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## Western Environmental Law Center

November 4, 2013

*Sent via Electronic Mail (appeal only) and Certified Mail, Return Receipt (protest and exhibits)*

Appeals Deciding Officer  
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**Re: Appeal of the San Juan National Forest Final Oil and Gas Leasing Availability Decision**

Dear Appeals Deciding Officer:

The Western Environmental Law Center along with San Juan Citizens Alliance, Natural Resources Defense Council, National Parks Conservation Association, Earthworks, and Sheep Mountain Alliance (together “Conservation Groups”) submit the following Appeal regarding the San Juan National Forest Final Oil and Gas Leasing Availability Decision (hereinafter “Decision”). The Decision is closely tied to the joint San Juan National Forest and Tres Rios Field Office Land and Resource Management Plan (“LRMP”), the collective authorizations for which share a Final Environmental Impact Statement (“FEIS”), covering three related, but separate, records of decision. This revised joint LRMP and FEIS replaces the 1983 San Juan National Forest Land and Resource Management Plan and the 1985 San Juan/San Miguel Resource Management Plan.

The Bureau of Land Management (“BLM”) and U.S. Forest Service (“USFS”) have prepared the LRMP and FEIS jointly, providing a framework for the future management direction of lands administered by the Tres Rios Field Office (“TRFO”) and San Juan National Forest (“SJNF”), comprising eleven counties in southwest Colorado and covering a 3-million-acre planning area and a 2.37 million acre oil and gas leasing area. Conservation Groups have consistently participated in the planning process for the LRMP and FIES – specifically by submitting comments on April 11, 2008 regarding the Draft EIS, and again on November 25, 2011 regarding the Supplement to the Draft EIS, both of which are incorporated herein by this reference – and have interests that are adversely affected by planning decisions made in the FEIS. *See* 43 C.F.R. § 1610.5-2. According to the FIES, “[t]he USFS considers leasing

availability decisions to be separate from but closely linked to planning decisions, with both planning- and project-level components. Oil and gas leasing is analyzed together for both agencies in this FEIS.” FEIS at 1. Consequently, Conservation Groups’ concerns regarding the USFS oil and gas leasing availability decision in this appeal closely relate, and, thus, follow our concerns related to the LRMP decisions by the two agencies.

The **Western Environmental Law Center** (“WELC”) uses the power of the law to defend and protect the American West’s treasured landscapes, iconic wildlife and rural communities. WELC combines legal skills with sound conservation biology and environmental science to address major environmental issues in the West in the most strategic and effective manner. WELC works at the national, regional, state, and local levels; and in all three branches of government. WELC integrates national policies and regional perspective with the local knowledge of our 100+ partner groups to implement smart and appropriate place-based actions.

Founded in 1986, **San Juan Citizens Alliance** (“SJCA”) organizes people to protect our water and air, our lands, and the character of our rural communities in the San Juan Basin. SJCA focuses on four program areas: 1) *Wild San Juans Campaign*, preserving the San Juan National Forest lands and adjacent areas; 2) *Dolores River Campaign*, protecting the Dolores River watershed; 3) a *River Protection program*, safeguarding river flows and water quality in the San Juan basin; 4) *San Juan Basin Energy Reform Campaign*, ensuring proper regulation and enforcement of the oil, gas, and coal industry and transitioning to a renewable energy economy. SJCA has been active in BLM and National Forest oil and gas issues in southwest Colorado since the early 1990s, and has commented on virtually every multi-well drilling program, lease sale, and programmatic environmental review conducted in the region by the federal land management agencies since the early 1990s. SJCA’s members live, work, and recreate throughout the San Juan Basin and San Juan Mountains. SJCA’s members’ health, use and enjoyment of this region is directly impacted by the decisions identified in this protest.

The **Natural Resources Defense Council** (“NRDC”) is a non-profit environmental membership organization with more than 565,000 members throughout the United States, including thousands in Colorado. NRDC members use and enjoy public lands across the country, including those in the San Juan National Forest and within BLM’s Tres Rios Field Office. With its nationwide membership and a staff of lawyers, scientists, and other environmental specialists, NRDC plays a leading role in a diverse range of land and wildlife management and resource development issues. In particular, NRDC has had a longstanding and active interest in the protection of public lands and national forests, the responsible development of oil and gas resources, and the protection of public health from environmental threats.

The mission of the **National Parks Conservation Association** (“NPCA”) is to protect and enhance America's National Parks for present and future generations. NPCA believes that America's national parks and historical sites embody the American spirit. They are windows to our past, homes to some of our rarest plants and animal species, and places where every American can go to find inspiration, peace, and open space. But these living, breathing monuments to our nation's history, culture, and landscape need care and support to overcome the many dangers that threaten to destroy them forever. At the NPCA, we work every day to ensure our national parks get that vital care and support.

**Earthworks** is a nonprofit organization dedicated to protecting communities and the environment from the impacts of irresponsible mineral and energy development while seeking sustainable solutions. Earthworks stands for clean water, healthy communities and corporate accountability. We're working for solutions that protect both the Earth's resources as well as our communities.

**Sheep Mountain Alliance** is a grassroots citizen's organization dedicated to the preservation of the natural environment in the Telluride region and Southwest Colorado.

**STATEMENT OF REASONS  
IN SUPPORT OF CONSERVATION GROUPS' APPEAL OF THE UNITED STATES  
FOREST SERVICE, SAN JUAN NATIONAL FOREST, OIL AND GAS LEASING  
AVAILABILITY DECISION:**

Conservation Groups' appeal is focused on impacts to the planning area from oil and gas development authorized by BLM and USFS (the "agencies") action, and are specifically concerned with impacts to air quality, greenhouse gas ("GHG") emissions, water resources, and other land use values in the planning area. Regarding the USFS oil and gas leasing availability decision, in particular, Conservation Groups are also concerned about the agency's execution of its multiple use mandate, as discussed below. We recognize that the agencies have taken many pioneering steps in addressing impacts to these resource values, and Conservation Groups wish to commend the agencies for this effort. There are, however, several areas where additional analysis and/or conservation measures are warranted, as discussed in detail below.

**I. The Agencies have Failed to Appropriately Balance Multiple Use Values in the Planning Area, Improperly Elevating Oil and Gas Above Other Critical Resources.**

As a threshold matter, and particularly critical to the USFS's final oil and gas leasing availability decision – which will make “approximately 1,279,811 acres of the National Forest System land administratively available for oil and gas leasing,” which is approximately 95% of the total available acres – Conservation Groups have serious reservations relative to the USFS's application of its multiple use mandate and the implications of oil and gas leasing on the planning area's myriad surface use values. With the advent of new drilling technologies and greater extraction processes, previously unleased National Forest lands have become attractive development prospects; indeed, such development pressures have been acknowledged throughout the FEIS. While the USFS may require No Surface Occupancy (“NSO”) stipulations for any lease – which the agencies have required for certain lands in the planning area – in the absence of this protection, mineral development brings with it road and infrastructure construction, as well as other surface disturbing activities. However, the USFS's “multiple use, sustained yield” mandate, as well as changes to resource management statutes, may create a mandatory standard in the context of oil and gas development, which, here, the agency has ignored.

Both the USFS and BLM are guided by similar, but not identical, “multiple use, sustained yield” mandates. Under the multiple use principle, agencies balance the many, and often

competing, land resources in a National Forest or on BLM land, while sustained yield requires the agencies to control “depleting uses over time.” *See Norton v. S. Utah Wilderness Alliance*, 542 U.S. 55, 58 (2004) (describing BLM’s multiple use, sustained yield mandate under the Federal Land Management Policy Act (FLPMA)). Under this principle, “the optimal level of a use is the highest level sustainable in the long run that does not diminish (and ideally increases) the sustained yield of other resources.”<sup>1</sup>

BLM maintained control over oil and gas resources on USFS land until Congress gave USFS veto authority over oil and gas drilling in 1987. *See* Federal Onshore Oil and Gas Leasing Reform Act (“FOOGLRA”) of 1987, 30 U.S.C. § 181 *et seq.* Unlike BLM lands, however, the USFS may only balance renewable surface uses – and not oil and gas – under its multiple use mandate. Congress was clear in the Multiple Use Sustained Yield Act (“MUSYA”) and the National Forest Management Act (“NFMA”) that national forests were established and administered for outdoor recreation, wilderness, range, timber, watershed, and wildlife and fish purposes. 16 U.S.C. §§ 528, 1604(e)(1). Reading the Forest Service’s obligations under NFMA and MUSYA literally, USFS is not authorized to balance leasable mineral resources – including oil and gas – against its permissible renewable resources when developing a LRMP.

Indeed, no statute authorizes USFS to promote or even consider oil and gas as co-equal resources in an LRMP, as the agencies have done, here. However, the Forest Service still has the opportunity, and, in fact, obligation to follow the plain language of its multiple use mandate and elevate surface resource values, such as wilderness and wildlife, above favored mineral commodity development.

Although courts are generally deferential to BLM and USFS regarding multiple use decisions, no court has examined whether either agency may consider an unauthorized, non-compulsory, major use. MUYSA, and later NFMA, made clear that forests must be administered for “outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness” resources. *See, e.g.*, 16 U.S.C. § 528; 16 U.S.C. § 1604(e)(1); 16 U.S.C. § 1604(g)(3)(A); *Ctr. For Sierra Nevada Conservation v. U.S. Forest Serv.*, 832 F. Supp. 2d 1138 (E.D. Cal. 2011). Unlike BLM’s multiple use, sustained yield mandate, nonrenewable resources, including oil and gas, are noticeably absent from the Forest Service’s administrative command.

MUYSA did address mineral uses, but, critically, did not authorize USFS to consider oil and gas as a seventh multiple use, equal to other resource values. MUYSA is clear that nothing within its multiple use, sustained yield mandate should be construed to affect the use or administration of mineral uses within Forest Service land. *See* 16 U.S.C. § 528.

As noted above, Congress eventually gave USFS greater control over oil and gas resources in 1987. *See* 30 U.S.C. § 226(g)-(h). Under FOOGLRA, the USFS has complete regulatory authority over oil and gas surface disrupting activities on Forest System lands; 30 U.S.C. § 226(g), and BLM may not issue any lease on National Forest lands over the Forest Service’s objection, 30 U.S.C §§ 226(h); 43 C.F.R. §§ 3101.7–1, 3101.7–2. As BLM has

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<sup>1</sup> PAUL CULHANE, PUBLIC LANDS POLITICS 126 (Resources for the Future, John Hopkins University Press) (1981).

discretion to issue an oil and gas lease so long as the Forest Service consents, under FOOGLRA, the Forest Service has discretion over leasing on its lands. Here, the Forest Service has made the decision to make the overwhelming majority of the forest available for leasing despite clear indications that doing so conflicts with its multiple use mandate. Specifically, the TRFO/SJNF acknowledged that “[t]he availability of a potential wilderness area is conditioned by the value of the wilderness resource, when compared to the value of, and need for, other resources. Examples of values that may conflict with wilderness values include oil and gas potential and exploration.” FEIS at 546.

Critically, while FOOGLRA did not state what standards should apply to USFS decisions to authorize oil and gas leasing, or how these decisions should fit within the Forest Service’s planning framework, federal courts have ruled that developers cannot compel the USFS to authorize oil and gas leasing. *See Rocky Mountain Oil & Gas Ass’n v. U.S. Forest Serv.*, 12 F. App’x 498, 500 (9<sup>th</sup> Cir. 2001) (unpublished). Indeed, an individual project may proceed only if it is consistent with the governing forest plan, and the forest plan must give co-equal consideration to “outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness.” 16 U.S.C. §§ 1604(e)(1), 1604(i). Notably absent from these values is mineral development, and although Congress did not assign weight among those six resources, when NFMA is read with FOOGLRA and the rest of the Mineral Leasing Act, it did assign those resources greater weight than oil and gas development projects. This interpretation is further supported by the Forest Service’s duty to protect against “depredations” upon the National Forests. 16 U.S.C.A. § 551; *see also* 36 C.F.R. § 228.102.

While at least one forest district is entirely closed to oil and gas development, *see e.g. Rocky Mountain Oil & Gas Ass’n v. U.S. Forest Serv.*, 157 F. Supp. 2d 1142, 1143 (D. Mont. 2000) *aff’d*, 12 F. App’x 498 (9<sup>th</sup> Cir. 2001) (upholding the Forest Service’s decision not to issue oil and gas leases in the Rocky Mountain Division of the Lewis and Clark National Forest), here, SJNF has elevated its consideration of oil and gas development, rooting its promotion of energy development in “the federal government’s policy to foster and encourage private enterprise in the orderly development of domestic mineral resources.” SJNF Record of Decision for Oil and Gas Leasing Availability (Sept. 2013) (hereinafter “Leasing ROD”) at 6. For example, the SJNF Oil and Gas Leasing ROD provides that “[t]he purpose of this decision is to facilitate the ultimate production of energy resources.” *Id.* The Forest Supervisor’s decision continues, noting that of the 1,279,811 acres of SJNF available for leasing, this decision will immediately allow consideration of “approximately 360,000 acres of land for which expressions of interest in leasing [already] have been submitted by private entities.” *Id.* Notably, at least some of this land has been made available despite competing wilderness values, with the agencies acknowledging that the availability of “potential wilderness” is conditioned on “oil and gas potential and exploration.” FEIS at 546.

The elevation of oil and gas development above competing priorities would have myriad impacts on the other uses and resource values, as well. For instance, the FEIS acknowledges that oil and gas development could lead to water depletions that would “reduce fishery habitat available for use, increase sediment production, and result in degraded fishery habitat” as well as potentially leading to “salinity and water contamination from petroleum products, drilling mud, and other contaminants.” FEIS at 244. Yet the LRMP admits that, already, “the ability to support

healthy, self-sustaining populations of fish and other aquatic biota has been reduced in a number of the streams and rivers located within the planning area.” LRMP at 56. USFS cannot comply with its multiple use mandate while authorizing oil and gas leasing and development that would so dramatically undermine other uses that the Service is statutorily required to prioritize, including watershed, and fish and wildlife resources.

The determination to allow widespread oil and gas leasing and development also fails to protect groundwater resources. The FEIS acknowledges that the water used for this development would likely come from within the planning area, and that the withdrawals could “place pressure on existing domestic, municipal, and agricultural groundwater uses at a time period when municipal demand for water is expected to grow.” FEIS at 279. In fact, the FEIS states that some portions of the Fruitland Formation could be “effectively dewatered” by widespread energy development. FEIS at 269. The Forest Service cannot reasonably choose to prioritize oil and gas development in this way, nor is doing so consistent with its mandate to manage the forest for the *sustained* yield of its resources.

No legislative mandate directs or even permits USFS to take an amorphous energy promotion policy into account when considering its multiple use, sustained yield mandate. Yet, the SJNF has taken this approach in elevating the development of oil and gas resources on Forest Service lands. It is critical that the agencies address this gap in decisionmaking before final authorization of USFS oil and gas leasing availability.

## **II. The Agencies have Failed to Take a Hard Look at the Direct, Indirect and Cumulative Impacts of Oil and Gas Development on Certain Resource Values in the Planning Area**

The National Environmental Policy Act (“NEPA”), 42 U.S.C. § 4321 *et seq.*, and its implementing regulations, promulgated by the Council on Environmental Quality (“CEQ”), 40 C.F.R. §§ 1500.1 *et seq.*, is our “basic national charter for the protection of the environment.” 40 C.F.R. § 1500.1. Recognizing that “each person should enjoy a healthful environment,” NEPA ensures that the federal government uses all practicable means to “assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings,” and to “attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences,” among other policies. 43 U.S.C. § 4331(b).

NEPA regulations explain, in 40 C.F.R. §1500.1(c), that:

Ultimately, of course, it is not better documents but better decisions that count. NEPA’s purpose is not to generate paperwork – even excellent paperwork – but to foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.

Thus, while “NEPA itself does not mandate particular results, but simply prescribes the necessary process,” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989),

agency adherence to NEPA’s action-forcing statutory and regulatory mandates helps federal agencies ensure that they are adhering to NEPA’s noble purpose and policies. *See* 42 U.S.C. §§ 4321, 4331.

NEPA imposes “action forcing procedures . . . requir[ing] that agencies take a *hard look* at environmental consequences.” *Methow Valley*, 490 U.S. at 350 (citations omitted) (emphasis added). These “environmental consequences” may be direct, indirect, or cumulative. 40 C.F.R. §§ 1502.16, 1508.7, 1508.8. A cumulative impact – particularly important here – is defined:

the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.7.

Federal agencies determine whether direct, indirect, or cumulative impacts are significant by accounting for both the “context” and “intensity” of those impacts. 40 C.F.R. § 1508.27. Context “means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality” and “varies with the setting of the proposed action.” 40 C.F.R. § 1508.27(a). Intensity “refers to the severity of the impact” and is evaluated according to several additional elements, including, for example: unique characteristics of the geographic area such as ecologically critical areas; the degree to which the effects are likely to be highly controversial; the degree to which the possible effects are highly uncertain or involve unique or unknown risks; and whether the action has cumulatively significant impacts. *Id.* §§ 1508.27(b).

Furthermore, the Federal Land Policy and Management Act (“FLPMA”), 43 U.S.C. § 1701 *et seq.*, directs that “the public lands be managed in a manner that will protect the quality of [critical resource] values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use.” 43 U.S.C. § 1701(a)(8). This substantive mandate requires that the agencies not elevate the development of oil and gas resources above other critical resource values in the planning area, as the agencies have done, here. To the contrary, FLPMA requires that where oil and gas development would threaten the quality of critical resources, that conservation of these resources should be the preeminent goal. As detailed, below, for several critical resource values in the planning area – while the agencies have taken many pioneering steps in an attempt to address the serious impacts of the proposed action – in many cases the TRFO/SJNF do not go far enough and, thus, the authorized action conflicts with the agencies’ mandate under FLPMA.

#### **A. The BLM and USFS has Failed to Take a Hard Look at Certain Impacts to Air Quality**

The BLM and USFS have identified that “the primary goal of air quality management is

to protect air quality within, and adjacent to, the SJNF and TRFO;” specifically recognizing the importance of meeting air quality standards as well as visibility protection for Class I areas. FEIS at 339. In particular, the agencies must consider the air quality impacts from oil and gas development in the planning area. Much of air pollution from oil and gas development and operations, which is specifically discussed, below, also degrades visibility. Section 169A of the Clean Air Act (“CAA”), 42, U.S.C. § 7401 *et seq.* (1970) sets forth a national goal for visibility, which is the “prevention of any future, and the remedying of any existing, impairment of visibility in Class I areas which impairment results from manmade air pollution.” Congress adopted the visibility provisions in the CAA to protect visibility in “areas of great scenic importance.” H.R. Rep. No. 294, 95<sup>th</sup> Cong. 1<sup>st</sup> Sess. at 205 (1977). In promulgating its Regional Haze Regulations, 64 Fed. Reg. 35,714 (July 1, 1999), the U.S. Environmental Protection Agency (“EPA”) provided:

Regional haze is visibility impairment that is produced by a multitude of sources and activities which emit fine particles and their precursors and which are located across a broad geographic area. Twenty years ago, when initially adopting the visibility protection provisions of the CAA, Congress specifically recognized that the “visibility problem is caused primarily by emission into the atmosphere of SO<sub>2</sub>, oxides of nitrogen, and particulate matter, especially fine particulate matter, from inadequate[ly] controlled sources.” H.R. Rep. No. 95-294 at 204 (1977). The fine particulate matter (PM) (e.g., sulfates, nitrates, organic carbon, elemental carbon, and soil dust) that impairs visibility by scattering and absorbing light can cause serious health effects and mortality in humans, and contribute to environmental effects such as acid deposition and eutrophication.

The visibility protection program under sections 169A, 169B, and 110(a)(2)(J) of the CAA is designed to protect Class I areas from impairment due to manmade air pollution. The current regulatory program addresses visibility impairment in these areas that is “reasonably attributable” to a specific source or small group of sources, such as, here, air pollution resulting from oil and gas development and operations authorized by the LRMP. *See* 64 Fed. Reg. 35,714.

Moreover, EPA finds the visibility protection provisions of the CAA to be quite broad. Although EPA is addressing visibility protection in phases, the national visibility goal in section 169A calls for addressing visibility impairment generally, including regional haze. *See e.g., State of Maine v. Thomas*, 874 F.2d 883, 885 (1<sup>st</sup> Cir. 1989) (“EPA’s mandate to control the vexing problem of regional haze emanates directly from the CAA, which ‘declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in Class I areas which impairment results from manmade air pollution.’”) (citation omitted).

Here, there are six Class I areas within or near the SJNF and TRFO where measurements have been collected: Mesa Verde National Park, Bandelier National Monument, Canyonlands National Park, San Pedro Parks wilderness, Weminuche wilderness, and White River National Forest. *See* FIES at 343. The agencies recognize that “[t]he existing condition of visibility in the region is already impaired from existing sources.” *Id.* at 363. Specifically, three Class I areas – Canyonlands National Park, Mesa Verde National Park, and Weminuche wilderness – have predicted visibility impacts above the 5% air quality related values (“AQRV”) threshold.



The agencies further identify serious concerns with cumulative air quality impacts, noting, “cumulative impacts from existing sources may pose a problem and need to be carefully examined by the regulatory agencies prior to issuing permits for new construction in the area.” *Id.* at 356. Specifically, cumulative air quality in the planning area is impacted by substantial emissions from Four Corners Power Plant, San Juan Generating Stations, as well as numerous existing oil and gas wells. Regarding nitrogen dioxide (“NO<sub>x</sub> or NO<sub>2</sub>”), the agencies provide:

The [Four Corners Power Plant] emits over 49,000 tons per year of NO<sub>x</sub> and is less than 8.5 miles from the San Juan Generating Station, which emits over 40,000 tons per year of NO<sub>x</sub>. These are likely the significant contributing sources to the high localized NO<sub>2</sub> concentration. In addition, numerous existing oil and gas wells are in this part of New Mexico, and additional NO<sub>2</sub> sources are anticipated in this area.

FIES at 366. Regarding sulfur dioxide (“SO<sub>2</sub>”), the agencies provide:

[A]nnual SO<sub>2</sub> [national ambient air quality standards (“NAAQS”)] (365 µg/m<sup>3</sup>) could be surpassed at 469 µg/m<sup>3</sup> in the vicinity of the Four Corners Power Plant and San Juan Generating Stations. The location of the coarse grid maximum SO<sub>2</sub> impacts is in the same spot as the maximum concentrations of coarse grid NO<sub>x</sub> and PM<sub>10</sub>, which is near the Four Corners Power Plant (which emits over 27,000 tons per year of SO<sub>2</sub>) and the San Juan Generating Station (which emits over 32,000 tons per year of SO<sub>2</sub>).

*Id.* at 367.

The cumulative air quality impacts from these sources results in serious impairments in the planning area. For example, at Mesa Verde National Park, the Class I prevention of significant deterioration (“PSD”) increment for NO<sub>2</sub>, SO<sub>2</sub>, and PM<sub>10</sub> would all be exceeded. *See id.* at 354, 358, 359. Moreover, because Mesa Verde National Park is adjacent to proposed oil and gas development in the planning area, the National Park Service (“NPS”) expressed concerns about indirect impacts, notably due to “increased fire risk from biomass production as a result of nitrogen fertilization,” as well as “potential species composition shifts from native to non-native vegetation as a result of nitrogen deposition.” *Id.* at 360.

As with the draft Supplemental EIS (“SEIS”), the FEIS does not fully and accurately evaluate the air quality impacts from the proposed development and does not include adequate enforceable mitigation measures to assure no adverse impacts on air quality will occur in the affected area. Very few changes were made to the air quality analysis for the FEIS in direct response to the large number of substantive air quality comments received by the agencies on the draft SEIS, including significant air quality comments from both the Environmental Protection Agency (“EPA”) and the National Park Service (“NPS”). Of primary concern is the fact that the Agencies did not implement a comprehensive and enforceable set of air quality mitigation measures that would ensure no significant impacts to air quality and air quality related values in the FEIS. Without further analysis of the mitigation measures needed to sufficiently address

potential air quality impacts for this FEIS, the Agencies are failing to satisfy their most fundamental obligations under NEPA.<sup>2</sup>

The FEIS does include some additional, important mitigation measures to address impacts to air quality and climate, but, as discussed below, these measures do not go far enough in either analysis or commitments. Following are more detailed comments on the air quality portions of the FEIS. The original comments submitted by Conservation Groups on the SEIS are referenced in the following detailed review and are incorporated herein by reference.

#### **a. Air Quality Mitigation Measures**

In response to cumulative impacts to both air quality standards and visibility in Class I areas, as well as the agencies recognition that “[t]he air quality impact analysis indicates that some potentially significant environmental effects could occur with all alternatives[,] [t]he SJNF and TRFO plan to require certain air pollution mitigation measures, which would be effective in reducing impacts to air quality.” FEIS at 372; *see also* FEIS at 361, 364 (“[t]he SJNF and TRFO would adopt many mitigation measure that would reduce nitrogen and sulfur emissions from oil and gas production and development activities in the SJNF and TRFO.”). The agencies have further noted that “[t]his FEIS is the first NEPA analysis where lands that could be made available for lease are identified and stipulated.” *Id.* at 372.

Consistent with this commitment, the TRFO/SJNF have required air quality mitigation, which will result in notable reductions to criteria pollutant emissions. On this point the agencies offer:

Reducing NO<sub>x</sub> emissions has several environmental benefits, including 1) decreased nitrogen deposition and associated ecosystem impacts, 2) decreased acidification of water chemistry at sensitive wilderness lakes, 3) reduced ozone precursors thereby reducing ozone formation, 4) reduced impacts to visibility from nitrogen aerosol species, and 5) improved ambient near-field air quality. Reducing VOC emissions has the benefit of reducing an ozone precursor, thereby reducing ozone formation and air toxics.

The environmental benefits of sulfur emission reductions include 1) decreased sulfur atmospheric deposition and acidification of water chemistry at sensitive wilderness lakes, 2) improved ambient near-field air quality, and 3) reduced impacts to visibility from sulfur aerosol species.

Reducing particulate matter emissions would 1) improve ambient air quality, 2) reduce impacts to far-field visibility from aerosol particulates, and 3) improve

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<sup>2</sup> *See* Conservation Groups SEIS Comments (November 25, 2011), incorporated herein by reference, which further details on how the SEIS failed to satisfy the requirements of the National Environmental Policy Act (“NEPA”) and the Federal Land Policy and Management Act (“FLPMA”), Attachment 2 Technical Comments on the Air Quality Analysis Technical Support Document and Air Quality Analysis, Section I.

near-field visibility and public safety.

FEIS at 373.

Such benefits should not be viewed as abstract improvements, but represent real, on the ground advances in the planning area. For example, “[t]he Air Quality Modeling Study for the Four Corners Area ... demonstrates that ozone reductions and improvement to visibility at Mesa Verde National Park are possible if high-level controls are implemented for both oil and gas operations and power plants throughout the Four Corners Region,” and, additionally, several mitigation measures were also required “to reduce deposition of nitrogen within Weminuche wilderness and Mesa Verde National Park Class I areas.” *Id.*

While Conservation Groups feel the inclusion of air quality mitigation measures are plainly required by federal law, as detailed below, we recognize that by the inclusion of such measures, here, the agencies have taken a pioneering step forward. Thus, the TRFO/SJNF are to commended, and such action should set an example for other field offices as they engage in revision of their management plans. That being said, such measures do not go far enough.

Given the serious air quality issues in the planning area from both existing sources and cumulative impacts in the region, additional conservation measures are necessary to meet the agencies primary goal of air quality management, which “is to protect air quality within, and adjacent to, the SJNF and TRFO.” *Id.* at 339.

As held by the Supreme Court, “one important ingredient of an EIS is the discussion of steps that can be taken to mitigate adverse environmental consequences.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1989). This detailed discussion of mitigation measures “flows both from the language of the Act and, more expressly, from CEQ’s implementing regulations. Implicit in NEPA’s demand that an agency prepare a detailed statement on ‘any adverse environmental effects which cannot be avoided should the proposal be implemented,’ 42 U.S.C. § 4332(C)(ii), is an understanding that the EIS will discuss the extent to which adverse effects can be avoided.” *Id.* at 351-52. Notably, NEPA regulations require that agencies: “Use all practicable means ... to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.” 40 C.F.R. § 1500.2(f).

**i. The agencies failed to include many of the mitigation measures identified in SEIS comments.**

Numerous comments were submitted in the SEIS regarding the need for more mitigation measures to address air quality impacts. Specifically, the agencies responded to comments from, among others: the Conservation Groups, EPA, Colorado Department of Public Health and Environment (“CDPHE”), Montezuma County, and the San Miguel County Commissioners, calling on the agencies to “revise the air quality mitigation options and require all available options to reduce emissions.”<sup>3</sup> In particular, Conservation Groups provided extensive comments

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<sup>3</sup> Tres Rios FEIS Response to Comments Appendix S S-24, AQ27.

on the need for more comprehensive and enforceable mitigation measures for inclusion in the FEIS. *See* Conservation Groups SEIS Comments at Section VIII (air quality attachment).<sup>4</sup>

Moreover, EPA recommended specific mitigation measures to include in the FEIS, in addition to those listed in Table S-3.1.33 of the SEIS. EPA's recommendations were based on concerns with NO<sub>2</sub> and visibility impacts, as well as monitored ozone concentrations approaching the 8-hour air quality standard in the project area. These additional EPA-recommended measures are listed below, and include:<sup>5</sup>

- Centralized liquid gathering systems to reduce truck traffic and associated mobile source emissions, as well as traffic impacts to wildlife.
- Tier IV or better drill and completion rig engines to significantly reduce NO<sub>x</sub> emissions.
- Low or no bleed pneumatic controllers and pumps to reduce VOC emissions.
- Vapor recovery units or combustors that meet 95% control efficiency for tank batteries, dehydrators and separators.
- Plunger lift systems to significantly reduce VOC emissions associated with depressurization of production systems during a blowdown operation, when equipment is shut down for emergencies or scheduled maintenance.
- Limiting the number of drill rigs operating simultaneously.

EPA also recommended Utah's Greater Natural Buttes Supplement to the Draft EIS as examples of good applicant-committed mitigation measures. The agencies responded to the extensive comments by EPA and the Conservation Groups by providing:

Air quality regulatory agencies require that definitive mitigation measures be developed and analyzed to mitigate the air quality impacts. As a result of public comment, the air quality mitigation options were revised and some new options were added. It is anticipated that several mitigation options in combination would be necessary to achieve the desired reduction in project emissions. The final mitigation options selected for air quality protection can be found in the Air Quality section of the Final LRMP and FEIS and are stated as part of the selected alternative in the Record of Decision (ROD).

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<sup>4</sup> November 25, 2011 comments from Conservation Groups on the SEIS, Attachment 2 Technical Comments on the Air Quality Analysis Technical Support Document and Air Quality Analysis.

<sup>5</sup> EPA, December 2, 2011 letter Re: Comments on the San Juan Public Lands Supplement to the Draft Environmental Impact Statement and Rating of the Draft Environmental Impact Statement CEQ #20110277 and 20070514, at 4.

Tres Rios FEIS Response to Comments Appendix S S-24, AQ27.

In fact, the list of mitigation measures for the reasonably foreseeable development scenario in the FEIS includes several additional mitigation measures. These additional measures include:

- Storage tank emission controls – Reduce 95% of VOC emissions (identified as a LRMP standard).
- Dehydrator emission controls – 95% or better reduction in VOC emissions and 95% or better reduction in CH<sub>4</sub> emissions (identified as a LRMP standard).
- Collocation and centralization of facilities – Reduce tailpipe emissions and other benefits (identified as a LRMP guideline).
- Optimization of engines – Use lowest necessary horsepower, fewest engines, highest efficiency, lowest cumulative emissions. Estimated 30% reduction in emissions compared to current practices (identified as a LRMP guideline).

FEIS, Table 3.12.33.

Of note, only the storage tank and dehydrator emission controls are identified as “standards” for the LRMP. The other two additional measures are identified as “guidelines,” and, we assume, are therefore discretionary. In fact, several other mitigation measures that were identified as “highly favorable” in the SEIS, and were to be implemented in the record of decision (“ROD”), Plan of Development, and/or Conditions of Approval mechanisms, are now only listed as “Additional Measures” in the FEIS and are to be used “at the discretion of the agencies if additional mitigation is warranted.” FEIS at 376. These measures, which were downgraded to a discretionary status, include:

- Reduce Truck Traffic Emissions.
- Electric Compression.
- Solar Powered Telemetry and Well Automation.
- Selective Catalytic Reduction Control for New Lean Burn Drill Rig Engines.

Some of the mitigation measures that were included in the SEIS have stayed the same or have been changed for the FEIS to require stronger and/or more specific levels of control. Mitigation measures that have been strengthened in the FEIS, include:

- NO<sub>x</sub> Emission limits in the FEIS are more specific: 2.0 grams per horsepower-hour, applicable to new and existing (replacement or reconditioned) engines less than 300 horsepower. FEIS at 375 and LRMP at 93.
- NO<sub>x</sub> Emission limits in the FEIS are more specific: 1.0 gram per horsepower-hour,

applicable to new and existing (replacement or reconditioned) engines 300 horsepower and greater. *Id.*

- Reduced Emissions Completions in the FEIS now specify a 95% capture rate of VOC emissions vented or flared during well completions and recompletions. FEIS at 375.
- Pneumatic device controls in the SEIS required low-bleed devices for new and existing wells and require low- *and no*-bleed devices for new and existing wells in the FEIS. *Id.* at 373 (Table 3.12.33).

However, some of the mitigation measures that were included in the SEIS have been changed in the FEIS to be more lenient and/or less specific than what was originally proposed. The measures that have been relaxed in the FEIS, include:

- Centralized Liquid Gathering Systems and Liquid Transport Pipeline were “highly favorable” requirements to be implemented in the ROD, Plan of Development and/or as Conditions of Approval in the SEIS and are identified as “guidelines” for the LRMP in the FEIS. FEIS at 373 (Table 3.12.33).
- Low Emissions Drill Rig Engine requirements (50% reduction in NO<sub>x</sub> emissions) in the SEIS were to be implemented in the ROD yet in the FEIS these requirements (specified as Tier 2 “or best available”) are identified as a LRMP “guideline.” *Id.*

Notably, certain important air quality mitigation measures that were recommended by Conservation Groups and, in most cases, also by EPA, were not incorporated in the FEIS. These measures include:

- Field electrification to reduce NO<sub>x</sub> emissions.
- Stricter engine requirements to reduce NO<sub>x</sub> emissions (e.g., Tier 4 drill rigs and Tier 2 or better construction equipment).
- Restrictions on the number of drill rigs operating simultaneously.
- Leak Detection and Repair programs to reduce VOC and methane emissions at all possible locations and with regular frequency.
- Plunger lift systems to significantly reduce VOC emissions associated with depressurization of production systems during a blowdown operation, when equipment is shut down for emergencies or scheduled maintenance.
- Steps to minimize traffic impacts (e.g., fugitive dust reduction measures for vehicle traffic on unpaved roads, centralization of facilities to minimize traffic).

BLM should commit to implementation of specific and enforceable management actions that ensure no significant impacts to air quality and air quality related values in the FEIS. At a

minimum, BLM should implement – as enforceable requirements – the air quality standards included in the USFS’s LRMP. *See* LRMP Standards at 93-94 (2.12.11 – 2.12.20). Similar to USFS standards, BLM’s management actions should require mitigation measures to conform to the following:

A standard is an approach or condition that is determined to be necessary to meet desired future conditions and objectives, and/or to ensure the long-term viability of resources. A standard (worded as “must” or “shall”) describes a course of action that must be followed or a level of attainment that must be reached. Deviations from standards would require analysis and documentation through a subsequent land management plan amendment.

LRMP at 7.

**ii. Critical updates to air quality modeling is necessary.**

Conservation Groups continue to have concerns about the National Ambient Air Quality Standards (“NAAQS”) analysis. Based on a review of the Response to Comments for the FEIS, there were no changes to the modeling for the FEIS. Conservation Groups raised several critical issues with the modeling analysis for the SEIS, and all of those concerns remain for the FEIS. *See*, Conservation Groups SEIS Comments at Section III. Notably, the SEIS modeling predicted significant NO<sub>2</sub> impacts, PM impacts and SO<sub>2</sub> impacts. The SEIS and FEIS fail to include an assessment of near-field impacts and continue to put off an assessment of the impact from the proposed development on regional ozone concentrations.

Since the time of the SEIS, there have been several changes to the health-based NAAQS that should have been specifically addressed in the FEIS. In January of 2010 EPA proposed stricter ozone standards, between 60 and 70 parts per billion (ppb).<sup>6</sup> EPA has since decided to continue implementing the 75 ppb standard until the next regularly scheduled regulatory review, which began this year (in 2013).<sup>7</sup> The new ozone NAAQS should be factored into the future ozone modeling that will occur under the FEIS. Specifically, the Air Quality Technical Support Document (“TSD”) states:

The evaluation of ozone impacts is not included in this analysis. CALPUFF does not include adequate atmospheric chemistry to simulate the complex atmospheric reactions that lead to the formation of ozone. Current ozone concentrations within the San Juan Basin area are approaching NAAQS limits. The U.S. Environmental Protection Agency (EPA) and CDPHE have agreed with the USDA Forest Service (FS) and Bureau of Land Management (BLM) regarding their approach for modeling air quality impacts using CALPUFF, stipulating that in addition to

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<sup>6</sup> *See* 73 FR 16436, Effective May 27, 2008 and 75 FR 2938, January 19, 2010.

<sup>7</sup> Of note, the 2008 standard is currently under legal challenge. *See*, September 22, 2011, EPA Memo, Implementation of the Ozone National Air Quality Standard, available at: <http://www.epa.gov/ozonepollution/pdfs/OzoneMemo9-22-11.pdf>.

modeling, phased air monitoring program results could trigger ozone modeling with an appropriate chemical model.<sup>8</sup>

In addition to a pending update to the ozone NAAQS, EPA finalized the new 1-hour average NO<sub>2</sub> and SO<sub>2</sub> NAAQS during the time that the SEIS analysis was being completed. Near-field analyses of predicted 1-hour NO<sub>2</sub> and 1-hour SO<sub>2</sub> concentrations based on EPA modeling guidelines should have been compared with the new NAAQS for the FEIS.<sup>9</sup> EPA has also since finalized PM<sub>2.5</sub> increment standards to prevent significant deterioration of air quality, which went into effect on October 20, 2011 and the FEIS should have also evaluated PM<sub>2.5</sub> increment consumption.<sup>10</sup>

In addition to the modeling results, Conservation Groups and EPA both raised several issues with the inputs to the model and the way in which the modeling was conducted. Specifically, Conservation Groups provided detailed comments on the inventory, assumptions and modeling parameters. *See* Conservation Groups SEIS Comments at Section V. Similarly, EPA provided detailed comments on the inventory, and, specifically, on the lack of information on operational field equipment emissions, such as heaters (which can be a significant source of NO<sub>x</sub> emissions) and flaring, and on the lack of information on drill rig and completion engines (e.g., engine type, drilling duration and emission factors). In general, EPA questioned the inventory size and accuracy, and further commented on a general lack of transparency and clarity in the information provided. EPA recommended that “the assumptions used in developing the emissions inventory and subsequent modeling be presented in the Final EIS to ensure transparency and full disclosure.”<sup>11</sup> The Response to Comments for the FEIS did not address any of these specific and detailed inventory comments, and the FEIS failed to integrate these concerns into the agencies final decisionmaking.

### **iii. Impacts at Class I and Sensitive Class II Areas.**

The FEIS does not sufficiently address comments received by Conservation Groups, EPA and NPS on the NAAQS, PSD, visibility and deposition impacts to Class I and Sensitive Class II areas.

Conservation Groups’ comments pointed out that the agencies’ modeling analysis for the SEIS predicted significant NAAQS, PSD, visibility and ecosystem impacts in Class I and sensitive Class II areas from both direct project sources and from cumulative impacts. *See*

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<sup>8</sup> FEIS, Air Quality Modeling Technical Support Document for the San Juan Public Lands Center Land Management Plan and Environmental Impact Statement (October 8, 2010) at 1-1.

<sup>9</sup> *See* 75 FR 6474, February 9, 2010 (for the 1-hour NO<sub>2</sub> NAAQS), and 75 FR 35520, June 22, 2010.

<sup>10</sup> *See* 75 FR 64865, Oct. 20, 2010.

<sup>11</sup> EPA, December 2, 2011 letter Re: Comments on the San Juan Public Lands Supplement to the Draft Environmental Impact Statement and Rating of the Draft Environmental Impact Statement CEQ #20110277 and 20070514, at 3.



Conservation Groups SEIS Comments at Section III. Specifically, the far-field NAAQS analysis predicts four exceedances of the 1-hour NO<sub>2</sub> NAAQS at Mesa Verde National Park, one exceedance of the 1-hour NO<sub>2</sub> NAAQS at Bandelier National Monument, and numerous exceedances of the 1-hour NO<sub>2</sub> NAAQS from cumulative impacts at Canyon de Chelly National Monument and Chaco Culture National Historic Park. The far-field NAAQS analysis also predicts cumulative 24-hour PM<sub>10</sub> concentrations that exceed the NAAQS at Mesa Verde National Park and cumulative 1-hour SO<sub>2</sub> concentrations that exceed the NAAQS at Mesa Verde National Monument, Canyonlands National Park, Bandelier National Monument, Canyon de Chelly National Monument, Chaco Culture National Historic Park, and Natural Bridges National Monument. Visibility impacts are predicted from direct project impacts assessed for the SEIS at numerous Class I and Sensitive Class II areas including Mesa Verde National Park, Arches National Park, Canyonlands National Park, Black Canyon of the Gunnison National Park, Canyon de Chelly National Monument, Hovenweep National Monument and Chaco Culture National Historic Park.<sup>12</sup> The cumulative air quality impact analysis for the SEIS under the maximum development scenario showed numerous visibility impacts at *every single* Class I and Sensitive Class II area assessed, including – in addition to the above-mentioned areas – Bandelier National Monument and Natural Bridges National Monument.<sup>13</sup> Significant ecosystem impacts are also predicted from direct project sources alone on nitrogen deposition in Mesa Verde National Park.<sup>14</sup>

The FEIS fails to consider recent monitored exceedances of the NAAQS in several Class I and Sensitive Class II areas. Conservation Groups highlighted many of these exceedances in comments on the draft SEIS – *see* Section II of the attachment to SJCA comments, as incorporated herein. Specifically, the following table shows background air quality monitoring data, including more recent data from 2012-2013:

**Air Quality Monitoring Data in Class I and Sensitive Class II Areas<sup>15</sup>**

Site	ID	Year	Ozone 1 <sup>st</sup> High Maximum 8-hr avg [ppb]	Ozone 4 <sup>th</sup> High Maximum 8-hr avg [ppb]	PM <sub>2.5</sub> Maximum 24-hr avg [µg/m <sup>3</sup> ]	PM <sub>2.5</sub> 98 <sup>th</sup> %-ile 24-hr avg [µg/m <sup>3</sup> ]
Canyonlands National Park	49-037-0101/ 49-037-9000	2013	69	66	na	na
		2012	79	72	19.9	11
		2011	73	69	9.8	7.8
		2010	76	68	16.4	5.8

<sup>12</sup> SEIS TSD, at Tables 7-56 and 7-57.

<sup>13</sup> SEIS TSD, at Tables 7-60, 7-61 and 7-62. Maximum extinction changes calculated using visibility Method 2 (currently the preferred means of estimating visibility impacts under FLAG guidance).

<sup>14</sup> SEIS TSD, at Tables 7-38, 7-40, 7-44.

<sup>15</sup> EPA, AirData, <http://www.epa.gov/airdata>

Site	ID	Year	Ozone 1 <sup>st</sup> High Maximum 8-hr avg [ppb]	Ozone 4 <sup>th</sup> High Maximum 8-hr avg [ppb]	PM <sub>2.5</sub> Maximum 24-hr avg [ $\mu\text{g}/\text{m}^3$ ]	PM <sub>2.5</sub> 98 <sup>th</sup> %-ile 24-hr avg [ $\mu\text{g}/\text{m}^3$ ]
Mesa Verde National Park	08-083-0101/ 08-083-9000	2013	70	69	na	na
		2012	72	69	15.6	15.4
		2011	78	70	11.6	7.7
		2010	77	66	33.1	12
Great Sand Dunes National Park	08-003-9000	2012	none	none	10.4	9.6
		2011	none	none	20.2	18
		2010	none	none	15.6	9.3
Capitol Reef National Park	49-055-9000	2012	none	none	14.2	11.3
		2011	none	none	11.7	6.5
		2010	none	none	5.9	4.5
Weminuche Wilderness Area (Shamrock Station)	08-067-1004/ 08-067-9000	2013	76	72	na	na
		2012	72	69	25.7	14.6
		2011	82	77	13.3	9.9
		2010	81	74	31.4	21.6
Weminuche Wilderness Area	08-111-9000	2012	none	none	25.7	11
		2011	none	none	8.7	7.7
		2010	none	none	27.7	9.6
50 miles NW of Bandelier National Monument (Coyote, San Pedro Parks)	35-039-0026/ 35-039-9000	2013	74	66	na	na
		2012	none	none	8.3	7.7
		2011	none	none	27.5	18.5
		2010	none	none	9.7	5.5
50 miles SW of Black Canyon of the Gunnison National Park (Norwood)	08-113-0008	2011	71	69	none	none
Canyon de Chelly National Monument	04-001-1235	2012	none	none	14.5	9.6
		2011	none	none	11.8	11.8
		2010	none	none	8.8	6.2

na – not available

Monitored fine particle concentrations in the area continue to be between 25% and 50% of the PM<sub>2.5</sub> NAAQS with higher 98<sup>th</sup> percentile concentrations recorded in 2012 (compared with past years) at both Mesa Verde National Park and Canyonlands National Park. More concerning, however, is the fact that ozone monitoring in and near all potentially affected Class I and Sensitive Class II areas continues to show that ozone concentrations are already at levels of concern with respect to EPA's proposed new ozone NAAQS (between 60 and 70 ppb).<sup>16</sup> The ozone monitoring site located in Norwood, Colorado (08-113-0008 in the above table) is

<sup>16</sup> 75 F.R. 2938, January 19, 2010.

identified as part of the ozone analysis and monitoring strategy laid out in the FEIS. Specifically, BLM and USFS commit in the FEIS to:

[D]eploy a continuous ozone monitoring station to evaluate actual ozone concentrations downwind of the Paradox Basin in cooperation with the CDPHE. This station would provide, at a minimum, 3 years of data (EPA reference quality). This ozone monitoring station was purchased and deployed during the summer of 2010 at a site cooperatively selected by the CDPHE, BLM, and USFS now located in Norwood, Colorado.

FEIS at 348.

However, EPA data indicate that this monitoring site is no longer operational with the last collection date identified as October 6, 2011.<sup>17</sup> BLM should update the ozone monitoring strategy for the FEIS to reflect changes in the monitoring network.

The FEIS fails to include the many additional Class I and Sensitive Class II areas identified in Conservation Groups' comments. In particular, we continue to advise that an analysis of impacts is warranted at Great Sand Dunes National Park and Capitol Reef National Park Class I areas, as well as at Curecanti National Recreation Area and Yucca House National Monument Class II areas.

EPA, in comments on the SEIS, expressed concern with the predicted visibility impacts. Specifically, EPA made the following comment:

According to Tables 7-56 (Method 2) and 7-58 (Method 6) in the revised AQTSD, up to 20 days of visibility impairment of greater than 10% could occur at Mesa Verde National Park due to the direct project emissions. Additionally, the analysis predicts that three Class I areas would experience visibility impacts above the 5% change AQRV threshold. These impacts included 29 days of 5% AQRV threshold at Mesa Verde National Park, 3 days at Canyonlands National Park and 1 day at Weminuche Wilderness. Canyons of the Ancients, a Class II area, had 40 days above the 5% AQRV threshold. EPA strongly recommends requiring further reductions of PM<sub>10</sub>, PM<sub>2.5</sub>, and NO<sub>x</sub> emissions to reduce these adverse impacts.<sup>18</sup>

In addition, EPA expressed concern with the Class I PSD increment exceedances at Mesa Verde National Park, providing:

Table S-3.1.9 of the Supplement presents both the direct and cumulative impacts on the NO<sub>2</sub> PS increments at Class I and Class II areas. These cumulative impact

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<sup>17</sup> See EPA AirData, available at: <http://www.epa.gov/airdata>.

<sup>18</sup> EPA, December 2, 2011 letter Re: Comments on the San Juan Public Lands Supplement to the Draft Environmental Impact Statement and Rating of the Draft Environmental Impact Statement CEQ #20110277 and 20070514, at 3 (attached as Exhibit 62).

predictions include an exceedance of the 1-hour NO<sub>2</sub> PSD increment at the nearby Mesa Verde National Park Class I area (predicted cumulative impact of 4.285 µg/m<sup>3</sup> vs. the PSD Class I annual standard of 2.5 µg/m<sup>3</sup>). EPA recommends reducing the emissions of NO<sub>2</sub>, an ozone precursor, through additional required NO<sub>x</sub> emission reductions to mitigate the predicted exceedances.<sup>19</sup>

For specific NO<sub>x</sub> and PM emission reduction recommendations, EPA's comments refer to the specific additional mitigation recommendations discussed earlier (i.e., incorporate centralized liquids gathering systems to reduce truck traffic and associated mobile source emissions, incorporate Tier IV or better drill and completion rig engines to significantly reduce NO<sub>x</sub> emissions, limit the number of drill rigs operating simultaneously).

In addition, NPS, in comments on the SEIS, expressed the following concerns:

As before, we are concerned about potential impacts on visibility and nitrogen deposition at Mesa Verde National Park and modeling results certainly show that these concerns are well-founded ... The impacts are predicted to be substantial enough that more action may be necessary at the project-level as the number of wells grows. Therefore, when project-level base case modeling is performed showing guideline thresholds to be exceeded an assessment of mitigation options like those discussed on pages 3-43 through 3-48 should be undertaken. The mitigation necessary to get to the point of complying with guidance thresholds should then be required of the applicant.<sup>20</sup>

Additionally, and in more recent comments on proposed oil and gas leasing activity in the Tres Rios planning area, NPS again expressed concern with the air quality impacts from such activity on Mesa Verde National Park. Specifically, NPS communicated the following in regard to the February 2013 proposed lease sale:

Of particular concern at Mesa Verde NP is nitrogen deposition from emissions of oxides of nitrogen. At a minimum there should be rigorous nitrogen mitigation required for all wells that might be drilled and produced in this lease area through stipulations included in BLM leases with requirements associated with the subsequent permit to drill.<sup>21</sup>

NPS submitted additional comments on this same proposed lease sale providing even

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<sup>19</sup> *Id.*

<sup>20</sup> NPS, October 3, 2011 letter Re: National Park Service comments on the Draft Environmental Impact Statement Supplemental, San Juan Public Lands Center Management Plan (attached as Exhibit 63).

<sup>21</sup> NPS, September 17, 2012 letter Re: National Park Service comments on the Preliminary Environmental Assessment and Draft Finding of No Significant Impact for the February, 2013 Lease Sale (attached as Exhibit 64).

more detail on NPS concerns with nitrogen deposition and ozone impacts in the affected area and on the need for area-wide mitigation measures, as lease stipulations:

The air analysis for the [San Juan Public Lands Center (SJPLC) Supplemental Draft EIS] states: “The air quality impact analysis indicated that some potentially significant environmental effects could occur. Mitigation options have been developed to reduce the impacts to air quality and to reduce the project emissions of greenhouse gases.” The SJPLC analysis identified a list of rigorous mitigation measures sought to address predicted nitrogen deposition impacts in Mesa Verde NP, as well as regional ozone concerns. The intent was to include these mitigation measures as lease stipulations.<sup>22</sup>

NPS, in the same comment letter on the 2013 leasing activity in the Tres Rios planning area, highlighted concerns with nitrogen deposition at Mesa Verde National Park, by indicating that “an already deleterious situation is not trending in the right direction”, and that “incremental deposition increases from potential oil and gas development are of concern to the NPS” and, further, that “this situation has prompted the NPS to request rigorous NO<sub>x</sub> controls in the SJPLC SDEIS.”<sup>23</sup>

NPS, again in the same comment letter on the 2013 leasing activity in the Tres Rios planning area, highlighted concerns with impacts to ozone stating that “[m]onitored ozone levels are elevated across the region, and are hovering just below the national ambient air quality standard in Mesa Verde NP...” and that “[r]egional cumulative modeling assessments indicate that emissions from the oil and gas sector contribute substantially to ozone formation in the region...” and, again, “[t]hat area-wide mitigation measures are necessary to address the anticipated cumulative ozone impacts”.<sup>24</sup>

Clearly, there is significant concern, including from Federal Land Managers, that the agencies’ did not ensure there would be no adverse impacts to criteria air pollutants, visibility and nitrogen deposition from the project development. In fact, of the additional mitigation measures proposed for the FEIS, only the two discretionary measures that were added would address PM<sub>10</sub>, PM<sub>2.5</sub> and NO<sub>x</sub> emissions. Specifically, the measure encouraging collocation and centralization of facilities (identified as a LRMP “guideline”) could reduce tailpipe emissions (NO<sub>x</sub>) and fugitive dust, and the measure encouraging optimization of engines (also identified as a LRMP “guideline”) could reduce an estimated 30% of NO<sub>x</sub> emissions compared to current practices. However, neither of these measures are required, and, therefore it does not appear that the FEIS includes the necessary measures to prevent the significant air quality and air quality related values impacts modeled in the SEIS.

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<sup>22</sup> NPS, October 2, 2012 letter Re: Additional National Park Service comments on the Preliminary Environmental Assessment and Draft Finding of No Significant Impact for the February, 2013 Lease Sale (attached as Exhibit 65).

<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

The FEIS should include additional mitigation measures to control NO<sub>x</sub> and PM emissions from project sources, such as:

- Field electrification to reduce NO<sub>x</sub> emissions.
- Stricter engine requirements to reduce NO<sub>x</sub> emissions (e.g., Tier 4 drill rigs and Tier 2 or better construction equipment).
- Restrictions on the number of drill rigs operating simultaneously.
- Steps to minimize traffic impacts (e.g., fugitive PM reduction measures for vehicle traffic on unpaved roads, centralization of facilities to minimize traffic and reduce PM).

#### **iv. Background air quality.**

The current status of air quality in an area is a fundamental consideration for analysis in an EIS. CDPHE, NPS and Conservation Groups all provided comments on the monitoring section of the SEIS. Specifically, Conservation Groups' comments on the SEIS detailed the additional background concentrations that should be included in the FEIS and explained that these monitored concentrations should be part of the modeling analysis. Dates for the background concentrations should also be included in the document. *See* Conservation Groups SEIS Comments at Section II. However, the agencies failed to improve upon the background concentrations discussion, and these values were not considered in the NAAQS analysis during the EIS process.

Background monitored concentrations of all pollutants should have been reviewed and updated if necessary for the FEIS. Given the increasing development in the area, there may be higher concentrations that should be reflected in this document. In particular, elevated monitored levels for the 8-hour ozone National Ambient Air Quality Standard ("NAAQS") in this area in recent years are very concerning. Exposure to ozone is a serious concern as it can cause or exacerbate respiratory health problems, including shortness of breath, asthma, chest pain and coughing, decreased lung function and even long-term lung damage, as discussed in greater detail below. *See also*, EPA's National Ambient Air Quality Standards for Particulates and Ozone, 62 FR 38,856 (July 18, 1997). According to a recent report by the National Research Council ("NRC"): "short-term exposure to current levels of ozone in many areas is likely to contribute to premature deaths."<sup>25</sup> Even ozone concentrations at levels as low as 60 ppb can be considered harmful to human health and the agencies should consider this when evaluating the air impacts in the FEIS.

Elevated ozone concentrations have been recorded in recent years at eight monitors in the Four Corners Area, but the FEIS only includes data from Mesa Verde National Park in its table

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<sup>25</sup> National Research Council, *Link Between Ozone Air Pollution and Premature Death Confirmed*, (April 2008), available at: <http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12198>.

of background concentrations. The background value given for Mesa Verde is  $142 \mu\text{g}/\text{m}^3$ , which is just under the NAAQS.<sup>26</sup> The FEIS states that, “When considering only local pollution sources within the 4-km domain, oil and gas operations in New Mexico and Colorado are the largest local contributors to ozone on high concentration days over 70 ppb.” FEIS at 342. Thus, the increased oil and gas development that will take place under this FEIS is an important contributor to the ozone problem in the San Juan Basin.

Though the FEIS includes updated ozone monitoring data for the Shamrock Station monitor, in the form of the five highest 8-hour values recorded during the summer of 2011, all of which are exceedances of the NAAQS, the background concentrations and the air quality analysis were not modified to reflect these data.

The FEIS also includes updated  $\text{NO}_2$  monitoring data for the Shamrock Station monitor, listing the five highest daily 1-hour average values recorded from 2009 to 2011, with a background concentration of 30 ppb listed as the 1-hour second-high concentration. *See* FEIS at 339-40 (Tables 3.12.1 and 2.12.2). Yet monitoring data from this site, including more recent data from 2012 and 2013, show background  $\text{NO}_2$  concentrations as high as 34 ppb.<sup>27</sup> And maximum 1-hour  $\text{NO}_2$  concentrations were recorded in 2013 at other nearby locations as high as 50 ppb – or 50% of the NAAQS.<sup>28</sup>

There is no room for growth in emissions that contribute to these harmful levels of ozone pollution in the area – namely, nitrogen oxides (“ $\text{NO}_x$ ”) and volatile organic compounds (“VOCs”). Any increase in emissions of ozone precursors will exacerbate the negative health effects of ozone in the region, as discussed below, and is almost certain to threaten the area’s compliance with EPA’s the ozone standard.

Additionally,  $\text{PM}_{2.5}$  is another potential area of major health impacts in the San Juan Basin.  $\text{PM}_{2.5}$  can become lodged deep in the lungs or can enter the blood stream, worsening the health of asthmatics and even causing premature death in people with heart and lung disease. Even  $\text{PM}_{2.5}$  concentrations lower than the current NAAQS are a concern for human health. While background  $\text{PM}_{2.5}$  values are not at the level of the NAAQS currently, it is likely that those levels will increase with continued development in the Four Corners Area. Elevated wintertime concentrations could become an issue as they have in other areas of concentrated oil and gas development in the West, such as in the Uinta Basin in Utah.<sup>29</sup>

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<sup>26</sup> The 75 ppb 8-hour ozone standard of 75 ppb translates to  $150 \mu\text{g}/\text{m}^3$ .

<sup>27</sup> EPA AirData, available at: <http://www.epa.gov/airdata>.

<sup>28</sup> *See* EPA AirData (monitors in Shiprock, NM (ID 35-045-1233) and Navajo Dam, NM (ID 35-045-0018)).

<sup>29</sup> Several very high values of  $\text{PM}_{2.5}$  were recorded in Vernal, Utah starting in 2007, including six exceedances of the 24-hour  $\text{PM}_{2.5}$  NAAQS and a maximum 24-hour average  $\text{PM}_{2.5}$  concentration of  $63 \mu\text{g}/\text{m}^3$ . In 2009, there were three recorded exceedances of the 24-hour average  $\text{PM}_{2.5}$  NAAQS in Roosevelt, Utah with 24-hour average concentrations reaching  $42 \mu\text{g}/\text{m}^3$  and four recorded exceedances in Vernal with 24-hour average concentrations as high as  $60.9 \mu\text{g}/\text{m}^3$ .

## b. Air Quality Impacts on Human Health

Entirely absent from the agencies discussion of air quality impacts is the relationship to human health. Logically, the required air quality mitigation measures discussed above with have a positive relationship to human health, but poor baseline air quality conditions due to direct, indirect and cumulative impacts in the planning area warrants an independent hard look analysis at human health; and, moreover, such analysis is required by NEPA and CEQ implementing regulations.

Research indicates a strong correlation between oil and gas development and increased ozone concentrations – particularly in the summer when warm, stagnant conditions yield an increase in O<sub>3</sub> from oil and gas emissions.<sup>30</sup> Particularly in areas of significant existing oil and gas development – such as the San Juan Basin in the Four Corners region, which was the focus of research, here – summertime “peak incremental O<sub>3</sub> concentration of 10 ppb” have been simulated. *Id.* at 1118. This study indicates a “clear potential for oil and gas development to negatively affect regional O<sub>3</sub> concentrations in the western United States, including several treasured national parks and wilderness areas in the Four Corners region – particularly Mesa Verde and the Weminuche wilderness. *See* FEIS at 340 (Providing that ambient air measurements for existing air quality in the project area is not in compliance with NAAQS for ozone, “where the existing air quality concentrations are approaching the ambient 8-hour air quality standard of 150 µg/ m<sup>3</sup> (75 parts per billion [ppb] measured as the annual fourth highest daily maximum 8-hour concentration, averaged over 3 years”). “It is likely that accelerated energy development in this part of the country will worsen the existing problem.”<sup>31</sup> Additionally, oil and gas production in the mountain west has recently been linked to *winter* ozone levels that greatly exceed the National Ambient Air Quality Standards (“NAAQS”).<sup>32</sup>

Despite these impacts – and indeed the agencies acknowledgment of these impacts – the LRMP’s preferred alternative calls for oil and gas activity that would be the largest emission sources for each of the identified criteria and hazardous air pollutants. As the Endocrine Disruption Exchange has noted:

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<sup>30</sup> Marco A Rodriguez, et al., *Regional Impacts of Oil and Gas Development on Ozone Formation in the Western United States*, JOURNAL OF AIR & WASTE MANAGEMENT ASSOCIATION (Sept. 2009) (attached as Exhibit 1).

<sup>31</sup> *See* Rodriguez at 1118 (attached above as Exhibit 1).

<sup>32</sup> *See* Gail Tonnesen and Richard Payton, EPA Region 8. *Winter Ozone Formation: Results from the Wyoming Upper Green River Basin Studies and Plans for the 2012, Uintah Basin Study* (seminar abstract) (Jan. 2012), available at: <http://www.esrl.noaa.gov/csd/seminars/2012/TonnesenPayton.html> (citing, *inter alia*, Schnell, et. al., *Rapid photochemical production ozone at high concentrations in a rural site during winter*, 2 Nature Geosci. 120-122 (2009) (attached as Exhibit 2).



In addition to the land and water contamination issues, at each stage of production and delivery tons of toxic volatile compounds, including benzene, toluene, ethylbenzene, xylene, etc., and fugitive natural gas (methane), escape and mix with nitrogen oxides from the exhaust of diesel-driven, mobile and stationary equipment to produce ground-level ozone. Ozone combined with particulate matter less than 2.5 microns produces smog (haze). Gas field produced ozone has created a serious air pollution problem similar to that found in large urban areas, and can spread up to 200 miles beyond the immediate region where gas is being produced. Ozone not only causes irreversible damage to the lungs, it is equally damaging to conifers, aspen, forage, alfalfa, and other crops commonly grown in the West. Adding to this is the dust created by fleets of diesel-driven water trucks working around the clock hauling the constantly accumulating condensate water from well pads to central evaporation pits.<sup>33</sup>

Increases in ground-level ozone not only impact regional haze and visibility, but can also result in dramatic impacts to human health. According to the EPA:

Breathing ground-level ozone can result in a number of health effects that are observed in broad segments of the population. Some of these effects include:

- Induction of respiratory symptoms
- Decrements in lung function
- Inflammation of airways

Respiratory symptoms can include:

- Coughing
- Throat irritation
- Pain, burning, or discomfort in the chest when taking a deep breath
- Chest tightness, wheezing, or shortness of breath

In addition to these effects, evidence from observational studies strongly indicates that higher daily ozone concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity. The consistency and coherence of the evidence for effects upon asthmatics suggests that ozone can make asthma symptoms worse and can increase sensitivity to asthma triggers.<sup>34</sup>

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<sup>33</sup> The Endocrine Disruption Exchange. Undated. *Chemicals In Natural Gas Operations: Health Effects Spreadsheet and Summary*, available at: <http://www.endocrinedisruption.com/chemicals.multistate.php> (attached as Exhibit 3).

<sup>34</sup> EPA, *Health Effects of Ozone in the General Population*, available at: <http://www.epa.gov/apti/ozonehealth/population.html> (attached as Exhibit 4).

Oil and gas development is one of the largest sources of VOCs, ozone, and sulfur dioxide emissions in the United States. Nevertheless, the agencies chosen Alternative B leaves available for leasing 2,040,664 acres, or 75% of the joint planning area. FEIS at 499. The relationship between air quality and human health must be analyzed in the LRMP and FIES. The failure of the TRFO/SJNF to do so, here, represents a fundamental shortcoming of the agencies analysis, and must be corrected. “The agenc[ies] must examine the relevant data and articulate a satisfactory explanation for its action including a ‘rational connection between the facts found and the choice made.’” *Motor Vehicle Mfrs.*, 463 U.S. at 43 (1983).

## **B. The BLM and USFS have Failed to Take a Hard Look at Climate Change.**

The BLM and USFS have notably advanced the issue climate change in the LRMP and FEIS – even offering Appendix G, which is the agencies climate change management strategy – however, agency decisionmaking still fails to reflect the magnitude of the challenges we face. For example, the agencies provide that “[m]anaging for sustainable ecosystems is an overarching strategy of the LRMP, intended to provide the ecological conditions that maintain or restore the diversity of native ecosystems, which in turn would maintain the diversity and populations of most plant and animal species.” FEIS at 92. The agencies later continue, however, that “factors outside of the USFS’s and BLM’s control, such as climate change, could create ecological conditions unlike those of the reference period,” thus restraining or even preventing the realization of this goal. *Id.* Nevertheless, the LRMP’s reasonably foreseeable development (“RFD”) scenario predicts that over 2,900 wells will be drilled in the next 15 years, accessing an estimated reserve total of 519 million barrels of oil and 51.5 trillion cubic feet of gas. *See id.* at 493, 487. If we are to stem the impacts of climate change and manage for sustainable ecosystems, such gaps in agency decisionmaking must be addressed, as discussed more fully below.

The BLM and USFS’s recognition of climate change and the associated impacts is, of course, consistent with the EPA’s determination that human emissions of greenhouse gases are causing global warming that is harmful to human health and welfare. *See* 74 Fed. Reg. 66,496 (Dec. 15, 2009), *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*. The D.C. Circuit has upheld this decision as supported by the vast body of scientific evidence on the subject. *See Coal. for Responsible Regulation, Inc. v. E.P.A.*, 684 F.3d 102, 120-22 (D.C. Cir. 2012). Indeed, EPA could not have found otherwise, as virtually every climatologist in the world accepts the legitimacy of global warming and the fact that human activity has resulted in atmospheric warming and planetary climate change.<sup>35</sup> The

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<sup>35</sup> *See, e.g.,* See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *The Science of Climate Change* (1995) (attached as Exhibit 5); U.S. Climate Change Science Program, *Abrupt Climate Change* (Dec. 2008) (attached as Exhibit 6); James Hansen, et. al., *Global Surface Temperature Change*, REVIEWS OF GEOPHYSICS, 48, RG4004 (June 2010) (attached as Exhibit 7); *see also*, Richard A. Muller, *Conversion of a Climate Change Skeptic*, NEW YORK TIMES, July 28, 2012 (attached as Exhibit 8) (citing Richard A. Muller, et. al., *A New Estimate of the Average Earth Surface Temperature, Spanning 1753 to 2011*, (attached as Exhibit 9); Richard A. Muller, et. al., *Decadal Variations in the Global Atmospheric Land Temperatures* (attached as Exhibit 10)).

world's leading minds and most respected institutions – guided by increasingly clear science and statistical evidence – agree that dramatic action is necessary to avoid planetary disaster.<sup>36</sup> Greenhouse gas (“GHG”) concentrations have been steadily increasing over the past century,<sup>37</sup> and our insatiable consumption of fossil fuels is pushing the world to a tipping point where, once reached, catastrophic change will be unavoidable.<sup>38</sup> In fact, the impacts from climate change are already being experienced, with drought and extreme weather events becoming increasingly common.<sup>39</sup>

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<sup>36</sup> See, e.g., Rob Atkinson, et. al., *Climate Pragmatism: Innovation, Resilience, and No Regrets* (July 2011) (attached as Exhibit 11); Veerabhadran Ramanathan, et. al., *The Copenhagen Accord for Limiting Global Warming: Criteria, Constraints, and Available Avenues* (Feb. 2010) (attached as Exhibit 12); UNITED NATIONS, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Climate Change 2007: Synthesis Report* (2007) (attached as Exhibit 13); A.P. Sokolov, et. al., *Probabilistic Forecast for Twenty-First-Century Climate Based on Uncertainties in Emissions (without Policy) and Climate Parameters*, MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT) (Oct. 2009) (attached as Exhibit 14); UNITED NATIONS, FRAMEWORK CONVENTION ON CLIMATE CHANGE, *Report of the Conference of the Parties* (Dec. 2011) (attached as Exhibit 15); Bill McKibben, *Global Warming's Terrifying New Math*, ROLLING STONE, July 19, 2012 (attached as Exhibit 16); Elizabeth Muller, *250 Years of Global Warming*, BERKLEY EARTH, July 29, 2012 (attached as Exhibit 17); Marika M. Holland, et. al., *Future abrupt reductions in summer Arctic sea ice*, *Geophysical Research Letters*, Vol. 33, L23503 (2006) (attached as Exhibit 18).

<sup>37</sup> See Randy Strait, et. al., *Final Colorado Greenhouse Gas Inventory and Reference Case Projections: 1990-2020*, CENTER FOR CLIMATE STRATEGIES (Oct. 2007) (attached as Exhibit 19); Robin Segall et. al., *Upstream Oil and Gas Emissions Measurement Project*, U.S. ENVIRONMENTAL PROTECTION AGENCY (attached as Exhibit 20); Lee Gribovicz, *Analysis of States' and EPA Oil & Gas Air Emissions Control Requirements for Selected Basins in the Western United States*, WESTERN REGIONAL AIR PARTNERSHIP (Nov. 2011) (attached as Exhibit 21).

<sup>38</sup> See, e.g., James Hansen, *Tipping Point: Perspective of a Climatologist*, STATE OF THE WILD 2008-2009 (attached as Exhibit 22); GLOBAL CARBON PROJECT, *A framework for Internationally Co-ordinated Research on the Global Carbon Cycle*, ESSP Report No. 1 (attached as Exhibit 23); INTERNATIONAL ENERGY AGENCY, *CO<sub>2</sub> Emissions from Fuel Combustion, Highlights 2011* (attached as Exhibit 24); GLOBAL CARBON PROJECT, *10 Years of Advancing Knowledge on the Global Carbon Cycle and its Management* (attached as Exhibit 25); Malte Meinshausen, et. al., *Greenhouse-gas emission targets for limiting global warming to 2° C*, *NATURE*, Vol. 458, April 30, 2009 (attached as Exhibit 26).

<sup>39</sup> See, e.g., UNITED NATIONS, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (2011) (attached as Exhibit 27); Aiguo Dai, *Increasing drought under global warming in observations and models*, *NATURE: CLIMATE CHANGE* (Aug. 2012) (attached as Exhibit 28); Stephen Saunders, et. al., *Hotter and Drier: The West's Changed Climate* (March 2008) (attached as Exhibit 29).

Renowned NASA climatologist, Dr. James Hansen, provides the analogy of loaded dice – suggesting that there still exists some variability, but that climate change is making these extreme events ever more common.<sup>40</sup> In turn, climatic change and GHG emissions are having dramatic impacts on plant and animal species and habitat, threatening both human and species resiliency and the ability to adapt to these changes.<sup>41</sup> According to experts at the Government Accountability Office (“GAO”), federal land and water resources are vulnerable to a wide range of effects from climate change, some of which are already occurring. These effects include, among others, “(1) physical effects, such as droughts, floods, glacial melting, and sea level rise; (2) biological effects, such as increases in insect and disease infestations, shifts in species distribution, and changes in the timing of natural events; and (3) economic and social effects, such as adverse impacts on tourism, infrastructure, fishing, and other resource uses.”<sup>42</sup>

The agencies LMRP and FEIS is cognizant of these impacts, quoting the Intergovernmental Panel on Climate Change (“IPCC”) in providing that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20<sup>th</sup> century is very likely due to the observed increase in anthropogenic [human-made] greenhouse gas concentrations.” FEIS at 364. Specifically regarding the planning area, the agencies offer that “the observed temperature record in southwest Colorado shows average annual warming of about 2 degrees Fahrenheit over the past 30 years. Additional warming is predicted for the future.” Appendix G-1. Despite the strength of these findings, the agencies back away from taking serious action to address impacts, providing, for example: “The assessment of so-called ‘greenhouse gas’ emissions and climate change is in its formative phase; therefore, it is not yet possible to know with confidence the net impact to climate,” and that “[t]he lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts.” *Id.* at 364. This type of dismissive approach fails to satisfy the guidance outlined in Department of Interior Secretarial Order 3226, discussed below, or the

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<sup>40</sup> See, James Hansen, et. al., *Climate Variability and Climate Change: The New Climate Dice* (Nov. 2011) (attached as Exhibit 30); James Hansen, et. al., *Perception of Climate Change* (March 2012) (attached as Exhibit 31); James Hansen, et. al., *Increasing Climate Extremes and the New Climate Dice* (Aug. 2012) (attached as Exhibit 32).

<sup>41</sup> See Fitzgerald Booker, et. al., *The Ozone Component of Climate Change: Potential Effects on Agriculture and Horticultural Plant Yield, Product Quality and Interactions with Invasive Species*, J. INTEGR. PLANT BIOL. 51(4), 337-351 (2009) (attached as Exhibit 33); Peter Reich, *Quantifying plant response to ozone: a unifying theory*, TREE PHYSIOLOGY 3, 63-91 (1987) (attached as Exhibit 34).

<sup>42</sup> GAO Report, *Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources* (2007) (attached as Exhibit 35); see also Committee on Environment and Natural Resources, National Science and Technology Council, *Scientific Assessment of the Effects of Global Climate Change on the United States* (2008) (attached as Exhibit 36); Melanie Lenart, et. al. *Global Warming in the Southwest: Projections, Observations, and Impacts* (2007) (attached as Exhibit 37) (describing impacts from temperature rise, drought, floods and impacts to water supply on the southwest).

requirements of NEPA. “Reasonable forecasting and speculation is . . . implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labelling any and all discussion of future environmental effects as ‘crystal ball inquiry.’” *Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1246 n.9 (9<sup>th</sup> Cir. 1984 (quoting *Scientists’ Inst. for Pub. Info., Inc. v. Atomic Energy Comm.*, 481 F.2d 1079, 1092 (D.C. Cir. 1973))).

Nevertheless, the TRFO/SJNF provide a long list of changes and impacts already observed in the planning area. Such noted ecosystem impacts include:

- Between 2000 and 2005 sudden aspen decline has been prevalent in the planning area and has damaged over 17% of aspen forests in Colorado.
- Widespread and unprecedented episode of pinyon pine mortality in the Southwest and planning area, with millions of pinyon pine trees killed by pinyon Ips bark beetles between 2000 and 2005.
- The warming climate from 1978 to 2004 has caused the onset of spring snowpack melt and river snowmelt runoff to occur 2 to 3 weeks earlier in southwest Colorado.
- The incidence of wildfire has changed due to increased spring and summer temperatures and earlier onset of spring snowmelt, and since the 1980s large wildfires across the western United States have occurred with increased frequency and duration, with a lengthening fire season.
- Changes to the hydrologic system impacting rare plant species.
- Alpine ecosystems are also changing with upward encroachment of tree and subalpine plant species, and many alpine plant species are vulnerable as alpine habitat is impacted or lost.
- Coldwater fish species, especially native lineage greenback cutthroat trout and Colorado River cutthroat trout may be especially vulnerable to increasing water temperatures and hydrologic changes such as reduced late-season base flows.

Appendix G-1, G-2.

While the agencies are to be commended for identifying and creating a strategy to address these impacts from climate change – noting that “[m]aintaining the health, diversity, and productivity of the SJNF and TRFO is a primary mission” – the agencies stop short of taking all of the meaningful actions available to them to address the cause of anthropogenic climate change; i.e., the GHG emissions that will result from the production and combustion of fossil fuel resources in the planning area. *Id.* at G-2.

“Oil and gas development activities on the SJNF and TRFO are predicted to produce greenhouse gas emissions. The amount of CO<sub>2</sub> and CH<sub>4</sub> emissions associated with well development on new federal leases for the RFD scenario were estimated for well drilling, well completion, and gas production.” *Id.* at 364. The agencies reference relatively modest figures for GHG emissions, estimating emissions totaling “88,281 tons of CO<sub>2</sub> per year and 399 tons of CH<sub>4</sub> per year (9,975 tons of CO<sub>2</sub> equivalents as CH<sub>4</sub>).” *Id.* However, these emissions account for only a relatively narrow set of production operations, only including emissions from drill rig engines, hydraulic fracturing engines, compressor engines, and well pad separators. *Id.* at 365 (table 3.12.21). These figures fail to account for other oil and gas operation emissions, fugitive oil and

gas emissions, as detailed below, and, notably, fails to address the GHG emissions associated with burning these fossil fuel resources.

The FEIS provides that “[i]n 2004, 331,000 barrels of oil and 89 billion cubic feet (BCF) of gas were produced in the planning area, excluding CO<sub>2</sub> production. CO<sub>2</sub> production from three wells in Montezuma County added another 321 BCF to the total gas produced in the area.” *Id.* at 486. The agencies RFD predicts: “an ultimate production volume of 9 million barrels of oil (MMBO) and 3.25 trillion cubic feet of gas (TCFG) could be recovered from these 1,185 projected wells during the 15-year (2006-2020) scenario period,” estimates which are carried over from the agencies 2006 RFD. 2009 Addendum to the RFD, at 5-6. However, the 2009 RFD Addendum projects an additional 1,769 Gothic shale gas wells on all lands in the planning area during the 15-year (2009-2023) analysis period, which could produce an additional 2.7 trillion cubic feet of gas (“TCFG”) in the planning area by the end of Year 2023 – resulting in a RFD scenario total of 5.95 TCFG of production. *Id.* at 6. Moreover, the 2000 USGS National Assessment estimates oil and gas resources in the San Juan Basin and Paradox basin include 519 million barrels of oil and 51.5 trillion cubic feet of gas (which doesn’t even include shale gas resources that would significantly increase this estimate). FEIS at 487.

There is a lapse in data and analysis regarding these production estimates and their respective contribution to planning area GHG emissions, seriously undermining the agencies conclusions and treatment of climate change while also failing to take the hard look that NEPA demands. As noted above, NEPA imposes “action forcing procedures ... requir[ing] that agencies take a *hard look* at environmental consequences.” *Methow Valley*, 490 U.S. at 350 (citations omitted) (emphasis added). These “environmental consequences” may be direct, indirect, or cumulative. 40 C.F.R. §§ 1502.16, 1508.7, 1508.8. BLM is required to take a hard look at those impacts as they relate to the agency action, and the LRMP and FEIS fail to provide this hard look analysis. “Energy-related activities contribute 70% of global GHG emissions; oil and gas together represent 60% of those energy-related emissions through their extraction, processing and subsequent combustion.”<sup>43</sup> Even if science cannot isolate each additional oil or gas well’s contribution to these overall emissions, this does not obviate BLM’s responsibility to consider oil and gas development in the planning area from the cumulative impacts of the oil and gas sector. In other words, the BLM and USFS cannot ignore the larger relationship that oil and gas management decisions have to the broader climate crisis that we face. Here, the LRMP failed to include the full scope of GHG emissions into its analysis, and, thus, failed to provide the hard look detailed analysis of impacts that NEPA demands. *See Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1379 (9<sup>th</sup> Cir. 1998) (“To ‘consider’ cumulative effects, some quantified or detailed information is required. Without such information, neither the courts nor the public, in reviewing the [agency’s] decisions, can be assured that the [agency] provided the hard look that it is required to provide.”). If we are to stem climate disaster – the impacts of which we are already experiencing – the agencies resource management decisions, as here, must be reflective of this reality and plan accordingly.

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<sup>43</sup> International Investors Group on Climate Change, *Global Climate Disclosure Framework for Oil and Gas Companies* (attached as Exhibit 38).

BLM is, at the end of the day, responsible for the management of 700 million acres of federal onshore subsurface minerals.<sup>44</sup> Indeed, “the ultimate downstream GHG emissions from fossil fuel extraction from federal lands and waters by private leaseholders could have accounted for approximately 23% of total U.S. GHG emissions and 27% of all energy-related GHG emissions.”<sup>45</sup> This suggests that “ultimate GHG emissions from fossil fuels extracted from federal lands and waters by private leaseholders in 2010 could be more than 20-times larger than the estimate reported in the CEQ inventory, [which estimates total federal emissions from agencies’ operations to be 66.4 million metric tons]. Overall, ultimate downstream GHG emissions resulting from fossil fuel extraction from federal lands and waters by private leaseholders in 2010 are estimated to total 1,551 [million metric tons of CO<sub>2</sub> equivalent (“MMTCO<sub>2</sub>e”)].” *Id.* In 2010, the GAO estimated that BLM could eliminate up to 40% of methane emissions from federally authorized oil and natural gas development, the equivalent of eliminating 126 Bcf or 46.3 MMTCO<sub>2</sub>e of GHG pollution annually and equivalent to roughly 13 coal-fired power plants.<sup>46</sup> To suggest that the agency does not, here, have to account for GHG pollution from activity authorized by the LRMP and FEIS, is to suggest that the collective 700 million acres of subsurface mineral estate is not relevant to protecting against climate change. This sort of flawed, reductive thinking is problematic, and contradicted by the agency’s very management framework that provides a place-based lens to account for specific pollution sources to ensure that the broader public interest is protected. Therefore, even though climate change emissions from the Alternatives may look minor when viewed in isolation, when considered cumulatively with all of the other GHG emissions from BLM-managed land, they become significant and cannot be ignored.

Moreover, research conducted by the National Research Council has confirmed the fact that the negative impacts of energy generation from fossil fuels are not represented in the market price for such generation.<sup>47</sup> In other words, failing to internalize the externalities of energy

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<sup>44</sup> See DOI-BLM, *Mineral and Surface Acreage Managed By BLM*, available at: [http://www.blm.gov/wo/st/en/info/About\\_BLM/subsurface.html](http://www.blm.gov/wo/st/en/info/About_BLM/subsurface.html).

<sup>45</sup> Stratus Consulting, prepared for: The Wilderness Society, *Greenhouse Gas Emissions from Fossil Energy Extracted from Federal Lands and Waters*, Feb. 1, 2012 (attached as Exhibit 39).

<sup>46</sup> GAO, *Federal Oil & Gas Leases: Opportunities Exist to Capture Vented and Flared Natural Gas, Which Would Increase Royalty Payments and Reduce Greenhouse Gases*, GAO-11-34 at 12 (Table 1)(October 2010) (attached as Exhibit 46). This GHG equivalence assumes a CH<sub>4</sub> warming potential of 72 (20-year warming period) as per the Intergovernmental Panel on Climate Change’s Fourth Assessment Report and using EPA’s GHG equivalencies calculator.

<sup>47</sup> See, e.g., National Research Council, *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use* (2010) (attached as Exhibit 40); Nicholas Muller, et. al., *Environmental Accounting for Pollution in the United States Economy*, AMERICAN ECONOMIC REVIEW at 1649-1675 (Aug. 2011) (attached as Exhibit 41); see also, Generation Investment Management, *Sustainable Capitalism*, (Jan. 2012) (advocating a paradigm shift to *Sustainable Capitalism*; “a framework that seeks to maximize long-term economic value creation by

generation from fossil fuels – such as the impacts to climate change and human health – has resulted in a market failure that requires government intervention. The agencies should be mindful of this cost failure as they evaluate our nation’s dependence on dirty energy from oil and gas – particularly as it relates to other incompatible resource values deserving protection in the planning area. Moreover, the federal working group addressing the social cost of carbon (“SCC”) has released new estimates that revise significantly upward the costs associated with GHG pollution, with median impacts pegged at \$43 and \$65 per ton.<sup>48</sup> However, the LRMP and FEIS have failed to meaningfully contemplate a transition to renewable energy generation; not only as an alternative which may eventually suppress demand for oil and gas resources, but also as a pathway toward mitigating climate change as it relates to agency decisionmaking on federal lands.<sup>49</sup>

Despite the agencies noted impacts to climate change, the TRFO/SJNF’s preferred alternative would authorize oil and gas development in a manner that suggests it has no power whatsoever to influence broader events. Agency decisionmaking – particularly at the RMP stage, where fundamental land use choices are made – must be reflective of this broader reality, and the agencies failure to account for the full lifecycle of oil and gas production represents an incurable deficiency in the LRMP and FEIS. As discussed more fully below, BLM not only has the authority, but an obligation to address GHG emissions and methane waste. Furthermore, the agencies must consider not only the cumulative impact of the GHG emissions authorized by the revised LRMP, it must also consider those emissions combined with other activity in the area. As the noted above, “[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct.” *Ctr. for Biological Diversity*, 538 F.3d 1172, 1217. The agency’s failure to assess cumulative impacts, particularly, as here, the cumulative impacts of climate change, “impermissibly subject[s] the decisionmaking process contemplated by NEPA to ‘the tyranny of small decisions.’ ” *Kern*, 284 F.3d at 1078 (citation omitted).

#### **a. Methane Emissions and Waste**

The agencies are to be commended for taking action to address the serious issue of methane (“CH<sub>4</sub>”) emissions and waste in the oil and gas production process. “Much emphasis is also put into reducing CH<sub>4</sub> emissions from drilling and gas production activities. Reducing CH<sub>4</sub>

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reforming markets to address real needs while considering *all* costs and stakeholders.”) (attached as Exhibit 42).

<sup>48</sup> See Interagency Working Group on the Social Cost of Carbon, United States Government, *Technical Support Document: Technical Update on the Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866* (May 2013) (attached as Exhibit 43).

<sup>49</sup> See, e.g., INTERNATIONAL ENERGY AGENCY, *Energy Technology Perspectives 2012: Pathways to a Clean Energy System* (2012) (attached as Exhibit 44); UNITED NATIONS, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Renewable Energy Sources and Climate Change Mitigation* (2012) (attached as Exhibit 45).



emissions would reduce emissions of a significant greenhouse gas and increase CH<sub>4</sub> gas revenue sales benefitting both the operator and the federal government.” FEIS at 373.

Despite the agencies pioneering action, however, they offer no estimate of the current or projected methane emission rates from drilling and production activities; making it impossible to provide a detailed hard look analysis of the agencies mitigation strategy. Such emission rates can differ quite dramatically from one oil and gas field to the next, and, depending on the type of mitigation and emission controls employed, emissions can range anywhere from 1% to 12% of production.<sup>50</sup>

Here, the agencies RFD scenario predicts an ultimate production volume of 5.95 trillion cubic feet of gas (“TCFG”), from 2,954 projected wells across the planning area, during the 15-year scenario period – based on 3.25 TCFG from 1,185 wells in the Paradox Basin, Northern San Juan Basin, and San Juan Sag, as well as 2.7 TCFG from 1,769 wells in the Gothic Shale Gas Play. *See* 2009 Addendum to the RFD, at 5-6.

5,950 billion cubic feet of gas (“BCFG”) is equivalent to 2406.78 MMTCO<sub>2</sub>e.<sup>51</sup>

Assuming a lower-bound leak rate of 1% – which is approximately one-third lower than the EPA estimate of methane emissions in the Inventory of U.S. GHG Emissions and Sinks: 1990-2011<sup>52</sup> – methane emissions from gas production in the planning area over the 15-year planning period would be 24.07 MMTCO<sub>2</sub>e, which is equivalent to the annual CO<sub>2</sub> emissions of 6.8 coal plants.<sup>53</sup>

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<sup>50</sup> *See, e.g.,* David T. Allen, et. al., *Measurements of methane emissions at natural gas production sites in the United States*, PNAS (Aug. 19, 2013) (finding emissions as low as 1.5% of production at select sites) (attached as Exhibit 66); Anna Karion, et. al., *Methane emissions estimate from airborne measurements over a western United States gas field*, GEOPHYSICAL RESEARCH LETTERS (Aug. 27, 2013) (finding emissions of 6 to 12 percent, on average, in the Uintah Basin) (attached as Exhibit 67). *See also*, Joe Romm, *Study of Best Fracked Wells Finds Low Methane Emissions But Skips Super-Emitters*, CLIMATE PROGRESS (September 19, 2013), available at: <http://thinkprogress.org/climate/2013/09/19/2646881/study-fracked-wells-methane-emissions-super-emitters/>.

<sup>51</sup> *See* GAO-11-34 (2010) at 25 (using a conversion factor of .4045 MMTCO<sub>2</sub>e/Bcf for vented gas) (attached above as Exhibit 46).

<sup>52</sup> *See* U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011* (April 2013) (attached as Exhibit 51).

<sup>53</sup> *See* U.S. Environmental Protection Agency, *Greenhouse Gas Equivalencies Calculator*, available at: <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>.

Assuming an upper-bound leak rate of 12%, the high end of the rate found in a 2012 study using air sampling over the Uinta Basin,<sup>54</sup> methane emissions from gas production in the planning area over the 15-year planning period would be 288.81 MMTCO<sub>2</sub>e, which is equivalent to the annual CO<sub>2</sub> emissions of 81.7 coal plants.

Although there is substantial variability between the 1% and 12% emission leak rates – and, even without specific data from the planning area, we can assume leakage somewhere between these two extremes – even at the low end emissions are not trivial, as, here, production volume leakage represents the equivalent annual emissions of between 6.8 and 81.7 coal fired power plants.

Even setting aside the issue of climate change, every ton of methane emitted to the atmosphere from oil and gas development is a ton of natural gas *lost*. Every ton of methane lost to the atmosphere is therefore a ton of natural gas that cannot be used by consumers. Methane lost from federal leases may also not yield royalties otherwise shared between federal, state, and local governments. This lost gas reflects serious inefficiencies in how BLM oil and gas leases are developed. Energy lost from oil and gas production – whether avoidable or unavoidable – reduces the ability of a lease to supply energy, increasing the pressure to drill other lands to supply energy to satisfy demand. 40 C.F.R. §§ 1502.16(e)-(f). In so doing, inefficiencies create indirect and cumulative environmental impacts by increasing the pressure to satisfy demand with new drilling. 40 C.F.R. §§ 1508.7, 1508.8(b).

#### **i. Mineral Leasing Act’s duty to prevent waste.**

Conservation Groups, and in particular WELC, have been urging field offices throughout the West to adopt common sense and economical measures to address the issue of fugitive methane waste. As exercised here by the TRFO/SJNF, the agencies have expansive authority – and, indeed, the responsibility and opportunity – to prevent the waste of oil and gas resources, in particular methane, which is the primary constituent of natural gas. The Mineral Leasing Act of 1920 (“MLA”) provides that “[a]ll leases of lands containing oil or gas ... shall be subject to the condition that the lessee will, in conducting his explorations and mining operations, use all reasonable precautions to prevent waste of oil or gas developed in the land...” 30 U.S.C. § 225; *see also* 30 U.S.C. § 187 (“Each lease shall contain...a provision...for the prevention of undue waste...” As the MLA’s legislative history teaches, “conservation through control was the dominant theme of the debates.” *Boesche v. Udall*, 373 U.S. 472, 481 (1963) (citing H.R.Rep. No. 398, 66th Cong., 1st Sess. 12-13; H.R.Rep. No. 1138, 65th Cong., 3d Sess. 19 (“The legislation provided for herein...will [help] prevent waste and other lax methods....”)).

BLM’s implementing regulations, reflecting these provisions, currently provide that “[t]he objective” of its MLA regulations in 43 C.F.R. Subpart 3160 “is to promote the orderly

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<sup>54</sup> *See* Brian Maffly, *Uinta Basin gas leakage far worse than most believe*, THE SALT LAKE TRIBUNE (Aug 05, 2013), available at: <http://www.sltrib.com/sltrib/news/56692751-78/basin-carbon-emissions-gas.html.csp> (“Between 6 percent and 12 percent of the Uinta Basin’s natural gas production could be escaping into the atmosphere.”).

and efficient exploration, development and production of oil and gas. 43 C.F.R. § 3160.0-4. In part, “orderly and efficient” operations are ensured through unitization or communitization agreements. 43 C.F.R. §§ 3161.2, 3162.2-4(b) (BLM authority to require lessees unitization or communitization agreements); 43 C.F.R. Subpart 3180 (general rules pertaining to drilling unit agreements). Such unit agreements, because they may limit BLM authority in subsequent stages, are therefore important tools for preventing waste. *See William P. Maycock et al.*, 177 IBLA 1, 20-21 (Dec. Int. 2008) (“BLM is not required to analyze an alternative that is [n]ot feasible because it is inconsistent with the basic presumption of the Unit Agreement and BLM cannot legally compel the operator to adopt that alternative under the terms of the Unit Agreement”).

Critically, subpart 31360 specifically requires BLM officials to ensure “that all [oil and gas] operations be conducted in a manner which protects other natural resources and the environmental quality, protects life and property and results in the *maximum ultimate recovery of oil and gas with minimum waste and with minimum adverse effect on the ultimate recovery of other mineral resources.*” 43 C.F.R. § 3161.2 (emphasis added). The lease owner and or operator is, similarly, charged with “conducting all operations in a manner which ensures the proper handling, measurement, disposition, and site security of leasehold production; which protects other natural resources and environmental quality; which protects life and property; and *which results in maximum ultimate economic recovery of oil and gas with minimum waste and with minimum adverse effect on ultimate recovery of other mineral resources.*” 43 C.F.R. § 3162.1(a) (emph. added). Waste is defined as “(1) A reduction in the quantity or quality of oil and gas ultimately producible from a reservoir under prudent and proper operations; or (2) avoidable surface loss of oil or gas.” 43 C.F.R. § 3160.0-5. Avoidable losses of oil or gas are currently defined as including venting or flaring without authorization, operator negligence, failure of the operator to take “all reasonable measures to prevent and/or control the loss,” and an operator’s failure to comply with lease terms and regulations, order, notices, and the like. *Id.*

In many respects, we think that BLM’s current rules can be tightened. Regardless, it is clear that BLM’s expansive authority, responsibility, and opportunity to prevent waste must permeate the agency’s full planning and decisionmaking processes for oil and gas, as the agencies have taken steps to accomplish, here. This ensures that BLM and USFS take advantage of not only proven, often economical technologies and practices to prevent methane waste, but, further, the agency’s tools to ensure the orderly and efficient exploration, development, and production of oil and gas through controls placed on the very scale, pace, and nature of development. Moreover, it is clear that BLM’s authority, responsibility, and opportunity extends to both existing and future oil and gas development. BLM, ultimately, manages the federal – i.e., publicly owned – onshore oil and gas resource in trust for the American people.

## **ii. President Obama’s Climate Action Plan and Secretarial Order 3289.**

President Obama’s June Climate Action Plan explains that “[c]urbing emissions of methane is critical to our overall effort to address global climate change.” P.10. The President’s call for action ties in nicely with BLM’s authorities and responsibilities, beyond the MLA, to reduce methane emissions.

The starting point is the Federal Land Policy and Management Act of 1976 (“FLPMA”). Pursuant to FLPMA, the agencies must manage the public lands:

in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, *air and atmospheric*, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition, that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use.

43 U.S.C. § 1701(a)(8) (emphasis added). The BLM and USFS, as a multiple use agencies, must also manage the public lands and the oil and natural gas resource to “best meet the present and future needs of the American people” and to ensure that management “takes into account the long-term needs of future generations for . . . non-renewable resources, including . . . minerals.” 43 C.F.R. § 1702(c). Put differently, the driving force behind agency-authorized oil and gas development is the long-term, and broad, public interest – not the often short-term, and narrow, interest of oil and gas companies. The agencies duty to prevent waste must account for this driving force.

Here, BLM and USFS are to ensure that these objectives and duties are adhered to through the completion of LRMP, which must, *inter alia*, “use and observe the principles of multiple use and sustained yield” and “weigh long-term benefits to the public against short-term benefits.” See 43 U.S.C. § 1712(c)(1), (7). Thus, the TRFO/SJNF have a substantive duty to consider the enduring legacy of oil and gas development in land management decisionmaking, which is to be balanced against other critical multiple use resource values.

Additionally, the BLM, as an agency within the U.S. Department of Interior, is subject to Secretarial Order 3289 (Dept. Int. Sept. 14, 2009). Secretarial Order 3289, in section 3(a), provides that BLM “must consider and analyze climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, developing multi-year management plans, and making major decisions regarding potential use of resources under the Department’s purview.” Section 3(a) of Secretarial Order 3289 also reinstated Secretarial Order 3226 (January 19, 2001). Secretarial Order 3226 commits the Department of the Interior to address climate change through its planning and decisionmaking processes. As the Order explains, “climate change is impacting natural resources that the Department of the Interior (Department) has the responsibility to manage and protect.” Sec. Or. 3226, § 1. The Order therefore “ensures that climate change impacts are taken into account in connection with Department planning and decision making.” *Id.* The Order obligates BLM to “consider and analyze potential climate change impacts” in four situations: (1) “when undertaking long-range planning exercises”; (2) “when setting priorities for scientific research and investigations”; (3) “when developing multi-year management plans, and/or” (4) “when making major decisions regarding the potential utilization of resources under the Department’s purview.” *Id.* § 3. The Order specifically provides that “Departmental activities covered by this Order” include “management plans and activities developed for public lands” and “*planning and management activities associated with oil, gas and mineral development on public lands.*” *Id.* (emphasis

added). BLM's oil and gas decisions are thus contemplated by and subject to section 3 of the Order.

These authorities and responsibilities can be properly exercised through effective use of NEPA. To comply with NEPA, the BLM and USFS must take a hard look at direct, indirect, and cumulative impacts, as discussed above. 40 §§ C.F.R. 1502.16(a), (b); 1508.25(c). In evaluating impacts, the agencies must discuss “[e]nergy requirements and conservation potential of various alternatives and mitigation measures,” “[n]atural or depletable resource requirements and conservation potential of various alternatives and mitigation measures,” and “[m]eans to mitigate adverse environmental impacts (if not fully covered under 1502.14(f)).” 40 C.F.R. §§ 1502.16(e), (f), (h).

We emphasize, here, the “heart” of the NEPA process: BLM's duty to consider “alternatives to the proposed action” and to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” 42 U.S.C. §§ 4332(2)(C)(iii), 4332(2)(E); 40 C.F.R. § 1502.14(a). Alternatives, discussed more fully below, are critical because, “[c]learly, it is pointless to ‘consider’ environmental costs without also seriously considering action to avoid them.” *Calvert Cliffs’ Coordinating Comm., Inc. v. U.S. Atomic Energy Comm.*, 449 F.2d 1109, 1128 (D.C. Cir. 1971). Operating in concert with NEPA's mandate to address environmental impacts, BLM's fidelity to alternatives analysis helps “sharply defin[e] the issues and provid[e] a clear basis for choice among options by the decision maker and the public.” 40 C.F.R. § 1502.14. An agency must, accordingly, “[r]igorously explore and objectively evaluate all reasonable alternatives” and specifically “[i]nclude the alternative of no action.” 40 C.F.R. §§ 1502.14(a), (d). Even where impacts are “insignificant,” BLM must still consider alternatives. *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1229 (9<sup>th</sup> Cir. 1988) (agency's duty to consider alternatives “is both independent of, and broader than,” its duty to complete an environmental analysis); *Greater Yellowstone Coalition v. Flowers*, 359 F.3d 1257, 1277 (10<sup>th</sup> Cir. 2004) (duty to consider alternatives “is ‘operative even if the agency finds no significant environmental impact’”).

### **iii. The agencies have taken pioneering action to mitigate methane emissions.**

Here, the agencies have taken pioneering action to address the issue of methane waste. The Final San Juan National Forest and Proposed Tres Rios Field Office LRMP breaks new and essential ground in acknowledging the GHG pollution resulting from oil and gas development on federal lands, and in establishing mandatory mitigation measures at the planning stage that will bind future leases and permits to drill to comply with these measures. As the FEIS notes:

NEPA analysis is typically conducted for oil and gas leasing and when permits are issued. **This FEIS is the first NEPA analysis where lands that could be made available for lease are identified and stipulated.** In a subsequent analysis stage, when there is a site-specific proposal for development, additional air quality impact analysis would occur. This typically occurs when an application for a permit to drill is submitted.

Based on the analysis results, additional mitigation or other equally effective options could be considered to reduce air pollution.

FEIS at 372 (emphasis added). The TRFO/SJNF are to be strongly commended for recognizing that the climate change impacts from oil and gas industry activities are cumulative and that reducing methane losses from business-as-usual industry practices at the field office level contribute significantly to climate change and must be mitigated. In this FEIS, the TRFO/SJNF also recognize that methane emissions represent waste of a key natural resource that belongs to all U.S. citizens and failure to control such waste robs mineral owners and the U.S. and state treasuries of royalty revenues. Accordingly, the agencies have adopted six important methane mitigation measures, which include:

- Centralized Liquid Gathering Systems and Liquid Transport Pipelines
- Reduced Emission Completions/Recompletions (green completions)
- Low-Bleed/No-Bleed Pneumatic Devices on all New Wells
- Dehydrator Emissions Controls
- Replace High-bleed Pneumatics with Low-Bleed/No-Bleed or Air-Driven Pneumatic Devices on all Existing Wells; and
- Electric Compression

Green completions are a widely recognized Best Management Practice (“BMPs”) for controlling methane emissions, as are dehydrator emissions controls. Electric compression is at best a partial measure for compressors – a significant source of methane emissions – since its application as adopted in the FEIS would be limited to locations able to access the electric grid. Compressors not able to access the grid would need enhanced maintenance or conversion to dry seals to reduce methane emissions.

An especially noteworthy measure is the requirement for operators to replace high-bleed pneumatic devices with low-bleed, no-bleed, or air-driven devices on all existing wells as well as on all new wells. See FEIS at 376. Recent research (David T. Allen *et. al.*, 2013) has found methane emissions from pneumatic devices to be higher than that currently estimated by the EPA, making pneumatics a particularly important source for targeting emissions controls. In justifying this requirement, the TRFO/SJNF found:

The cost to inventory and replace high-bleed pneumatics with low-bleed pneumatic devices on existing oil and gas wells located on federal land is not high compared to the value of CH<sub>4</sub> gas lost to the atmosphere. Most replacement costs are recouped in under 1 year, resulting in a large economic benefit for industry. This measure could be applied to any existing gas well on the SJNF and TRFO.

*Id.* at 376.

**iv. Additional methane mitigation measures should be adopted, and additional analysis is required.**

There are, however, several widely recognized BMPs for mitigating methane emissions that have not been adopted by the TRFO/SJNF in the FEIS. We believe that most, if not all of these measures should be considered and adopted, both because they can reduce methane emissions from significant emissions sources and because they have also been shown to have very quick paybacks from the sale of captured methane, even at today's low gas prices. The most important of these additional measures include:

- Liquids Unloading (using plunger lifts or other deliquification technologies)
- Improved Compressor Wet Seal Maintenance/Replacement with Dry Seals
- Vapor Recovery Units on Storage Vessels
- Pipeline Best Management Practices; and
- Leak Detection and Repair

These and other mitigation measures are included among Best Management Practices that have been identified by BLM, EPA, the State of Colorado, and other organizations, as detailed below. *See Appeal Addendum* for listings of these BMPs by source.

Another area of concern to Conservation Groups is the effectiveness of the mitigation measures adopted to ensure that the methane captured is able to make it to market for sale and the realization of rapid payback. This concern is raised in particular by the BLM San Juan Public Lands Office's "2009 Addendum to the Oil and Gas Potential and Reasonable Foreseeable Development Scenarios in the San Juan National Forest and BLM Public Lands, Colorado" (the "Addendum"), with respect to the Centralized Liquid Gathering Systems and Liquid Transport Pipelines mitigation measure adopted in the FEIS.

The original RFD and the Addendum forecast additional future oil and gas drilling and production in two locations in the planning area. The original RFD forecast 1185 new conventional and coal-bed methane ("CBM") wells throughout the planning area, producing 9 million barrels of oil and 3.25 trillion cubic feet ("TCF") of gas through the end of the initial planning period (2021). Addendum at 9. The Addendum forecasts 1769 new unconventional wells in the Gothic Shale Gas Play in the Paradox Basin area, producing 2.7 TCF of gas through the adjusted planning period (2023). Addendum at 37 (Table 7). Combined, a total of almost 3000 new wells are forecast for the planning area during this period.

The first issue raised by the Addendum for implementation of the Centralized Liquid Gathering Systems and Liquid Transport Pipelines mitigation measure is the prevalence of drilling on private lands and the phased nature of foreseeable development. According to the Addendum, in the Gothic Shale Gas Play, private lands constitute 42% of surface ownership and

34% of the mineral estate. Addendum at 5. The Addendum states: “Since 2006, most of the leasing, permitting, and drilling activity in the Gothic Shale Gas Play has been focused on private fee lands along the western boundary of the trend.” Addendum at 5. Additionally, of the 1769 wells forecast for the Gothic Shale Gas Play, 750 or 42% are forecast to occur on private lands. Addendum at 37 (Table 7).

The proposed liquids gathering and treatment mitigation measure would “require pipelines to transport condensate and other liquids for non-wildcat wells via pipelines and use centralized liquids gathering systems,” and would apply to both Paradox Basin conventional and shale gas wells. FEIS at 374. It would also require “[t]reating fluids at a centralized production and collection facility....” *Id.* It is not clear how the TRFO/SJNF will be able to enforce this mitigation measure given the prevalence of oil and gas development on private lands. Conservation Groups request additional information about how liquids gathering and treatment infrastructure can be planned and built in a timely fashion by operators serving oil and gas development on both private and public lands.

Additionally, the Addendum identifies three phases of development, “... an initial, slow exploratory and appraisal phase of drilling activity between Years 0-7 (2009-2015), followed by a period dominated by increased drilling of appraisal and field development wells during Years 8-12 (2016-2020), with a final period of infill development drilling through Years 13-15 (2021-2023).” Addendum at 35. In terms of drilling activity:

The projected 1,769 wells equated to an average annual drilling rate of 118 wells per year from 2009 to 2023. More specifically, the drilling of 186 wells is predicted during the initial exploratory and appraisal phase of activity (Years 0-7) from 2009 to 2015, with an additional 819 new wells drilled during an intermediate phase of field development (Years 8-12) from 2016 to 2020, and followed by the drilling of 764 more wells during the final stage of infill field development in the trend (Years 13-15) from 2021 to 2023.

Addendum at 35. Again, it is unclear how the agencies will require operators on private and public lands to coordinate development over these phases to ensure that centralized liquids gathering and treatment investments are made prior to the appraisal and field development phase when production increases dramatically. The agencies should identify and describe the mechanisms they plan to employ to achieve this desirable outcome.

The second issue raised by the Addendum is how gas (as opposed to liquids) captured by implementation of the mitigation measures adopted will enter sales gas lines and make it to market, as opposed to simply being flared and wasted. The Addendum describes the development of several exploratory wildcat wells in the Gothic Shale Gas Play. *See* Addendum at 25, 26. Rather serendipitously, these wells were apparently located in proximity to an interstate sales line with the capacity and technical ability to carry the gas produced. The Addendum reports:

In December 2008, BBC [Bill Barrett Corporation] tied directly into Williams’ Northwest interstate pipeline system and placed the first Gothic shale gas



completion online. A total of three wells have been connected to the sales line since that time with gas production reaching approximately 2 million cubic feet of gas per day (MMCFG/D) in February 2009 from the three completions.

Addendum at 27. Conservation Groups believe that the agencies should spell-out whether all of the gas captured by the mitigation measures adopted is expected to have similar access to a sales line, or whether some or all of it will be sent to flares and wasted. If the latter, Conservation Groups believe that additional mitigation measures should be instituted, comparable to the measure adopted for liquids, requiring planning and timely development of gas gathering and treatment infrastructure to ensure that GHG emissions are reduced, that revenues from gas sales are maximized for the realization of paybacks for operators, royalty payments for the federal and state governments, and that waste of this important resource is minimized.

**v. The capture of methane is critical due to its global warming potential.**

Ensuring compliance with the agencies methane waste obligations through proper analysis and documentation in the NEPA process is important: technologies and practices change, and the agencies duty to prevent degradation and waste cannot be excused just because the agency apparently lags behind the technological curve. The GAO's 2010 report noted that BLM's existing waste prevention guidance – Notice to Lessees and Operators (“NTL”) 4a – was developed in 1980, well before many methane reduction technologies and practices were developed and understood. GAO also found that NTL 4a does not “enumerate the sources that should be reported or specify how they should be estimated.”<sup>55</sup> Problematically, GAO noted “that [BLM] thought the industry would use venting and flaring technologies if they made economic sense,” a perspective which assumes – wrongly – that markets work perfectly in the absence of necessary regulatory signals and is belied by the lack of information about the magnitude of methane waste and the documented, if still poorly understood, barriers to the deployment of GHG reduction technologies and practices. *Id.* at 20-33. Compounding the problem, GAO also “found a lack of consistency across BLM field offices regarding their understanding of which intermittent volumes of lost gas should be reported to [the Oil and Gas Operations Report].” *Id.* at 11. BLM, to its credit, conceded: “existing guidance was outdated given current technologies and said that they were planning to update it by the second quarter of 2012.” *Id.* at 27.

Indeed, a Report released by NRDC identified that “[c]apturing currently wasted methane for sale could reduce pollution, enhance air quality, improve human health, conserve energy resources, and bring in more than \$2 billion of additional revenue each year.”<sup>56</sup> Moreover, the Report further identified ten technically proven, commercially available, and profitable methane

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<sup>55</sup> See GAO-11-34 (2010) at 11, 27 (attached above as Exhibit 46).

<sup>56</sup> Susan Harvey, et al., *Leaking Profits: The U.S. Oil and Gas Industry Can Reduce Pollution, Conserve Resources, and Make Money by Preventing Methane Waste* (March 2012) (attached as Exhibit 47).

emission control technologies that together can capture more than 80 percent of the methane currently going to waste. *Id.* Such technologies must also be considered in BLM’s alternatives analysis.

Preventing GHG pollution and waste is particularly important in the natural gas context, where there is an absence of meaningful lifecycle analysis of the GHG pollution emitted by the production, processing, transmission, distribution, and combustion of natural gas. Although natural gas is often touted as a ‘cleaner’ alternative to dirty coal, recent evidence indicates that this may not, in fact be the case – and, at the least, indicates that we must first take immediate, common sense action to reduce GHG pollution from natural gas before it can be safely relied on as an effective tool to transition to a clean energy economy (a noted priority of this Administration).<sup>57</sup> A recent report by Climate Central addresses the leak rates estimated by various sources and the impacts of this new information on assertions that natural gas is a cleaner fuel than coal, ultimately concluding that given the losses from oil and gas sources it would be decades before switching electricity generation from coal to natural gas could bring about significant reductions in emissions.<sup>58</sup> As noted above, the TRFO/SJNF have taken a pioneering first step in addressing the issue of fugitive emissions and waste, and Conservation Groups urge the agencies to strengthen this path through additional hard look analysis and enforceable mitigation requirements.

Oil and natural gas systems are the biggest contributor to methane emissions in the United States, accounting for over one quarter of all methane emissions.<sup>59</sup> In light of serious controversy and uncertainties regarding GHG pollution from oil and gas development, the agencies quantitative assessment should account for methane’s long-term (100-year) global warming impact and, also, methane’s short-term (20-year) warming impact using the latest peer-reviewed science to ensure that potentially significant impacts are not underestimated or ignored. *See* 40 C.F.R. § 1508.27(a) (requiring consideration of “[b]oth short- and long-term effects”).

EPA’s GHG Inventory – which BLM has historically relied upon in its analysis – assumes that methane is 21 times as potent as carbon dioxide (“CO<sub>2</sub>”) over a 100-year time horizon,<sup>60</sup> a global warming potential (“GWP”) based on the Intergovernmental Panel on

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<sup>57</sup> Robert W. Howarth, *Assessment of the Greenhouse Gas Footprint of Natural Gas from Shale Formations Obtained by High-Volume, Slick-Water Hydraulic Fracturing* (Rev’d. Jan. 26, 2011) (attached as Exhibit 48). *See also* Robert W. Howarth et al., *Venting and Leaking of Methane from Shale Gas Development: Response to Cathles et al.* (2012) (attached as Exhibit 49); Eric D. Larson, PhD, Climate Central, *Natural Gas and Climate Change* (May 2013) (attached as Exhibit 50).

<sup>58</sup> *See* Larson, attached above as Exhibit 50.

<sup>59</sup> *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011* (attached above as Exhibit 51).

<sup>60</sup> *See* 78 Fed.Reg. 19802, April 2, 2013 (EPA proposal to increase methane’s GWP to 25 times CO<sub>2</sub>).

Climate Change's ("IPCC") Second Assessment Report from 1996.<sup>61</sup> However, the IPCC recently updated their 100-year GWP for methane, substantially increasing the heat-trapping effect to 34.<sup>62</sup> A Supplementary Information Report ("SIR"), prepared for BLM's oil and gas leasing program in Montana and the Dakotas, further explains that GWP "provides a method to quantify the cumulative effect of multiple GHGs released into the atmosphere by calculating carbon dioxide equivalent (CO<sub>2</sub>e) for the GHGs." SIR at 1-2.<sup>63</sup> However, substantial questions arise when you calibrate methane's GWP over the 20-year planning and environmental review horizon used in the SIR and, typically, by BLM, including the TRFO/SJNF. See SIR at 4-1 thru 4-45 (discussing BLM-derived reasonably foreseeable development potential in each planning area). Over this 20-year time period, the IPCC's new research has calculated that methane's GWP is 84<sup>64</sup> – yet another substantial increase from its earlier estimate of 72, which was still over three times as potent as otherwise assumed by the SIR.<sup>65</sup>

However, recent peer-reviewed science demonstrates that gas-aerosol interactions amplify methane's impact such that methane is actually 105 times as potent over a twenty year time period.<sup>66</sup> This information suggests that the near-term impacts of methane emissions have been significantly underestimated. See 40 C.F.R. § 1508.27(a) (requiring consideration of short and long term effects). Further, by extension, BLM has also significantly underestimated the near-term benefits of keeping methane emissions out of the atmosphere. 40 C.F.R. §§ 1502.16(e), (f); *id.* at 1508.27. These estimates are important given the noted importance of near

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<sup>61</sup> INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Second Assessment Report* (1996) (attached as Exhibit 52); see also U.S. Environmental Protection Agency, *Methane*, available at: <http://www.epa.gov/outreach/scientific.html>.

<sup>62</sup> See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis*, at 8-58 (Table 8.7) (Sept. 2013) (attached as Exhibit 68).

<sup>63</sup> BLM, *Climate Change, Supplementary Information Report, Montana, North Dakota and South Dakota* (2010) available at: [www.blm.gov/mt/st/en/prog/energy/oil\\_and\\_gas/leasing/leasingEAs.html](http://www.blm.gov/mt/st/en/prog/energy/oil_and_gas/leasing/leasingEAs.html) (attached as Exhibit 53).

<sup>64</sup> See IPCC *Physical Science Report*, attached above as Exhibit 68.

<sup>65</sup> See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Fourth Assessment Report, Working Group I, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Ch. 2, p. 212, Table 2.14, available at: [www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/ch2s2-10-2.html](http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html) (attached as Exhibit 54).

<sup>66</sup> Drew Shindell et al., *Improved Attribution of Climate Forcing to Emissions*, *SCIENCE* 2009 326 (5953), p. 716, available at: [www.sciencemag.org/cgi/content/abstract/326/5953/716](http://www.sciencemag.org/cgi/content/abstract/326/5953/716) (attached as Exhibit 55).

term action to ameliorate climate change – near term action that scientists say should focus, *inter alia*, on preventing the emission of short-lived but potent GHGs like methane while, at the same time, stemming the ongoing increase in the concentration of carbon dioxide.<sup>67</sup> These uncertainties – which, here, the agencies do not address – necessitate analysis in the LRMP and FEIS. 40 C.F.R. §§ 1508.27(a), (b)(4)-(5).

Additional, serious, yet unaddressed uncertainties pertain to the magnitude of methane pollution from oil and gas emissions sources. As provided in the most recent EPA Inventory of Emissions and Sinks: 1990-2011, “[f]urther research is needed in some cases to improve the accuracy of emission factors used to calculate emissions from a variety of sources;” specifically citing the lack of accuracy in emission factors applied to methane sources.<sup>68</sup> A lack of data reliability has resulted in notable variation in methane emissions reporting from year to year. For example, in a Technical Support Document (“TSD”) prepared for EPA’s mandatory GHG reporting rule for the oil and gas sector for 2012, EPA determined that several emissions sources were projected to be “significantly underestimated.”<sup>69</sup> EPA thus provided revised emissions factors for four of the most significant underestimated sources that ranged from ten times higher (for well venting from liquids unloading) to as many as 3,500 and 8,800 times higher (for gas well venting from completions and well workovers of unconventional wells).<sup>70</sup> When EPA accounted for just these four revisions, it more than doubled the estimated GHG emissions from oil and gas production, from 90.2 million metric tons of CO<sub>2</sub> equivalent (“MMTCO<sub>2</sub>e”) to 198.0 MMTCO<sub>2</sub>e.<sup>71</sup> These upward revisions were based primarily on EPA’s choice of data set, here, having replaced Energy Information Administration (“EIA”) data with emissions data from an EPA and Gas Research Institute (“GRI”) study. In the current year, EPA relied on yet another set of data; this time from an oil and gas industry survey of well data conducted by the American Petroleum Institute (“API”) and the American Natural Gas Alliance (“ANGA”).<sup>72</sup> The

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<sup>67</sup> See, e.g., *Limiting Global Warming: Variety of Efforts Needed Ranging from 'Herculean' to the Readily Actionable*, *Scientists Say*, SCIENCE DAILY (May 4, 2010), available at: <http://www.sciencedaily.com/releases/2010/05/100503161328.htm>; see also, Ramanathan, et. al., (attached above as Exhibit 12).

<sup>68</sup> *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011*, at 1-19 (attached above as Exhibit 51).

<sup>69</sup> U.S. Environmental Protection Agency, *Greenhouse Gas Emissions Reporting From The Petroleum And Natural Gas Industry Background Technical Support Document*, at 8, available at: <http://www.epa.gov/climatechange/emissions/subpart/w.html> (attached as Exhibit 56).

<sup>70</sup> *Id.* at 9, Table 1; see also *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011* (attached above as Exhibit 51).

<sup>71</sup> TSD at 10, Table 2 (attached above as Exhibit 57).

<sup>72</sup> *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011*, at 3-63 (attached above as Exhibit 51).

API/ANGA survey was conducted in response to EPA's upward adjustments in the previous GHG inventory, noting that "[i]ndustry was alarmed by the upward adjustment," and focused specifically on emissions from liquids unloading and unconventional gas well completions and workovers.<sup>73</sup> Overall, the survey found that revising emissions from these two sources alone would reduce EPA oil and gas methane emissions estimates, which resulted in reported oil and gas production emissions at 100 MMTCO<sub>2</sub>e pursuant to the EPA's GHG Reporting Program.<sup>74</sup>

To provide a specific example of these differing data sets, EPA previously used an emissions factor of 3 thousand standard cubic feet ("Mcf") of gas emitted to the atmosphere per well completion in calculating its GHG inventory. EPA determined that this figure was significantly underestimated and that a far more accurate emissions factor was 9,175 Mcf per well.<sup>75</sup> The API/ANGA study suggested that this emission factor is 9,000 Mcf.<sup>76</sup> However, these emissions factors are simply broad, generalized estimates for well emissions across the nation, and can vary significantly from one geologic formation to the next. For example, emissions reported in the Piceance Basin are as high as 22,000 Mcf of gas per well.<sup>77</sup>

Despite this variability in methane pollution data, what remains clear is that inefficiencies and leakage in oil and gas production results in a huge amount of avoidable waste and emissions, and, conversely, a great opportunity for the agencies to reduce GHG emissions on our public lands. Many of these uncertainties and underestimates, as EPA has explained, are a result of the fact that emissions factors were "developed prior to the boom in unconventional well drilling (1992) and in the absence of any field data and does not capture the diversity of well completion and workover operations or the variance in emissions that can be expected from different hydrocarbon reservoirs in the country." *Mandatory GHG Reporting Rule*, 75 Fed. Reg. 18608, 18621 (April 12, 2010). These underestimates are also caused by the dispersed nature of oil and gas equipment – rather than a single, easily grasped source, such as a coal-fired power plant, oil and gas production consists of large numbers of wells, tanks, compressor stations, pipelines, and other equipment that, individually, may appear insignificant but, cumulatively, may very well be quite significant. While dispersed, oil and gas development is nonetheless a massive, landscape-

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<sup>73</sup> API/ANGA, *Characterizing Pivotal Sources of Methane Emissions from Natural Gas Production: Summary and Analysis of API and ANGA Survey Responses*, Sept. 2012, at 1 (attached as Exhibit 57).

<sup>74</sup> See EPA, *Petroleum and Natural Gas Systems: 2011 Data Summary (for 2013 GHG Reporting)*, at 3 (attached as Exhibit 58).

<sup>75</sup> See EPA, *GHG Emissions Reporting*, attached above as Exhibit 57 at Appendix B at 84-87.

<sup>76</sup> *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011*, at 3-69 (attached above as Exhibit 51).

<sup>77</sup> See, e.g., EPA, *Natural Gas STAR Program, Recommended Technologies and Practices for Wells*, available at: [www.epa.gov/gasstar/tools/recommended.html](http://www.epa.gov/gasstar/tools/recommended.html); see also EPA, *Natural Gas STAR Program, Reduced Emissions Completions*, Oct. 26, 2005, at 14 (attached as Exhibit 59).

scale industrial operation – one that just happens to not have a single roof. BLM, as the agency charged with oversight of onshore oil and gas development, therefore has an opportunity to improve our knowledge base regarding GHG emissions from oil and gas production, providing some measure of clarity to this important issue by taking the requisite “hard look” NEPA analysis as part of its land use decisionmaking for the LRMP and FEIS.<sup>78</sup>

Convincing evidence also exists to support the consideration of alternatives that would attach meaningful stipulations to areas open to oil and gas leasing, above and beyond the pioneering steps taken by the agencies, here. As a prime contributor to short-term climate change over the next few decades, methane is a prime target for near-term GHG reductions. In fact, there are many proven technologies and practices already available to reduce significantly the methane emissions from oil and gas operations, further detailed below. These technologies also offer opportunities for significant cost-savings from recovered methane gas. Moreover, new research indicates that tropospheric ozone and black carbon (“BC”) contribute to both degraded air quality and global warming, and that emission control measures can reduce these pollutants using current technology and experience.<sup>79</sup> Employment of these strategies will annually avoid a substantial number of premature deaths from outdoor air pollution, as well as increase annual crop yields by millions of metric tons due to ozone reductions. Indeed, reducing methane emissions is important not only to better protect the climate, but also to prevent waste of the oil and gas resource itself and the potential loss of economic value, including royalties. BLM should evaluate these technologies, analyzing the benefits of technological implementation versus current agency requirements.

These benefits – as well as the proven, cost-effective technologies and practices that achieve these benefits – are documented by EPA’s “Natural Gas STAR” program, which encourages oil and natural gas companies to cut methane waste to reduce climate pollution and recover value and consolidates the lessons learned from industry for the benefit of other companies and entities with oil and gas responsibilities such as BLM.<sup>80</sup> EPA has identified well over 100 proven technologies and practices to reduce methane waste from wells, tanks, pipelines, valves, pneumatics, and other equipment and thereby make operations more efficient.<sup>81</sup> Though underutilized, EPA’s Natural Gas STAR suggests the opportunity to dramatically reduce GHG pollution from oil and gas development, *if* its identified technologies and practices were implemented at the proper scale and supported by EPA’s sister agencies, such as BLM. For

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<sup>78</sup> In this context, the 2010 SIR, while providing a basic literature review of GHG emissions sources, is merely a starting point for BLM’s responsibility to take a hard look at GHG emissions in the context of foreseeable drilling operations in the geologic formations proposed for leasing.

<sup>79</sup> Drew Shindell, et al., *Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security*, SCIENCE 2012 335, at 183 (attached as Exhibit 60).

<sup>80</sup> See generally, EPA, Natural Gas STAR Program, available at: [www.epa.gov/gasstar/](http://www.epa.gov/gasstar/).

<sup>81</sup> See EPA, Natural Gas STAR Program, *Recommended Technologies and Practices*, available at: [www.epa.gov/gasstar/tools/recommended.html](http://www.epa.gov/gasstar/tools/recommended.html).

calendar year 2010, EPA estimated that this program avoided 38.1 million tons CO<sub>2</sub> equivalent, and added revenue of nearly \$376 million in natural gas sales (at \$4.00/Mcf) – revenue which translates into additional royalties to federal and state governments for the American public.<sup>82</sup> Although the agencies have taken pioneering steps in requiring several mitigation measures as stipulations at the planning stage, additional emission reduction strategies, as detailed herein, can both strengthen the TRFO/SJNF’s existing requirements, as well as satisfy the requirements of SO 3226, FLPMA, and the MLA.

### **b. Managing for Community and Ecosystem Resiliency.**

Resilience is “an ability to recover from or adjust easily to misfortune or change.” MERRIAM-WEBSTER COLLEGIATE DICTIONARY (11<sup>th</sup> ed. 2008). In the context of climate change and the many resultant impacts, such as the alteration to the biosphere and impairments to human health, the resiliency of our landscapes and a community’s ability to respond and adapt to these changes takes on a new magnitude of importance.

Beyond mitigating climate change by reducing contributions of GHG pollution to the atmosphere, the agencies can also help promote ecological resiliency and adaptability by reducing external anthropogenic environmental stresses (like oil and gas development) as a way of best positioning public lands and the communities that rely on those public lands to withstand what is acknowledged ongoing and intensifying climate change degradation. Given the agencies principled declaration that “[m]aintaining the health, diversity, and productivity of the SJNF and TROF is a primary mission,” as well as the meaningful adaptation and mitigation strategies taken to respond to “ecosystem change as a result of climate change,” it is crucial for the agencies to close the gap in their decisionmaking regarding the cumulative contribution of oil and gas development authorized in the planning area, particularly given the conflict between such authorization and the agencies preeminent strategy “to manage for healthy, resilient ecosystems.” Appendix G-2. Quite simply, continuing to manage our public lands in a manner that allows for the virtually unabated extraction of mineral resources is incompatible with principals of ecosystem resilience that the agencies acknowledge as their primary mission. Agency decisionmaking, both at the planning stage and in future site-specific implementation, must be reflective of the climate challenges we now face.

While the TRFO/SJNF are to be credited for acknowledging the value of resilient ecosystems in the LRMP and FEIS, the next step is to also consider the resilience of our

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<sup>82</sup> See EPA, Natural Gas STAR Program, *Accomplishments*, available at: [www.epa.gov/gasstar/accomplishments/index.html#three](http://www.epa.gov/gasstar/accomplishments/index.html#three) (attached as Exhibit 61). BLM should also take a look at EPA’s more detailed program accomplishments to provide a measure of what BLM could itself accomplish, and to understand the nature of the problem and opportunities. Also of interest, for calendar year 2008, EPA estimated that its program avoided 46.3 million tons of CO<sub>2</sub> equivalent, equal to the annual GHG emissions from approximately 6 million homes per year, and added revenue of nearly \$802 million in natural gas sales. To speculate, the calendar year 2009 declines are likely associated with ongoing economic and financial stagnation and the low price of natural gas that has slowed natural gas drilling and production.

communities and their ability to adapt and respond to climate change. Although not specifically in the context of climate change, Congress has recognized the value that farmlands play in the welfare of people and our communities. *See* 7 U.S.C.A. §§ 4201(a)(1) (“the Nation’s farmland is a unique natural resource and provides food and fiber necessary for the continued welfare of the people of the United States”); (a)(3) (“continued decrease in the Nation’s farmland base may threaten the ability of the United States to produce food and fiber in sufficient quantities to meet domestic needs”); and (a)(5) (“Federal actions, in many cases, result in the conversion of farmland to nonagricultural uses where alternative actions would be preferred”). Any action taken that undermines a community’s welfare and capacity to provide for itself in the face of recognized changes to climate – such as the largely unabated development of oil and gas resources throughout the planning area – fails to realize the agencies multiple use mandate under FLPMA, and, further, is indefensible pursuant to BLM and USFS’s mandate to act as stewards of our public lands.

The myriad impacts that will result from the agencies LRMP decisionmaking must be considered within the context of resiliency. Although the TRFO/SJNF recognize the threat of climate change, the agencies decisionmaking is not reflective of this harm and fails to take many necessary and meaningful steps to ameliorate the impacts to communities, landscapes, and species. To the contrary, the agencies preferred alternative would open up extensive lands to oil and gas leasing and development. As discussed above, climate change is dramatically altering the relationship between human kind and the environment in which we live. It is incumbent on the agencies to not only takes steps to stem the pace of climate change through the practical implementation of mitigation technologies – as the agencies have already done through requiring several methane emission mitigation measures as stipulations in the planning phase – but, also, to position communities in a way that allows them to adjust and recover from the climate change impacts that they are already experiencing. While the TRFO/SJNF are to be commended for the pioneering efforts undertaken to address GHG emissions and ecosystem resilience, more is required if we are to meaningfully respond to the vast scale of impacts that we face.

### **C. The BLM and USFS have Failed to Take a Hard Look at Certain Critical Surface Resource Values in the Planning Area.**

While the TROF/SJNF have taken notable steps in limiting the impacts of oil and gas development within the planning area, the agencies do not go far enough, particularly with regard to the “preserv[ation] and protect[ion of] certain public lands in their natural condition.” 43 U.S.C. § 1701(a)(8). Notably, the SJNF’s oil and gas leasing availability decision, challenged here, fails to take a hard look at such permanent protection of critical areas in the National Forest for preservation in their natural condition – which, as discussed above, is fundamental to the TRFO/SJNF’s multiple use mandate. *See* 16 U.S.C. §§ 528, 1604(e)(1).

The LRMP provides that the total National Forest mineral estate is 1,863,402 acres, yet, 509,954 of these acres are designated wilderness – for which oil and gas development is already excluded. LRMP at 152 (Table 2.19.1); *see also* 16 U.S.C. § 1131(c) (defining wilderness as “an area where the earth and its community of life are untrammelled by man”). This results in a total mineral estate of 1,353,447 acres; of which the SJNF makes available 1,279,811 acres for oil and



gas leasing – or 95% of the National Forest. LRMP at 152. This creates a presumption that oil and gas development is seen by the SJNF as the highest and best use of the non-withdrawn lands.

In general, the SJNF fails to support its own Management prescriptions by making available for leasing many lands designated as Management Area 3 – Natural Landscape with Limited Management (MA-3). And, critically, the agencies have notably failed to analyze lease stipulation effectiveness.

As noted in Conservation Groups’ DLRMP comments:

During lease sales, lease stipulations applied to fluid mineral leases have continuously been demonstrated to be ineffective at mitigating negative impacts from oil and gas development to a variety of resources of concern. Lease stipulations must actually be analyzed to determine their effectiveness at mitigating impacts to other resources. This is never done at the lease sale or APD stage of the process.

Recommendation: The Final Land Management Plan and associated EIS must consider and disclose the actual effectiveness of lease stipulations listed in Appendix H: Resource Management Stipulations for New Oil and Gas Leases.

*See* Conservation Group DLRMP Comments at 26. Unfortunately, the FEIS and LRMP fail completely in providing any analysis of stipulation success or failure in protecting against or mitigating impacts, as requested by Conservation Groups, and, moreover, fail to justify or explain the TROF/SJNF decision to forego this critical level of analysis.

In particular, Map 48, Prospective Hydrocarbon Basins and Hydrocarbon Occurrence Potential, as well as the RFD, clearly show the FEIS and LRMP fail to adequately analyze oil and gas development potential. *See* Appendix V, Map 48. As noted in Conservation Groups’ SDEIS comments, the RFD and the SDEIS fail to analyze shale oil or gas development outside of the Gothic Shale Play Area. Yet, Map 48 clearly shows much of the SJNF – outside of the high elevations of the Dolores, Animas, and Piedra river basins – to have moderate potential. Included in these “moderate” areas are lands that have been nominated for leasing – including existing expressions of interest on 360,000 acres of SJNF lands – or have already been leased, demonstrating both the areas potential for oil and gas, as well as the pressure from industry proponents to develop the area. *See* Leasing ROD at 6. The failure of the agencies to provide a hard look analysis of these shale developments is a fatal flaw, and cannot be sustained.

Specifically, Conservation Groups have several site-specific concerns related to particular lands within the planning area, as detailed below. Collectively, however, these concerns reveal a larger flaw in the agencies management of the planning area, which is the TRFO/SJNF’s decision to authorize the development of our public lands without, in many instances, taking a hard look at the critical, site-specific resource values impacted by such authorization.

- Buckles Lake/Blanco River/Navajo Peak/Navajo River Area

Many private lands with conservation easements surround the southeastern portion of the SJNF. In particular, Conservation Groups maintain a robust partnership with the Chama Peak Land Alliance (the “Alliance”), an organization that strives to find a proactive means to support a traditional land use pattern for the area, as well as to maintain the area in a manner supportive of the abundant wildlife. As noted, the Alliance is a group of “Conservation Minded Landowners Working Collaboratively to Practice and Promote Ecologically and Economically Sound Land Management in the southern San Juan Mountains of Colorado and northern New Mexico.”<sup>83</sup> In recognition of the wildlife corridor and habitat importance of this area, and the notable private efforts being taken to preserve these critical areas in their natural condition, the Navajo Peak/Price Lakes area should not be available for leasing, or, at a minimum, should have NSO stipulations applied. Regardless, the agencies must take a hard look at the impacts of developing this area for oil and gas, which, further, must be reflective of these notable private conservation measures. The TRFO/SJNF has failed to provide such analysis.

As noted in prior Comments on the DLRMP:

We encourage the plan to reconsider the lack of protective stipulations in the Navajo River corridor at the south end of the San Juan Sag geological region. Great Outdoors Colorado has invested at least \$1 million to date for a legacy project to protect the Navajo River corridor in southern Archuleta County. The purpose of the legacy grant is to protect up to 8,500 acres of private lands situated in the Navajo River watershed in proximity to the South San Juan Wilderness. This is a specific example of better coordinating federal mineral leasing with private conservation projects.

Conservation Groups DLRMP Comments at 27. Remarkably – and without regard for existing conservation efforts, and despite the fact that much of this area is designated MA-3 – the SJNF makes this entire area available for leasing. Notably, oil and gas exploration has occurred in this area of the San Juan Sag for many years, yet, with very limited success. SJNF failed to meet its obligations to protect this prime wildlife habitat by making it available for leasing, and have failed to provide sufficient analysis justifying this decision.

While some of the MA-3 lands are protected with NSO stipulations, the bulk of the area is not. Indeed, in the area around Buckles Lake to Mesa Cortado, the TRFO/SJNF has failed to provide even a minimal level of protection, such as requiring controlled surface use (“CSU”) or timing limitations (“TL”) stipulations. The agencies decision to allow near unmitigated oil and gas development in the area from Mesa Cortado up to Blanco Basin could result in significant impacts to elk and other wildlife populations. Moreover, it creates a strong potential for the area to be developed as a swath of highly divided and industrialized National Forest land – from the Chalk Mountains of the South San Juan Wilderness to the primarily wild lands around Blanco River.

Given the myriad surface resource values deserving protection, the entire area from Mesa Cortado up to the Blanco Basin Road should have, at a minimum, prevailing CSU and TL

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<sup>83</sup> See Chama Peak Land Alliance, available at: <http://chamapeak.org/>.

stipulations, if not NSO stipulations. Yet, such protections are largely non-existent in the agencies management of the area. Perhaps even more concerning, however, is the TRFO/SJNF's failure to provide a sufficient hard look analysis for these resource values.

- Piedra River, Martinez and Fourmile Creeks Watersheds

The SJNF areas around Mule Mountain, Devil Mountain, the areas in the upper Piedra Basin, as well as the area around FR 634 from Fourmile Creek to the Piedra Basin are important wildlife, recreational, and scenic areas. That the SJNF leaves much of this land available to leasing, and without the protection of NSO stipulations, creates the real potential for it to become an industrialized landscape. While TL and CSU stipulations cover much of this area, the agencies have failed to provide these protections in certain critical areas. For example, only Standard Stipulations apply to the Elk Creek/Horse Creek area, Trail Ridge, Middle Fork to East Fork, and O'Neal Hill areas, which are all left without even CSU stipulations. The failure to include these areas is both irresponsible and unjustified. All are prime wildlife areas, and, in turn, are prime recreation and wildlife viewing areas, which also allow spectacular and uninhibited views of the Weminuche Wilderness peaks. The TRFO/SJNF failed to sufficiently consider and take a hard look at these values, which represents a fundamental failure of the agencies decisionmaking.

- Western portion of the Dolores District

The agencies have made available for oil and gas development the vast majority of the western half of the Dolores District with only standard stipulations. This area, much of which is actively being explored for both shale oil and gas development, as well as carbon dioxide extraction, could, without active management and protection, become an incredibly dense patchwork of roads, well pads, and pipelines under the preferred leasing scenario. As is common to the agencies management throughout the planning area, and without any analysis or explanation for the TRFO/SJNF's reliance on only standard stipulations for the western Dolores District – despite clear justification for additional protections, such as CSU stipulations – the agencies have exposed a bias toward virtually unmitigated development of substantial areas within our National Forests. This bias fails to satisfy the TRFO/SJNF's multiple use mandate, and, moreover, fails to realize the agencies obligations under NEPA through an absence of hard look analysis justifying their decisionmaking.

**D. The FEIS Fails to Take a Hard Look at the Impacts of Oil and Gas Leasing and Development on Water Resources**

Scarce water resources on the SJNF must be carefully managed, and the impacts of widespread oil and gas development on these resources must not be ignored. As noted by the LRMP, “[d]ue to increasing public demand, proposals for new water development projects continue to increase. Addressing increasing water demands while, at the same time, maintaining the integrity of aquatic ecosystems may be one of the biggest challenges to public lands management over the next few decades.” LRMP at 63. Yet, the analysis provided in the FEIS fails to adequately characterize the impacts that oil and gas leasing and development would have

on these resources, and, consequently, on the environment, public health, and other uses of the forest.

**a. The FEIS provides inadequate analysis of the impacts that may arise from water contamination.**

Oil and gas development poses a number of risks to water quality including sedimentation generated by runoff from roads and well pads, as well as contamination from spills, leaks, or blowouts. Hydraulic fracturing fluids present a risk to water resources, as does flowback and produced water, which may contain fracking chemicals, as well as high levels of salts and heavy metals, and other substances which naturally occur in an oil and gas formation, including hydrocarbons and radioactive substances.

The FEIS acknowledges the risks of spills in multiple instances, noting that surface and groundwater contamination could result. FEIS at 137, 226, 247, 275-79. In addition, the FEIS notes that the chemicals that will be stored and used on site “are known to have adverse human health effects, even in small concentrations” and that, in the subsurface “hydraulic fracturing fluids or saline water could migrate into the upper Mesozoic sandstone aquifers . . . through vertical migration along damaged or poorly constructed well bore holes, or if fracturing extends into zones of geologic weakness, such as fractures and faults that are conduits to other zones.” FEIS at 275-76.

The FEIS also notes that “[g]iven the number of well pads and roads projected in the PLAA, consequential sedimentation of streams and still water bodies has the potential to impact fishery and aquatic resources.” FEIS at 246. Yet, the FEIS makes no effort to quantify the impacts this sedimentation would have on water quality, species, or other water uses.

Sedimentation and contamination of water resources is a real possibility and has occurred in other locations. The FEIS acknowledges this fact but provides no analysis of the potentially significant impacts that such contamination could have on water quality, wildlife, drinking water supplies, or other users that rely on water supplies from the SJNF. Simply reciting the fact that contamination may occur is insufficient to fulfill the duty, under NEPA, to analyze the environmental impacts of the proposed action. The Forest Service must take a hard look at the real risks a serious contamination event would pose to communities who rely on the forest for drinking water, to aquatic species, and to other water users.

**b. The FEIS fails to take a hard look at the impacts to groundwater quantity.**

The FEIS documents the risks to water supply in the area: “The withdrawal of groundwater resources from the planning area has the potential to place pressure on existing domestic, municipal, and agricultural groundwater uses at a time period when municipal demand for water is expected to grow.” FEIS at 279. Additionally, the FEIS states that “localized portions of the Fruitland Formation aquifer could be effectively dewatered” and that “[s]ome projections show that it would take several centuries to recharge this aquifer.” FEIS at 269. Yet, other than saying that “some springs, seeps, streams, and wetlands . . . [could] run dry,” the

agencies have failed to adequately analyze the impacts that the dewatering of the Fruitland Formation could have. *Id.* In addition, the FEIS/LRMP does not provide any standards, guidelines or stipulations to protect water quality or quantity from groundwater depletion.

**c. The FEIS fails to analyze the cumulative effects of oil and gas development on relevant watersheds.**

The condition of many watersheds throughout the planning area is already “poor . . . as a result of the cumulative impacts of management activities.” FEIS at 62. Oil and gas activities can have multiple impacts on these watersheds which cumulatively exacerbate watershed quality. As acknowledged by the agencies, oil and gas activities remove significant amounts of water from these watersheds, which reduces water quantity and increases contaminant loads because of decreased capacity for dilution downstream. A hard look analysis of the cumulative effects of oil and gas on relevant watersheds is required by NEPA.

Unlike most other uses of water, the use of water for oil and gas extraction and development – including hydraulic fracturing – can permanently remove water from the relevant watershed and from the water cycle altogether. This is because, as noted by the LRMP, “[r]einjection of produced water and flow back fluids . . . is the typical method of disposing of waste fluids.” FEIS at 276. The water is injected “into deep permeable subsurface target formations of poor water quality.” *Id.* Because of this, the water is no longer a part of the water cycle and is not available in the watershed at all. This is in contrast to uses of water for other purposes such as agricultural or municipal use in which water is eventually returned to the water cycle via percolation into groundwater, treatment facilities that discharge into water bodies, or evaporation and precipitation.

Yet, the BLM has not analyzed the cumulative effects of removing water from the relevant watersheds or from the water cycle altogether. The LRMP does states that “[i]n unique cases where water is transferred from one catchment to another, water lost (i.e., there is no return flow) from watersheds as a result of water transfer does not adversely alter or impact the aquatic ecology of the watershed or the stream.” LRMP at 64. However, the TRFO/SJNF does not provide evidence for this conclusion. The agencies must analyze the effects of permanent withdrawals from the relevant watersheds due to water use in oil and gas development.

**d. The FEIS fails to analyze an alternative that allows leasing but ensures necessary protections for water resources.**

While the FEIS stipulations and the LRMP resource direction contain important provisions to reduce risk to water resources from oil and gas operations, the agencies have failed to analyze an alternative that provides needed protections for water. These safeguards include improved site characterization to look for pathways by which contaminants may reach groundwater, stronger well design and construction standards, stimulation operation monitoring and reporting requirements, and improved waste water handling planning and practices. These necessary protections were documented in our comments on the SDEIS, and are incorporated herein.

The TRFO/SJNF declined to incorporate these protections, stating: “The exact specifics of well design, construction, and monitoring of potential environmental impacts involve issues that would be considered during subsequent project-level NEPA analysis and does not involve analysis at the BLM/USFS planning level.” First, the FEIS and LRMP do contain specific standards, guidelines, and stipulations for well design, construction, and monitoring, as cited below, indicating that such requirements can be set at the planning level. Moreover, the agencies NEPA analysis must fully consider the environmental benefits of additional protections for water resources, as detailed below. These additional protective measures represent reasonable alternative standards and stipulations with clear environmental benefits, which the TRFO/SJNF should have analyzed.

### **i. Stipulations**

In some cases, protective stipulations have been applied only to selected areas of the forest, with little or no justification for leaving the remaining forest acreage unprotected. The Forest Service fails to provide a reasoned justification for this decision in some cases, and fails to analyze the beneficial effects of applying stricter stipulations forest-wide.

Specifically, Conservation Groups have several concerns regarding Oil and Gas Leasing Stipulations, found in FEIS Appendix H.

For example, the stipulations in 1.6.1, Controlled Surface Use (Groundwater resources shallow) fail to protect shallow groundwater resources and do not require fluids, additives, and other materials used for drilling and completion operations to be non-toxic. Appendix H at H-15 Such a requirement for hydraulic fracturing fluids is present in stipulation 1.1.2. *Id.* at H-9. The current requirement that these materials “...must be protective of public health and the environment,” is subjective and it is not clear how the BLM and USFS will apply this standard in practice. *Id.* at H-15.

In addition, the stipulations in 1.6.2 apply only to multi-stage hydraulic fracturing, and, thus, fail to protect water because they do not apply to all operations using any well stimulation. *Id.* at H-16. All types of hydraulic fracturing present risks to water, as do other well stimulation techniques, such as acidizing, that can pose risks similar to those of hydraulic fracturing, and the agencies provides no justification for exempting such procedures from this or other stipulations. Moreover, the stipulation’s requirements for the minimum 2500’ buffer are not clear. Specifically, it is unclear which features will be used to delineate this buffer, which should be applied not only to potentially usable water shallower than 2000’, but to any potentially usable groundwater, regardless of depth. The stipulation should also be expanded to require cement evaluation logs on all strings of cemented casing that isolate protected water, potential flow zones, through which stimulation will be performed, and/or when there are indications of an inadequate cement job.

While Conservation Groups do support the requirements for pitless drilling systems required in 1.6.2, the use of tanks, rather than pits to contain flowback and stimulation fluids, should also be required, as in stipulation 1.6.1. Yet, the BLM and USFS fail to analyze an alternative in which all fluids are contained in tanks. Because such a requirement could

substantially reduce the risks of environmental contamination while imposing low costs on oil and gas producers, the agencies should have analyzed the environmental benefits of this reasonable alternative course of action.

Finally, the surface casing setting depth should be at least 100 feet below any potentially usable water-bearing interval. Such a requirement is consistent with American Petroleum Institute (“API”) guidance on fracking operations.<sup>84</sup> The current stipulation, however, is inadequate to protect groundwater. For instance, requiring fluids, additives, and other materials used for drilling and completion operations to be non-toxic, as required in stipulation 1.1.2, would strengthen these stipulations. Appendix H at H-9. The current requirement, that these materials “...must be protective of public health and the environment,” is subjective and it is not clear how the BLM will apply this standard in practice. *Id.* at H-16.

## **ii. Standards**

Furthermore, the standard to use pitless, self-contained drilling systems (e.g., closed loop drilling systems) where technically feasible, is unclear as to the requirements for demonstrating that such a system is not feasible. *See* LRMP at 66 (Standard 2.6.31). The use of tanks rather than pits to contain flowback and stimulation fluids should also have been made standard.

## **iii. Guidelines**

Conservation Groups support the guidance to use non-toxic fluid, additives, and other materials for well drilling. *Id.* (Guideline 2.6.35). This recommendation, however, should have been expanded to include not just materials used in drilling, but in all phases of oil and gas operations. In addition, BLM and USFS should have prohibited the use of diesel fuels, BTEX, and 2-BE in drilling and stimulation fluids.

Further, Conservation Groups support the guidance for operators to use proven technologies to recycle fresh water, drilling fluids, and produced water whenever possible. *Id.* (Guideline 2.6.37). However, the guidance should have included recommendations for proper handling and disposal of any concentrated wastes generated as a result of such recycling. As such, the LRMP and FEIS fail to adequately protect groundwater and surface water. Regarding monitoring pressure, in the response to comments, the TRFO/SJNF state: “a new guideline has been added creating a requirement for monitoring pressures in adjacent abandoned wells during high volume hydraulic fracturing operations.” FEIS Appendix S at S-106 (Response WA 53). We support such a requirement but could not locate this guideline in the LRMP.

The additional protective measures, above, as well as raised in our comments on the SDEIS, have not been adequately addressed by the leasing availability decision. Moreover, the environmental benefits of applying such standards have not been sufficiently analyzed by the FEIS. The Forest Service should consider an alternative that provides crucial protections for water resources forest-wide.

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<sup>84</sup> *See* API, Guidance Document HF1: Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines (Oct. 2009) (attached as Exhibit 69).

### III. Alternatives

Through the LRMP planning process, the TRFO/SJNF are required to “estimate and display the physical, biological, economic, and social effects of implementing each alternative considered in detail. The estimation of effects shall be guided by the planning criteria and procedures implementing [NEPA].” 43 C.F.R. § 1610.4-6. Incumbent to any NEPA process is a robust analysis of alternatives to the proposed action. Consideration of reasonable alternatives is necessary to ensure that the agency has before it and takes into account all possible approaches to, and potential environmental impacts of, a particular project. NEPA’s alternatives requirement, therefore, ensures that the “most intelligent, optimally beneficial decision will ultimately be made.” *Calvert Cliffs’ Coordinating Comm., Inc. v. U.S. Atomic Energy Comm’n*, 449 F.2d 1109, 1114 (D.C. Cir. 1971).

“[T]he heart” of an environmental analysis under NEPA is the analysis of alternatives to the proposed project, and agencies must evaluate all reasonable alternatives to a proposed action.” *Colorado Environmental Coalition*, 185 F.3d at 1174 (quoting 40 C.F.R. § 1502.14). An agency must gather “information sufficient to permit a reasoned choice of alternatives as far as environmental aspects are concerned.” *Greater Yellowstone*, 359 F.3d at 1277 (citing *Colorado Environmental Coalition*, 185 F.3d at 1174); see also *Holy Cross Wilderness Fund v. Madigan*, 960 F.2d 1515, 1528 (10<sup>th</sup> Cir. 1992). Thus, agencies must “ensure that the statement contains sufficient discussion of the relevant issues and opposing viewpoints to enable the decisionmaker to take a ‘hard look’ at environmental factors, and to make a reasoned decision.” *Izaak Walton League of America v. Marsh*, 655 F.2d 346, 371 (D.C. Cir.1981) (citing *Kleppe v. Sierra Club*, 427 U.S. 390, 410 n. 21 (1976)).

Notably, all of the FEIS alternatives – with the exception of the no leasing alternative – propose to authorize extensive oil and gas development within the planning area for the foreseeable future. And while the agencies have taken several substantial steps forward in, for example, requiring mitigation measures at the planning phase, the structure of the alternatives analysis in many ways limits the agencies hard look at certain critical resource values, as discussed throughout. In effect, the TRFO/SJNF’s alternatives analysis becomes little more than an exercise of form over substance. Indeed, throughout the FEIS, the agencies repeatedly dismiss Alternative C and D as being too extreme one way or the other. This leaves the agency with only one defensible choice, Alternative B.

Throughout the document, the agencies consistently dismiss the benefits of Alternative C – an alternative that, from the beginning, it never intended to select. In close review of the Alternatives, there is little difference between Alternatives A, B, and D; and C presents the only real difference of an alternative that attempts to sufficiently protect critical resource values. For example, outside of congressionally designated wilderness, which remains consistent across all Alternatives, only Alternatives B and C contemplate the protection of any additional wilderness areas. However, whereas Alternative C suggests an additional 535,269 acres of designated protections – based on the preservation of critical wild areas and surface resource values – the agencies chosen Alternative B proposes to protect only an additional 54,886 acres, significantly constraining protection and analysis to only 4 of a possible 20 deserving areas. See FEIS at 34.



Further, where Alternative C makes 644,113 acres administratively unavailable for oil and gas leasing, chosen Alternative B makes only 73,636 acres unavailable – a difference of 570,477 acres. *Id.* at 42. By comparison, the agencies development Alternative D makes 14,896 acres unavailable. *Id.* This type of narrowing of the alternatives, until all that remains is the agencies chosen plan, fails to satisfy the critical function of NEPA’s alternatives analysis and fails to sufficiently balance the BLM and USFS’s multiple use mandate.

#### IV. FLPMA: Unnecessary and Undue Degradation

Pursuant to the Federal Land Policy and Management Act (“FLPMA”), 43 U.S.C. § 1701 *et seq.*, “[i]n managing the public lands,” the agencies “shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands.” 43 U.S.C. § 1732(b). Written in the disjunctive, BLM must prevent degradation that is “unnecessary” and degradation that is “undue.” *Mineral Policy Ctr. v. Norton*, 292 F.Supp.2d 30, 41-43 (D. D.C. 2003). This protective mandate applies to agencies planning and management decisions, and should be considered in light of its overarching mandate that the TRFO/SJNF employ “principles of multiple use and sustained yield.” 43 U.S.C. § 1732(a); *see also, Utah Shared Access Alliance v. Carpenter*, 463 F.3d 1125, 1136 (10<sup>th</sup> Cir. 2006) (finding that BLM’s authority to prevent degradation is not limited to the RMP planning process). While these obligations are distinct, they are interrelated and highly correlated. The Bureau must balance multiple uses in its management of public lands, including “recreation, range, timber, minerals, watershed, wildlife and fish, and [uses serving] natural scenic, scientific and historical values.” 43 U.S.C. § 1702(c). It must also plan for sustained yield – “control [of] depleting uses over time, so as to ensure a high level of valuable uses in the future.” *Norton v. S. Utah Wilderness Alliance*, 542 U.S. 55, 58, 124 S.Ct. 2373, 159 L.Ed.2d 137 (2004).

“Application of this standard is necessarily context-specific; the words ‘unnecessary’ and ‘undue’ are modifiers requiring nouns to give them meaning, and by the plain terms of the statute, that noun in each case must be whatever actions are causing ‘degradation.’ ” *Theodore Roosevelt Conservation Partnership v. Salazar*, 661 F.3d 66, 76 (D.C. Cir. 2011) (citing *Utah v. Andrus*, 486 F.Supp. 995, 1005 n. 13 (D. Utah 1979) (defining “unnecessary” in the mining context as “that which is not necessary for mining” – or, in this context, “for oil and gas development” – and “undue” as “that which is excessive, improper, immoderate or unwarranted.”)); *see also Colorado Env’t Coalition*, 165 IBLA 221, 229 (2005) (concluding that in the oil and gas context, a finding of “unnecessary or undue degradation” requires a showing “that a lessee’s operations are or were conducted in a manner that does not comply with applicable law or regulations, prudent management and practice, or reasonably available technology, such that the lessee could not undertake the action pursuant to a valid existing right.”).

Here, that action is the development authorized by the agencies. The inquiry, then, is whether the agencies have taken sufficient measures to prevent degradation unnecessary to, or undue in proportion to, the development the LRMP and FEIS permits. *See Theodore Roosevelt Conservation Partnership*, 661 F.3d at 76. For example, methane waste and pollution may cause “undue” degradation, even if the activity causing the degradation is “necessary.” Where methane waste and pollution is avoidable, even if in the process of avoiding such emissions lessees or

operators incur reasonable economic costs that are consistent with conferred lease rights, it is “unnecessary” degradation. 43 U.S.C. § 1732(b).

Therefore, drilling activities may only go forward as long as unnecessary and undue environmental degradation does not occur. This is a *substantive* requirement, and one that the agencies must define and apply in the context of oil and gas development authorized in the planning area. In other words, the TRFO/SJNF must define and apply the substantive UUD requirements in the context of the specific resource values at stake – an application that can be found nowhere in the FEIS, but which the agencies are required to make.

Further, these UUD requirements are distinct from requirements under NEPA. “A finding that there will not be significant impact [under NEPA] does not mean either that the project has been reviewed for unnecessary and undue degradation or that unnecessary or undue degradation will not occur.” *Ctr. for Biological Diversity*, 623 F.3d at 645 (quoting *Kendall's Concerned Area Residents*, 129 I.B.L.A. 130, 140 (1994)). In the instant case, agencies failure to specifically account for UUD in the LRMP and FEIS – which is distinct from its compliance under NEPA – is also actionable on procedural grounds and must occur before the final LRMP is approved.

## V. Conclusion

The Conservation Groups appreciate your consideration of the information and concerns addressed herein, as well as the information included in the attached exhibits. This information is critical and must be reflected in the agencies final decisionmaking and ROD.

Should you have any questions, please do not hesitate to contact me.

Sincerely,



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## APPEAL ADDENDUM

### Best Management Practices for Methane Emissions Reductions from the Oil and Gas Industry

This Appeal Addendum identifies a series of different sets of methane mitigation Best Management Practices (“BMPs”) for oil and gas operations that have been endorsed by the BLM, a BLM contractor, the EPA Natural Gas Star Program, the State of Colorado, and non-profit research and advocacy organizations. While the TRFO/SJNF have adopted several key measures that are included in most of these sets of BMPs, there are many additional tried and true BMPs available to the agencies that could further mitigate methane waste and GHG pollution from additional emissions sources.

Notably, many of the methane emission reduction technologies and practices listed below are common across the different sources of BMPs, increasing confidence in their effectiveness. The methane mitigation BMPs not already required in the FEIS should be carefully considered for adoption by the SJNF/TRFO to provide best-available-technology and practice-based standards for reducing methane emissions from oil and gas activity in the planning area. Nationally, significant methane pollution mitigation is already being achieved through state regulations and the EPA Natural Gas Star Program. These reductions have been estimated and reported in the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011 (April 2013) at over 50 MMTCO<sub>2</sub>e in 2011.<sup>85</sup> By requiring additional methane mitigation measures, the SJNF/TRFO would be joining the EPA, several states, and leading oil and gas companies in reducing these harmful emissions.

#### 1. BLM OIL & GAS BMPs from BLM Website<sup>86</sup>

- Moving toward cleaner diesel engines
- Natural gas powered engines
- Flaring

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<sup>85</sup> *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011*, at 3-62 (Table 3-45) (attached above as Exhibit 51).

<sup>86</sup> See BLM, Best Management Practices for Fluid Minerals, available at: [http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS\\_REALTY\\_AND\\_RESOURCE\\_PROTECTION\\_/bmps.Par.60203.File.dat/WO1\\_Air%20Resource\\_BMP\\_Slideshow%2005-09-2011.pdf](http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS_REALTY_AND_RESOURCE_PROTECTION_/bmps.Par.60203.File.dat/WO1_Air%20Resource_BMP_Slideshow%2005-09-2011.pdf) (attached as Exhibit 70).

- Reduces Methane GHG emissions, however...
  - Combustion emissions include NO<sub>x</sub>, CO, VOCs, and PM<sub>2.5</sub>, which can pose visibility and health problems, and CO<sub>2</sub> (a less potent GHG). NO<sub>x</sub> and VOCs contribute to ozone formation.
  - Wastes valuable natural gas resources
- Reduced Emissions Completions
  - Using chemical pumps and well monitoring telemetry powered by solar panels
  - Using electricity from the nation's power grid is typically cleaner than using onsite diesel or natural gas engines to power drill rigs, compressors, and pumping units.
  - Using enclosed tanks instead of open pits to reduce fugitive VOC emissions
  - Vapor Recovery Units
  - Using and maintaining proper hatches, seals, and valves to minimize VOC emissions
  - Optimize Glycol Circulation and Install Flash Tank Separator
  - Replacement of Wet Seals with Dry Seals in Centrifugal Compressors
  - Reduce Emissions from Compressor Rod Packing Systems
  - Replace high-bleed devices with low-bleed and Retrofit bleed reduction kits on high-bleed devices
  - Installing Plunger Lift Systems and Automated Systems in Gas Wells
  - Directed Inspection & Maintenance and Infrared Leak Detection

## **2. Climate Change, Supplementary Information Report, URS Oct. 2010<sup>87</sup>**

### Oil and Gas GHG Mitigation

USEPA's Natural Gas STAR program has identified more than 80 potentially cost-effective technologies for decreasing methane emissions from the oil and natural gas industry (see <http://epa.gov/gasstar/tools/recommended.html>). Of these, the following discussion selects technologies that focus primarily on natural gas production and gathering equipment and on emission sources for which BLM

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<sup>87</sup> See BLM, Climate Change SIR (attached above as Exhibit 53).

may have a major role in identifying mitigation measures. GHG emission sources in the transmission and distribution sectors are generally not addressed.

Climate Change SIR at 6-4.

Mitigation measure costs and paybacks are summarized at 6-6 (Table 6-2), and described in Chapter 6. The report highlights the following mitigation technologies:

#### Natural Gas Mitigation Measures

##### *Wells*

- Reduced Emission (Green) Completions
- Plunger Lift Systems
- Smart Automation for Plunger Lift Systems
- Well Foaming Agents

##### *Tanks*

- Installation of Vapor Recovery Units
- Tank Consolidation

##### *Glycol Dehydrators*

- Flash Tank Separators
- Optimization of Glycol Recirculation
- Zero-emission Dehydrators

##### *Pneumatic Devices and Control systems*

- Replacement of High-Bleed Devices with Low-Bleed Devices
- Convert Gas Pneumatic Controls to Another Motive Force

##### *Valves*

- Test and Repair of Pressure Safety Valves
- Inspection and Repair of Compression Station Blowdown Valves

##### *Compressors*

- Electrification of Compressors
- Replacement of Wet Seals with Dry Seals
- Replacement of Compressor Rod Packing Systems

The report also addresses key mitigation technologies for oil production and Coal Bed Methane.

#### Oil Sector Mitigation Measures

- Methane Flaring
- Methane Reinjection: “ ... in many oil production fields natural gas cannot be captured and sold due to a lack of gas processing facilities and the absence of a nearby natural gas pipeline. When the gas cannot be sold, it can be vented, used as onsite fuel, flared, or reinjected into the oil field. ... methane reinjection is estimated to be ... more expensive than flaring. However, methane reinjection has several potential benefits over flaring, including (1) increasing oil well production, (2) avoiding combustion emissions, and (3) preserving natural gas in the well field for potential recovery at a later time.” *Id.* at 6-14, 6-15.
- CO2 Injection
- VRU Installation on Oil Storage Tanks

#### Coal Bed Methane Well Mitigation Measures

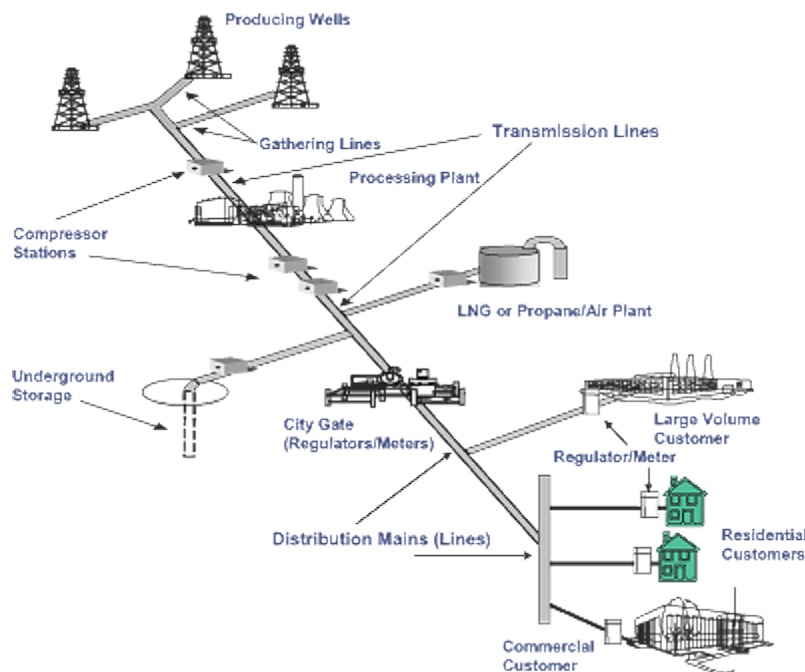
- CBM Wells to Remove Methane
- CBM Wells to Sequester CO2

### **3. EPA Natural Gas Star**

#### ***Cost-Effective Opportunities to Recover Methane***

In conjunction with the oil and natural gas industry, the EPA’s Natural Gas STAR Program has identified many technologies and practices that can be implemented to reduce methane emissions from oil and gas operations. Many of these technologies and practices can be effective in reducing emissions in all sectors throughout oil and natural gas systems. The Natural Gas STAR Program offers technical documents covering a wide range of recommended technologies and practices that have various implementation costs and anticipated payback

periods.<sup>88</sup> The following diagram shows some of the top methane emission reduction opportunities for each sector.



## Gas Production and Processing

- Perform reduced emissions completions
- Install plunger lifts
- Aerial leak detection using laser and/or infrared technology
- Eliminate unnecessary equipment and/or systems

## Oil Production

- Install VRUs on crude oil storage tanks
- Route casinghead gas to VRU or compressor for recovery & use or sale

## Gas Storage

- Convert gas pneumatic controls to instrument air
- Replace bi-directional orifice metering with ultrasonic meters
- Reduce methane emissions from compressor rod packing systems

## Gas Transmission

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<sup>88</sup> See EPA, Natural Gas STAR Program, Recommended Technologies and Practices, available at: <http://www.epa.gov/gasstar/tools/recommended.html>.



- DI&M at compressor stations
- Use fixed/portable compressors for pipeline pumpdown
- Install vapor recovery units on pipeline liquid/condensate tanks

#### **4. Colorado Bureau of Land Management, Comprehensive Air Resource Protection Protocol<sup>89</sup>**

SECTION VI – OIL & GAS DEVELOPMENT EMISSIONS REDUCTION STRATEGIES & BMPS. Table V-1 Best Management Practices and Air Emission Reduction Strategies for Oil and Gas Development [from which the methane mitigation measures below have been selected] displays some emission reduction measures, their potential environmental benefits and liabilities, and feasibility. The table is not meant to be exhaustive in terms of available or acceptable emissions reduction/control technologies or techniques, but provides a baseline or starting point from which to construct design features and mitigation options for project specific or regional analyses.

##### **Control Strategies for Drilling and Compression**

- Natural Gas fired drill rig engines (field gas use)
- Electrification of drill rig engines and/or compressors
- Reduced emission (a.k.a. “green”) completions
- Flaring of completion emissions
- Minimize/eliminate venting and/or use closed loop process where possible during "blow downs"
- Eliminate evaporation pits for drilling fluids
- Electrification of wellhead compression/ pumping
- Wind (or other renewable) generated power for compressors
- Compressor seals – replace wet with dry or use mechanical seal
- Compressor rod packing system – use monitoring and replacement system

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<sup>89</sup> See Colorado BLM, Comprehensive Air Resources Protection Protocol (“CARPP”), available at: [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5436475.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5436475.pdf) (attached as Exhibit 71).

### **Control Strategies Utilizing Centralized Systems**

- Centralization (or consolidation) of gas processing facilities (e.g., separation, dehydration, sweetening)
- Liquids Gathering systems (for condensate and produced water)

### **Control Strategies for Tanks, Separators, and Dehydrators**

- Eliminate use of open top tanks
- Capture and control of flashing emissions from all storage tanks and separation vessels with vapor recovery and/or thermal combustion units
- Capture and control of produced water, crude oil, and condensate tank emissions
- Capture and control of dehydration equipment emissions with condensers, vapor recovery, and/or thermal combustion
- Use zero emissions dehydrators or use desiccants dehydrators

### **Control Strategies for Misc. Fugitive Emissions**

- Install plunger lift systems to reduce well blow downs
- Install and maintain low VOC emitting seals, valves, hatches on production equipment
- Initiate equipment leak detection and repair program (e.g., including use of FLIR infrared cameras, grab samples, organic vapor detection devices, and/or visual inspection)
- Install or convert gas operated pneumatic devices to electric, solar, or instrument (or compressed) air driven devices/controllers
- Use "low" or "no bleed" gas operated pneumatic devices/controllers
- Use closed loop system or thermal combustion for gas operated pneumatic pump emissions
- Install or convert gas operated pneumatic pumps to electric, solar, or instrument (or compressed) air driven pumps
- Install vapor recovery on truck loading/unloading operations at tanks
- Reduced pace of (phased) development

## 5. Center for Sustainable Shale Development

The Center for Sustainable Shale Development (“CSSD”) is a collaborative effort of environmental organizations, philanthropic foundations, energy companies and other stakeholders committed to safe, environmentally responsible shale resource development. Strategic Partners include Chevron, Citizens for Pennsylvania’s Future (PennFuture), Clean Air Task Force, CONSOL Energy, Environmental Defense Fund, EQT Corporation, Group Against Smog and Pollution (GASP), Heinz Endowments, Pennsylvania Environmental Council, Shell, and the William Penn Foundation.

Geographic Scope and Applicability of CSSD Performance Standards: These standards apply to unconventional exploration, development, and gathering activities including site construction, drilling, hydraulic fracturing and production in the Appalachian Basin. These regional standards consider geology, topography, population density, infrastructure, surface water, ground water and other issues of particular concern in the Appalachian Basin. Accordingly, until such time as the scope of these standards may be amended, these standards and the CSSD evaluation and certification process will be limited to operators’ unconventional activities in the Appalachian Basin.

### AIR PERFORMANCE STANDARDS (August 19, 2013)

#### Performance Standard No. 9

1. Beginning on January 1, 2014, in accordance with the conditions set forth in Paragraphs 3 and 4 below, an Operator must direct all pipeline-quality gas during well completion of development wells, and re-completion or workover of any well into a pipeline for sales.
2. Any gas not captured and put in the sales pipeline may not be vented and must be flared in accordance with Standard No. 10 below.
3. Acceptable reasons for sending gas to a flare and not directing gas into the sales line include:
  - (a) Low content of flammable gas. Such low-flammability gas must be directed through a flare, past a continuous flame, to insure combustion begins when gas composition becomes flammable.
  - (b) For safety reasons.
4. Circumstances unacceptable for sending gas to flare, instead of directing it into a sales line, are:
  - (a) Beginning on January 1, 2014, a lack of a pipeline connection except for wells that are designated as either exploratory or extension wells using SEC definitions (however, companies should minimize flaring and maximize the use of reduced emissions completions on exploratory or extension wells, where possible);

- (b) Inadequate water disposal capacity;
  - (c) Undersized flow back equipment, lack of flow back equipment or lack of equipment operating personnel.
5. Any upset or unexpected condition that leads to flaring of gas, instead of directing it into a sales line, must be documented and records maintained by the Operator, including a description of the condition, the location, date, and quantity of gas flared.
  6. Using the SEC definitions, an exploratory well is a well drilled to find a new field or to find a new reservoir in a field previously found to be productive of oil or gas in another reservoir. An extension well is a well drilled to extend the limits of a known reservoir. Wells with these designations must be consistent with Operator reporting of such designations to the SEC, if applicable.

#### Performance Standard No. 10

Various operating conditions and time limits are imposed when flaring is permitted during well completion, re-completions or workovers of any well, pursuant to Standard No. 9 above.

#### Performance Standards No. 11

Various EPA air quality standards are applied to non-road dedicated diesel horizontal drilling rig engines, non-road dedicated diesel fracturing pump engines, or dedicated diesel heavy-duty vehicle engine at the well pad. CSSD encourages and supports the conversion of these engines to either dual-fuel, electricity or natural gas.

#### Performance Standard No. 12

Various NO<sub>x</sub>, CO and VOC standards are applied to compressor engines dedicated to unconventional activities.

#### Performance Standard No. 13

By October 15, 2013, all (existing or new) individual storage vessels at the wellpad with VOC emissions equal to or greater than 6 tpy must install controls to achieve at least a 95% reduction in VOC emissions.

#### Performance Standard No. 14

This standard is applicable to new and existing equipment dedicated to unconventional activities unless stated otherwise.

1. Change rod packing at all reciprocating compressors (both existing and new), including those at the wellhead, either every 26,000 hours of operation or after 36 months.

2. By October 15, 2013, pneumatic controllers (both existing and new) must be low – bleed, with a natural gas bleed rate limit of 6.0 scfh or less, or zero bleed when electricity (3-phase electrical power) is on-site.
3. New centrifugal compressors may not contain wet oil seals. Operators must replace worn out wet seals on existing centrifugal compressors with dry seals.
4. By March 20, 2014 or date of an operator’s initial application for certification (whichever is later), Operators will implement a directed inspection and maintenance program (DI&M) for equipment leaks from all existing and new valves, pump seals, flanges, compressor seals, pressure relief valves, open-ended lines, tanks and other process and operation components that result in fugitive emissions. Process components subject to DI&M are monitored by a weekly visual, auditory, and olfactory check, and once a year by a mechanical or instrument check to detect leaks. Once significant leaks are detected, they are required to be repaired in a timely manner.
5. Eliminate VOC emissions associated with the prevention of well-bore freeze-up (only de minimis emissions are permitted).
6. Existing and new compressors are required to be pressurized when they are off-line for operational reasons in order to reduce blowdown emissions.

#### **6. *Leaking Profits Best Management Practices, NRDC***

According to NRDC, the “top ten” methane waste and emissions mitigation measures, which are technically proven, commercially available and in most cases profitable, are:

- **Green or reduced-emissions completions**—All recovered liquids must be routed to storage vessels and all recovered gases must be routed to a gas gathering line and collection system. This process captures liquids and gases coming out of wells as they are being drilled, repaired, stimulated or re-stimulated during hydraulic fracturing and keeps them out of the atmosphere. If capturing methane is not feasible due to the absence of gathering infrastructure, options include (1) imposing royalty and tax payments on flared gas to create economic incentives for infrastructure incentives, or (2) requiring gas re-injection.
- **Liquids unloading**—operators must employ a plunger lift system or other liquids unloading system with an equal or greater methane capture rate at wellhead facilities to remove accumulated liquids from the well bore, separate them from the gas, route gas to a sales line, and route liquids to a storage vessel.
- **Improved maintenance for compressors, dry seals**—operators must implement a maintenance program for compressors that is in line with industry best practices and must also employ tandem dry seals for all centrifugal compressors used in the production and transmission of natural gas.

- **Pneumatic devices**—for all pneumatic devices, operators must employ low bleed or no-bleed controllers. High-bleed pneumatic devices should be prohibited for all new applications and replaced on existing ones.
- **TEG dehydrator emission controls**—methane venting from tri-ethylene (TEG) dehydrators must be minimized by retrofitting TEG dehydrating systems with emission control equipment including flash tank separators, optimizing the glycol circulation rate, rerouting the skimmer gas, and installing electric pumps to replace natural gas driven energy exchange pumps.
- **Desiccant dehydrators**—operators must deploy desiccant dehydrators, which pass gas through a bed of water-absorbing salt to remove gas moisture without venting methane, whenever feasible.
- **Vapor recovery units**—operators shall employ vapor recovery units comprising scrubbers, compressors and valves with all storage tanks that recover, at minimum, 99 percent of all vapors. Recovered vapors shall not be leaked or vented into the ambient air.
- **Pipelines**—all pipelines must be constructed using plastic pipe. If operators are able to demonstrate to the satisfaction of BLM that the use of plastic pipe is infeasible, operators shall employ plastic insert liners to reduce gas leakage. Excess flow valves shall be installed in all pipelines. When a pipeline is repaired or replaced, or cut to install a new connection point, the amount of methane released into the atmosphere must be reduced by either re-routing the gas and burning it as fuel during the repair and maintenance. Methane gas venting must also be mitigated by using hot tap connections, de-pressuring the pipeline to a nearby low pressure fuel system, or using a pipeline pump-down technique to route gas to sales.
- **Leak Monitoring and Repair** - Methane leaks can occur from numerous locations at an oil and gas facility—valves, drains, pumps, connections, pressure relief devices, open-ended valves, and lines. Since methane is a colorless, odorless gas, methane leaks often go unnoticed. Operators must establish a well-implemented program of regularly monitoring and repairing leaks to significantly reduce fugitive emissions.

#### 7. *Clearing the Air* Best Management Practices, World Resources Institute<sup>90</sup>

- Reducing emissions from well blowdowns with plunger lift systems
- Replacing existing high-bleed pneumatic controllers with low-bleed devices
- Leak detection and repair (“LDAR”)

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<sup>90</sup> World Resources Institute, *Clearing the Air: Reducing Upstream Greenhouse Gas Emissions from U.S. Natural Gas Systems*, available at: <http://www.wri.org/publication/clearing-air>.