EPA's Natural Gas Star Program and the [US Emissions Inventory 2007: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005](#).)

The Draft EIS indicates that about 500,000 tons per year of CO₂ and about 2,000 tons per year of methane will be released from the proposed project. Since methane results in about 20 times the heating trapping consequences of CO₂, the resulting emissions would be approximately 540,000 tons of carbon dioxide equivalent (CO_{2e}). (See Draft EIS at Appendix J, page 5.)

EPA's Recommendation:

EPA recommends that the cumulative impacts analysis be revised to include a comparison of the annual projected greenhouse gas emissions from the proposed project to annual emissions from other existing and reasonably foreseeable future sources of regional greenhouse gas emissions. This comparison will enable the decision makers to better understand the magnitude of the greenhouse gases associated with the proposed project and the extent to which their decision making on the proposed project may affect regional greenhouse gas emissions. EPA also recommends a comparison to national and global GHG emissions. Emissions of greenhouse gases in the United States have been quantified by the U.S. Department of Energy and EPA in publications released in 2007 and global emissions have been quantified by the United Nations Intergovernmental Panel on Climate Change. As a final point of comparison, EPA recommends including a greenhouse equivalencies calculator to translate greenhouse gas emissions from the project in terms that are easier to conceptualize. For example, a comparison of emissions to a range of other greenhouse gas emitting activities or sectors (www.epa.gov/solar/energy-resoures/calculator.html.) In addition, EPA recommends that

² Since the issuance of the April 2, 2007 Supreme Court decision in *Massachusetts v EPA*, 127 S Ct 1438 (2007), EPA has been developing a response to the remand as well as evaluating the broader ramifications of the decision throughout the Clean Air Act (CAA). On March 27, 2008, the Administrator announced that he has directed his staff to draft an Advanced Notice of Proposed Rulemaking (ANPR) to discuss and solicit public input on the specific effects of climate change and the interrelated issues raised by the possible regulation of greenhouse gas emissions under the CAA. Thus, this comment letter does not reflect, and should not be construed as reflecting, the type of judgment that might form the basis for a positive or negative finding under any provision of the CAA.

the cumulative impacts analysis also include a general, qualitative discussion of the anticipated effects of climate change, including potential effects at a regional level. The EIS also should identify possible mitigation measures that may be implemented to reduce and capture methane gas and reduce potential greenhouse gas emissions. There are a number of voluntary, cost-effective technologies and practices to reduce and off-set greenhouse gas emissions. We recommend that BLM encourage gas lessees to participate in EPA's Natural Gas STAR Program (www.epa.gov/gasstar). The Natural Gas STAR Program is a flexible, voluntary partnership between EPA and the oil and gas industry. Through EPA's Natural Gas STAR Program, EPA works with companies that produce, process, transmit and distribute natural gas to identify and promote the implementation of cost-effective technologies and practices to reduce emissions of methane.

Accountability for Implementation of Effective Mitigation Measures

The Draft EIS discloses the significant and unanticipated impacts to air quality and cultural resources that have occurred since gas development has occurred on the West Tavaputs Plateau. Given the potentially significant air quality impacts that may occur from the development of the 807 producing gas wells, EPA believes that a Supplemental Draft EIS should identify effective and enforceable mitigation strategies to ensure environmental and public health protection. EPA recommends the mitigation plan include a mechanism for public accountability, such as stakeholder forums and/or annual status reports. Public accountability can be an important tool in ensuring mitigation targets are met in a timely manner.

Specific Comments by page

1. Page 3-18, ambient air data should be updated with data at least through 2006. Also, identify ambient air monitoring stations for data depicted in Table 3.3-3.
2. Page 3-25, deposition data should be updated through 2006 in Tables 3.3-6 and 3.3-7.
3. Page 3-26, please identify origin(s) and year(s) measured of data presented in Table 3.3-8.
4. Pages 3-26 through 3-31 should be updated to reflect the IMPROVE data measured through 2006. For Numbers 1-4 above, Ambient Monitoring Data can be found at these locations:
<http://www.epa.gov/air/data/index.html>
<http://www2.nature.nps.gov/air/monitoring/ads/adsreport.cfm>
<http://vista.cira.colostate.edu/views/>
<http://nadp.sws.uiuc.edu/>
5. In the DRAFT EIS Volume IV, Appendix J - Total VOC emissions are presented for three of the Alternatives:
 - a. Proposed Action = 6,044 tpy
 - b. No Action = 479 tpy
 - c. Preferred = 837 tpy

6. Appendix J Air Emissions Inventory

- a. The VOC emission rate for the Proposed Action Storage Tank is considerably higher than the Preferred Action's Storage Tank emission rate. It is unclear why the VOC emissions are different.
- b. It appears that VOC emission estimates from pneumatic devices or gas-pneumatic methanol injection pumps have not been included in the inventory. Will either gas-pneumatic device be used?
- c. The VOC flash emissions from condensate storage tanks are provided and are proportional to the production in barrels per day. The estimates used 1.5 bbl/day for Alternative A and 1.0 bbl/day for Alt. E. What is the basis for this difference?
- d. To estimate condensate storage tank emissions at well sites, a liquid sample from the existing compressor station was used. However, this would presumably be after flashing has occurred. We recommend obtaining a pressurized liquid sample at the outlet of the separator for a more representative factor in estimating the condensate storage tank emissions.
- e. The proposed mitigation is to flare at every well site to control emissions from the condensate tanks and dehydrators. Vapor recovery should be considered rather than flaring, as this would conserve the amount of natural gas recovered. While we believe it is reasonable to assume 95% destruction efficiency for a flare, they should be equipped with continuous temperature monitor on the pilot flame and auto-igniters to assure this rate of destruction.
- f. For the well site dehydrators estimated, a lifetime average of throughput was used. Section 2.1.5.1 indicates initial flows of 2-4 MMscfd for shallow wells and 8 MMscfd for deeper wells, but this estimate used only 0.384 MMscfd for each well. While production will decline over time, drilling 128-168 wells/year appears to indicate that a higher throughput should be used.
- g. For estimating emissions from Completion Flare Emissions, they used two days, but Section 2.1.3 indicates it will take about 29 days per shallow well and 54 days per deeper well for completion activities.
- h. The emissions inventory uses 2.0 g/hp-hr for carbon monoxide and slightly less emission rate for NOX. How will these relatively low emission rates be achieved? The EIS should specify what engines will be selected, such as lean burn with oxidation catalytic engines or rich burn with non-selective catalytic reduction.