November 29, 2012

SUBMITTED ELECTRONICALLY

White River National Forest-Oil and Gas Leasing DEIS
PO Box 1919
Sacramento, CA 95812
Attn: DEIS Project Manager
Email: WRNFoilandgascomments@fscomments.org

RE: Comments on the Air Quality Analysis for the August 2012 White River National Forest Oil and Gas Leasing Draft Environmental Impact Statement (DEIS)

Dear DEIS Project Manager:

I am writing to submit comments on the August 2012 White River National Forest Oil and Gas Leasing Draft Environmental Impact Statement (DEIS). My comments pertain to the air quality portions of the DEIS. These comments were developed under contract to Pitkin County, Wilderness Workshop, and Natural Resources Defense Council.

The air quality modeling analyses performed by the USFS for the DEIS are incomplete and indicate that adverse impacts on air quality would occur due to the proposed leasing sources alone and cumulatively when considering other sources in the region. These adverse impacts will further exacerbate existing air quality conditions that threaten violation of air quality standards. Background data and other analyses indicate that compliance with National Ambient Air Quality Standards (NAAQS) is threatened, significant air quality deterioration is not being prevented and visibility impairment and ecosystem impacts are already occurring due in part to current and proposed future development of oil and gas resources in the area. An analysis of the area impacts is detailed in the attachment to this letter. Further, the air quality analyses presented in the DEIS and accompanying air quality technical support documents are insufficient as detailed in the attachment to this letter. As a result of these deficiencies, it is likely that air quality impacts would be predicted to be even more extensive than what is presented in the DEIS.

Specifically, the attachment to this letter includes detailed comments on the following air quality issues that this DEIS must address:

- Background concentrations of ozone and particulate matter in the impacted area are at or exceed the NAAQS and visibility impairment and ecosystem impacts are already occurring in nearby Class I areas due to ongoing development in the area
- The USFS's air quality modeling analysis predicts significant cumulative nitrogen dioxide, ozone and visibility impacts
- The USFS's air quality modeling analysis predicts significant direct and cumulative ecosystem impacts
- The USFS's air quality modeling analysis does not assure the prevention of significant deterioration of air quality
- The USFS's air quality modeling analysis is incomplete and likely underestimates impacts
- The DEIS does not sufficiently address greenhouse gas emissions and climate change impacts from the proposed leasing
- The DEIS does not include mitigation measures that will ensure there will be no adverse impacts from the proposed leasing

The DEIS does not adequately analyze the air quality impacts that could occur as a result of the actions authorized under the proposed alternatives, therefore, failing to comply with the National Environmental Policy Act (NEPA). The air analysis included in the DEIS is not a comprehensive assessment of the environmental and public health impacts resulting from an increase in air pollution in an area already heavily impacted by the adverse effects of increasing development. Without such an analysis, the USFS cannot know what the full impacts of the leasing activities proposed in the DEIS will be on air quality, human health and the natural environment or whether the USFS will prevent significant deterioration in air quality, as required by the Clean Air Act.

The USFS does not put forth any alternative in the DEIS that fully protects air quality in the area. All of the alternatives fall short of establishing enforceable mitigation measures that will ensure no violations of the applicable State and Federal requirements (*e.g.*, compliance with the National Ambient Air Quality Standards). The proposed alternative (C) appears to only consider the air quality impacts from the additional leasing and does not fully account for the impacts that will occur from existing leases in addition to the proposed additional leasing and therefore underestimates total impacts to air quality. The USFS must propose a detailed and enforceable mitigation plan and consider that plan in detail as an alternative in the DEIS, using any and all means, prior to issuance of the final EIS, that will ensure no violations of Clean Air Act standards and, further, adherence to thresholds established by best available science regarding protection of public health and the environment. If the USFS authorizes this leasing, as proposed, its actions will not ensure protection of air resources. The USFS must improve upon its air quality analysis and then must develop an alternative that ensures no violations of Clean Air Act standards.

I have many years of experience working on air quality issues. My curriculum vitae is enclosed for further information on my expertise. Based on my air quality experience, I believe the White River National Forest Oil and Gas Leasing DEIS will have potentially significant adverse impacts on air quality and that those impacts have not been adequately disclosed or addressed in the DEIS.

Thank you for consideration of these comments. Please include me on the mailing list for any future actions on the Oil and Gas Leasing DEIS for the White River National Forest.

Sincerely,

Megan M. Williams
megan@sevenfivesix.org
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Boulder, CO 80304

Attachments*

* Note that the exhibits referenced in the attachment to this letter were made available to the USFS for download from the following website: https://dl.dropbox.com/u/2329772/WRNF%20DEIS%20Williams%20Air%20Quality%20Exhibits%2020121128.zip. These exhibits, numbered 1-69 (including 80 files and totaling 300MB), will remain available at this location for 90 days past the comment deadline of November 30, 2012.

ATTACHMENT

Detailed Air Quality Comments on the White River National Forest Oil and Gas Leasing Draft Environmental Impact Statement[1]

I. The USFS's Own Assessment Indicates the Proposed Leasing Will Have Adverse Impacts on Air Quality and Therefore the DEIS Does not Satisfy the Requirements of the National Environmental Policy Act and the Clean Air Act

The USFS's analysis for the DEIS shows adverse impacts on air quality. Specifically, the USFS's own analysis fails to ensure compliance with the National Ambient Air Quality Standards (NAAQS) and shows numerous impacts to visibility and other air quality related values in nearby Class I and sensitive Class II areas. The USFS's analysis also does not ensure that the proposed leasing will prevent significant deterioration of air quality. In short, the DEIS does not satisfy the USFS's obligations under the National Environmental Policy Act (NEPA) to disclose whether the proposed development will cause Clean Air Act (CAA) violations, and to consider alternatives that better mitigate air pollution under NEPA, to prevent CAA violations.

The USFS has a fundamental obligation under NEPA to ensure compliance with the health-based NAAQS and to prevent significant deterioration of air quality and adverse impacts on air quality related values, such as visibility. (*See* 36 C.F.R. § 220.1(a) and 40 C.F.R. § 1508.27(b)(10)). The USFS must fulfill its obligations under NEPA to disclose whether the proposed leasing on the White River National Forest (WRNF) will cause significant impacts (*e.g.*, CAA violations), and to consider mitigation under NEPA to prevent any such significant impacts. (40 C.F.R. § 1502.14(f), 40 C.F.R. § 1502.16(h)).

More specifically, the USFS has obligations under NEPA to assess and report the near-field, far-field and cumulative impacts of expected emissions from the proposed leasing on the NAAQS, prevention of significant deterioration (PSD) increments, and air quality related values (AQRVs), and to identify alternatives or other mitigation measures sufficient to prevent expected violations of NAAQS, PSD increments and adverse impacts on AQRVs. (36 C.F.R. § 220, 40 C.F.R. §§ 1502.14(a), (f), 40 C.F.R. § 1502.16(h) and 40 C.F.R. § 1508.27(b)(10)). The USFS did not complete a near-field assessment as part of this DEIS. The USFS

[1] Note that the exhibits referenced in this attachment were made available to the USFS for download from the following website: https://dl.dropbox.com/u/2329772/WRNF%20DEIS%20Williams%20Air%20Quality%20Exhibits%2020121128.zip. These exhibits, numbered 1-69 (including 80 files and totaling 300MB), will

must conduct a comprehensive quantitative analysis of air quality impacts from any leasing activity that would be allowed under the EIS because—in addition to being necessary for the USFS to know if it is complying with a myriad of federal laws and regulations—such an analysis is necessary for the USFS to understand and evaluate potential significant impacts of the various leasing scenarios under the programmatic EIS on human health and the environment. Certainly, without a full understanding of the background and predicted near-field concentrations in the area, the public cannot know whether air quality will, at the very least, remain below the levels established by the EPA as protective of human health (*i.e.*, below the NAAQS) *before* the USFS proceeds with a leasing program. Without completing a comprehensive quantitative assessment of the air quality impacts of emissions from all potential sources, the USFS cannot fully satisfy its obligation under NEPA to determine whether changes in emissions that could result from the DEIS will have a "significant impact on the human environment", where "significant" means that the impact "threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment." See 40 C.F.R. § 1508.27(b)(10).

Further, compliance with the White River National Forest Land and Resource Management Plan requires the Forest "[m]eet state and federal air quality standards and comply with local, state, and federal air quality regulations and requirements either through original project design or through mitigation for such activities as prescribed fire, ski area development or expansion, mining, and oil and gas exploration and production."[2]

In order to meet its obligations under NEPA and the Forest Plan, the USFS must identify an allowable level of emissions for the proposed leasing that would not cause or contribute to exceedances of pollution standards in the ambient air or adverse impacts on air quality related values in Class I areas, and identify mitigation measures to achieve those emissions levels. NEPA explicitly requires that the EIS "shall include discussions of: (h) Means to mitigate adverse environmental impacts (if not fully covered under § 1502.14(f))." Where "[m]itigation includes: (a) avoiding the impact altogether by not taking a certain action or parts of the action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation." 40 C.F.R. § 1508.20.

In its DEIS analysis, the USFS must include all information relevant to reasonably foreseeable significant adverse impacts and must fully justify any incomplete or unavailable information per the requirements of 40 C.F.R. §1502.22. The USFS must also include a comprehensive analysis of cumulative effects, including

[2] White River National Forest Land and Resource Management Plan, Chapter 2, page 2-3, 2002 revision. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_000999.pdf, included at Exhibit 1.

effects of the proposed actions along with all past, present and reasonably foreseeable future actions on the affected environment. (36 C.F.R. § 220.4(f) and 40 C.F.R. § 1508.7).

The USFS has fallen short of accomplishing this in this DEIS. Importantly, all alternative scenarios are shown to violate at least one, if not several of the air quality standards laid out by the CAA. Even Alternative C, the proposed alternative and the alternative that appears to be most protective of resources, is shown to result in direct adverse impacts to air quality related values. Specifically, the DEIS and associated technical support documents report cumulative impacts that exceed the NAAQS, significant deterioration of air quality and numerous visibility and ecosystem impacts. Even more troublesome is the fact that the modeling does not fully evaluate impacts from existing leases and proposed future leases and does not fully disclose the maximum potential impacts. Further, background concentrations were not fully considered and understate air quality in the area meaning that the adverse air quality impacts would likely be worse, in reality, than what is shown in this DEIS.

II. The USFS Must Acknowledge and Consider the Existing Air Quality Concerns in the White River National Forest and Nearby Impacted Areas

The USFS must acknowledge the existing air quality concerns in the area and recognize that high background levels of air pollutants can mean that even if the activities analyzed in the DEIS will result in only minor increases in certain pollutants, the aggregate level of pollution that could result might have significant detrimental effects on human health and the environment (*e.g.*, visibility and ecosystems). In fact, according to the DEIS:

> Over the last decade, western Colorado has experienced substantial growth of oil and gas development activity contributing to the rapid growth of surrounding communities and accompanied by up to a four-fold increase in local sources of air pollution emissions (Pierce 2008a; Garfield County Public Health 2009).[3]

Background concentrations of ozone and PM in the area are at or exceed the NAAQS and leave virtually no room for additional growth in emissions. Visibility and other air quality related values in several Class I areas are already being impacted by growth of the oil and gas industry in the area. For the USFS to present alternatives for the DEIS that allow for growth in the emissions that

[3] Air Resources Specialist Report Oil and Gas Leasing Decision NEPA, White River National Forest, Andrea Holland, May 3, 2011 at 2, included at Exhibit 2.

contribute to these existing air quality concerns is inconsistent with the CAA's goal to protect human health and the environment. These issues must be dealt with in this DEIS by ensuring overall air quality compliance throughout the affected area. Specifically, the USFS must acknowledge and address the areas of concern described in more detail below.

Wintertime Ozone Exceedances Near Oil and Gas Fields Point to a Worsening Problem

The DEIS presents several background concentrations for ozone, ranging from 62 to 87 parts per billion (ppb), in Table 21 of the DEIS (p. 3-123) and in Table 5 of the Air Resources Specialist Report (p. 10).[4] These values are reported as the 4th highest maximum 8-hour average concentration per year and cover years 2003 to 2009. These background concentrations do not include some of the more recent monitoring activity in the region and some monitors do not account for wintertime ozone concentrations.

There is increasing precedence for wintertime ozone problems where oil and gas development occurs in the West. The atmospheric chemistry leading to ozone formation is complex and is highly sensitive to a wide range of factors, including the intensity of sunlight, air temperature and the quantity and chemical composition of the volatile organic compounds (VOC) and nitrogen oxide (NO_x) pollutants that combine in the presence of sunlight to form ozone. Traditionally, elevated ozone levels are thought to be a summertime problem that plagues large urban areas. But recent events that have occurred in rural southwest Wyoming and northeast Utah in wintertime demonstrate this is not always the case. This raises a concern with respect to potential wintertime ozone formation in the White River National Forest and the surrounding impacted areas.

According to a recent study by the National Oceanic and Atmospheric Administration, ozone rapidly formed in wintertime in southwest Wyoming "when three factors converged: ozone-forming chemicals from the natural gas field, a strong temperature inversion that trapped the chemicals close to the ground, and extensive snow cover, which provided enough reflected sunlight to jump-start the needed chemical reactions."[5] The White River National Forest also exhibits these factors needed for wintertime ozone formation. First, oil and gas sources in the area contribute to pollutant concentrations that have the potential to form ozone.

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[4] Air Resources Specialist Report Oil and Gas Leasing Decision NEPA, White River National Forest, Andrea Holland, May 3, 2011, included at Exhibit 2.

[5] See NOAA's press release at http://www.noaanews.noaa.gov/stories2009/20090118_ozone.html, January 18, 2009 for Schnell, R.C., et al. 2009, included as Exhibit 3a. Rapid photochemical production of ozone at high concentrations in a rural site during winter. *Nature Geoscience* 1-3 (January 18, 2009), http://www.nature.com/naturegeoscience, included as Exhibit 3b.

Second, strong temperature inversions are present, in particular where the WRNF and the surrounding impacted areas interact with the Uinta Basin to the west and the Colorado Plateau Basin to the south with these areas exhibiting a high potential for wintertime meteorological inversions. Finally, given the overall high elevation throughout the WRNF, extensive snow cover is persistent in the region during winter months.

In 2008, the State of Wyoming issued three ozone advisories in the winter for the Pinedale region in the Upper Green River Basin. At the time, the Wyoming Department of Environmental Quality said the cause of the elevated ozone levels is probably the area's intensive natural gas development.[6] Since then, the State of Wyoming, Bureau of Land Management (BLM) and the Environmental Protection Agency (EPA) have been coordinating efforts to reduce wintertime ozone concentrations in the area. High wintertime ozone concentrations have resulted in a nonattainment designation, effective July 20, 2012, for Sublette and parts of Lincoln and Sweetwater Counties.[7] The Uinta Basin in Utah is now experiencing a similar situation of wintertime ozone and particulate matter NAAQS exceedances together with increasing oil and gas development. Ignoring the possibility of wintertime ozone formation in the WRNF has the potential to lead to a nonattainment designation, similar to that facing these areas in Wyoming and Utah.

The importance of protecting the air quality for those people who live in the region, most importantly for sensitive populations, including children, the elderly and those with respiratory conditions is huge. 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.[8] According to a report by the National Research Council "short-term exposure to current levels of ozone in many areas is likely to contribute to premature deaths".[9]

In 2008, EPA revised the 8-hour ozone standard from 80 ppb to 75 ppb and in January of 2010 proposed even stricter standards, between 60 and 70 ppb.[10] EPA has since decided to continue implementing the 75 ppb standard until the

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[6] As reported in the Billings Gazette in 2008, included as Exhibit 4.
[7] *See* EPA's final designation at 77 FR 30088, May 21, 2012 included as Exhibit 5a and EPA's April 30, 2012 letter to Wyoming Governor Matt Mead at http://deq.state.wy.us/aqd/downloads/Nonattainmentletter4_30_12.pdf, included as Exhibit 5b.
[8] *See* EPA's National Ambient Air Quality Standards for Particulates and Ozone, 62 FR 38,856 (July 18, 1997), included as Exhibit 6.
[9] http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12198, included as Exhibit 7.
[10] *See* 73 FR 16436, Effective May 27, 2008, included as Exhibit 8a, and 75 FR 2938, January 19, 2010, included as Exhibit 8b.

next regularly scheduled regulatory review in 2013 and does not intend to finalize the proposed revisions from 2010.[11] The Clean Air Scientific Advisory Committee's (CASAC) —appointed by the Administrator to recommend revisions to the existing standards, per section 109(d)(2) of the Clean Air Act— recommended in 2008 that EPA substantially lower the 8-hour standard. At that time the EPA did not abide by the committees recommendations. Specifically, the CASAC put forth a unanimous recommendation to lower the 8-hour standard from 80 ppb to somewhere between 60-70 ppb.[12] The committee concluded that there is no scientific justification for retaining the current 8-hour standard and that the EPA needs to substantially reduce the primary 8-hour standard to protect human health, especially in sensitive populations. So, even ozone concentrations at levels as low as 60 ppb can be considered harmful to human health and the USFS should consider this when evaluating the air impacts in the DEIS, including by considering, in detail, an alternative in the DEIS pursuant to NEPA that would constrain impacts to within the 60-70ppb range established by the CASAC, regardless of what EPA eventually chooses to do in 2013 as the USFS has a duty, independent of the CAA, to protect public health and the environment.

In addition to the human health effects, ozone pollution can cause adverse effects to the physical environment. Ozone is absorbed by plants and can cause leaf discoloration, reduced photosynthesis, and reduced growth as well as make plants more susceptible to disease, pests and environmental stresses.[13] Ozone effects on trees are thought to accumulate over time such that whole forests or ecosystems can be affected. Many plant species have been specifically identified by the Federal Land Managers as being sensitive to ozone pollution in the Class I areas impacted by the proposed leasing on the WRNF, including White fir, Subalpine fir, Boxelder, Saskatoon serviceberry, Sagebrush, Trembling aspen, Chokecherry, Hybrid poplar, Ninebark, Chockcherry, Thimbleberry, Squawberry and Huckleberry in the Eagle's Nest, Flat Tops, Maroon Bells-Snowmass, Mount Zirkel, Rawah, Weminuche and West Elk Wilderness Areas in Colorado.[14]

Recent data from ozone monitors in the region indicate that ozone levels are already exceeding the NAAQS of 75 ppb on some days, by a considerable margin. The DEIS includes a summary of ozone data from 2003 to 2009 at various locations within and near the WRNF, including several concentrations

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[11] Note, the 2008 standard is currently under legal challenge. *See*, September 22, 2011, EPA Memo, Implementation of the Ozone National Air Quality Standard, http://www.epa.gov/ozonepollution/pdfs/OzoneMemo9-22-11.pdf, included as Exhibit 9.

[12] EPA-CASAC-LTR-07-001, Clean Air Scientific Advisory Committee's (CASAC) Peer Review of the Agency's 2nd Draft Ozone Staff Paper, October 24, 2006, included as Exhibit 10.

[13] As discussed in U.S. National Park Service, Air Quality in Our National Parks, 2002, Chapter 2, included as Exhibit 11.

[14] See Appendix 3.A of the Federal Land Manager's Air Quality Related Values Workgroup Phase I Report, December 2000 (FLAG guidance), included as Exhibit 12.

that exceed the NAAQS and a 4th highest maximum daily average ozone concentration as high as 87 ppb at the Aspen Mountain monitor in 2009.[15] In addition to the data reported in the DEIS, the newly established monitors in Meeker and Rangely have recorded maximum 8-hour average concentrations close to and exceeding the NAAQS with a maximum 8-hour average wintertime concentration recorded in February 2011 in Rangely of 88 ppb.[16] The ozone monitors in Rifle and Palisade also recorded maximum 8-hour average concentrations that exceeded the NAAQS in 2008 and again in 2012.[17] The monitor in Gothic recorded a maximum 8-hour average ozone concentration in 2012 of 81 ppb and the USFS monitors at Ajax Mountain, Sunlight Mountain, Wilson and Silt-Collbran all recorded maximum 8-hour average ozone concentrations that exceeded the NAAQS in recent years with, in some cases, even the 4th highest 8-hour average concentration exceeding 75 ppb. The following table summarizes some of these more recent monitoring data that are not included in the DEIS.

Summary of Recent Ozone Monitoring Data (since 2009)

Site	ID	Monitor Notes[1]	Year	1st Max. 8hr [ppb]	4th Max. 8hr [ppb]
Ajax Mtn.	08-097-0002	USFS - FRM	2009	86	73
Ajax Mnt.	08-097-0002	USFS - FRM	2010	91	75
Ajax Mnt.	08-097-0002	USFS - FRM	2011	76	74
Gothic	08-051-9991	FRM - CAMD	2012	81	70
Palisade	08-077-0020	FRM Special Purpose	2012	75	69
Rangely	08-103-0006	NPS - FRM	2011	88	73
Rifle	08-045-0012	FRM Special Purpose	2012	78	68
Silt-Collbran	08-077-0022	USFS - FRM	2011	76	74
Sunlight Mtn	08-045-0016	USFS - FRM	2010	85	77
Sunlight Mtn	08-045-0016	USFS - FRM	2011	80	76
Wilson	08-045-0017	USFS - FRM	2010	75	69
Wilson	08-045-0017	USFS - FRM	2011	78	74

TABLE NOTES:

[1] Monitor notes include information on whether or not the monitor is a Federal Reference Monitor (FRM), the owner, if other than CDPHE (*e.g.*, National Park Service (NPS)), US Forest Service (USFS) and the monitor type (*e.g.*, state and local air monitoring stations (SLAMS), Special

[15] USFS DEIS Table 21 at 3-123 and Air Resources Specialist Report at 10, included as Exhibit 2.

[16] EPA AirExplorer, Rangely, CO, Monitoring ID 08-103-0006, Annual monitoring report for 2011, First maximum value.

[17] EPA AirExplorer, Rifle, CO, Monitoring ID 08-045-0012, Annual monitoring reports for 2008 and 2012, First maximum value = 76 ppb in 2008 and 78 ppb in 2012. EPA AirExplorer, Palisade, CO, Monitoring ID 08-077-0020, Annual monitoring reports for 2008 and 2012, First maximum value = 77 ppb in 2008 and 75 ppb in 2012.

Purpose monitor, etc.).

The above table highlights the fact that there have been numerous recorded concentrations that exceed the 8-hour average ozone NAAQS in recent years. And 17 of the ozone monitors in the immediate area have recorded maximum 8-hour average concentrations that exceed the lower end of the range (60 ppb) identified by CASAC as harmful to human health.[18]

The National Park Service monitor in Dinosaur National Monument recorded four exceedances of the ozone NAAQS in 2012 with a maximum 8-hour average concentration of 84 ppb and a 4th high 8-hour average concentration of 76 ppb.

Just west of the planning area in northeastern Utah, maximum recorded wintertime ozone values at monitors in Ouray and Redwash in 2010 were as high as 123 ppb. The 4th highest maximum 8-hour average ozone concentration at these monitors in 2010 was 116 ppb, with a full 68 days recording 8-hour average concentrations of 75 ppb or greater and 135 days recording 8-hour average concentrations of 60 ppb or greater.[19] According to the recent draft Gasco development EIS in this area:

> Based on the emission inventories developed for Uintah County, the likely dominant source of ozone precursors at the Ouray and Redwash monitoring sites are oil and gas operations near the monitors. The monitors are located in remote areas where impacts from other human activities are unlikely to be significantly contributing to this ozone formation. Although ozone precursors can be transported large distances, the meteorological conditions under which this cold pool ozone formation is occurring tend to preclude any significant transport. Currently, ozone exceedences in this area are confined to the winter months during periods of intense surface inversions and low mixing heights.[20]

Air quality studies in the Uinta Basin are ongoing and targeted at finding the most effective mitigation strategies for the area. Currently, the area's study goals are

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[18] This includes monitored concentrations that exceed 60 ppb at all 17 of the following monitors: Aspen (08-097-0007), Ajax Mountain (08-097-0002), Colorado National Monument (08-077-1001), Dutch John Airport (49-009-0001), Flattops #3 (08-045-0014), Gothic (08-051-9991), Grand Mesa (08-077-0021), McClure Pass (08-051-0008), Meeker (08-103-0005), Palisade (08-077-0020), Rangely (08-103-0006), Rifle (08-045-0012), Ripple Creek Pass (08-045-0015), Silt-Collbran (08-077-0022), Sunlight Mountain (08-045-0016), Trout Creek Pass (08-015-0001), Wilson (08-045-0017).

[19] EPA Air Explorer, 2010. http://www.epa.gov/airexplorer/

[20] Gasco Draft EIS at 3-13, available online at http://www.blm.gov/ut/st/en/fo/vernal/planning/nepa_/gasco_energy_eis.html, included as Exhibit 13.

focused on evaluating the sensitivity of winter ozone concentrations to VOC and NO_x emissions. Compiled ozone data from the Uinta Basin 2010-2011 wintertime ozone study show 14 out of 16 monitors in the basin recorded at least one exceedance of the 8-hour NAAQS with no less than 7 of those monitors recording at least 18 exceedances (with the maximum number of exceedances, 25, recorded at two of the 16 monitors).[21] The 2010-2011 study concluded that closer proximity to oil and gas wells resulted in higher ozone concentrations.[22]

According to EPA, the high ozone concentrations recently monitored in Rangely may be related to the Uinta Basin air quality issues because the Rangely area "basically sits on the [Uinta] basin's eastern end".[23] And, in fact, the Rangely monitoring site – which recorded 3 exceedances of the ozone NAAQS during the study period – was included as part of the 2010-2011 Uinta Basin air quality study.[24]

The National Park Service ozone monitors in Dinosaur National Monument and Colorado National Monument are portable monitors that only operate May through September and therefore cannot detect wintertime ozone concentrations. It is critical that the USFS consider all available data from year-round monitors. Given the fact that many of the ozone monitors in the region do not collect data in the wintertime (*e.g.*, Aspen Mountain, Ripple Creek Pass, Flattops, Silt-Collbran, Wilson) and what little data have been collected to date show that elevated ozone concentrations are present, it is critical that the USFS not proceed without implementing further mitigation measures to prevent a similar situation to that in Utah and Wyoming where wintertime ozone concentrations near oil and gas development have caused regular and considerable exceedances of the ozone NAAQS and threatened these areas' attainment status. The parties involved in the air quality studies in the Uinta Basin are in the process of developing a conceptual model of how winter ozone is formed and recognize the need for a validated photochemical modeling analysis of the basin for simulating winter ozone formation in order to fully understand and quantify the effectiveness of mitigation strategies.[25]

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[21] Energy Dynamics Laboratory, Utah State University Research Foundation, Final Report: Uinta Basin Winter Ozone and Air Quality Study December 2010-March 2011, EDL/11-039, June 14, 2011, Table 4-1 at 42, included as Exhibit 14.

[22] Energy Dynamics Laboratory, Utah State University Research Foundation, Final Report: Uinta Basin Winter Ozone and Air Quality Study December 2010-March 2011, EDL/11-039, June 14, 2011, p. 97, included as Exhibit 14.

[23] Grand Junction Daily Sentinel, 'Big-City' Ozone Goes Rural, March 24, 2011, http://www.gjsentinel.com/news/articles/bigcity_ozone_goes_rural/, included as Exhibit_15.

[24] Energy Dynamics Laboratory, Utah State University Research Foundation, Final Report: Uinta Basin Winter Ozone and Air Quality Study December 2010-March 2011, EDL/11-039, June 14, 2011, Table 4-1 at 42, included as Exhibit 14.

[25] 2012 Uintah Basin Winter Ozone & Air Quality Study – Summary of Interim Findings, Ongoing Analyses, Additional Recommended Reasearch, and Possible Mitigation Strategies, Prepared by

Essentially, there is no room for growth in emissions that contribute to these harmful levels of ozone pollution in the area — namely, NO_x and VOC. The ozone impact assessment for the DEIS discusses the possibility of a NO_x-limited environment where "a small increase in in NO_x accompanied by a larger increase in VOC can lead to a reduction in ozone concentration".[26] Typically, ozone formation is considered NO_x-limited in rural areas and when the rate of ozone formation is NO_x-limited, ozone concentrations are most effectively controlled by reducing NO_x emissions.[27] Yet, in the proposed alternative the USFS is estimating over 450 tons per year of additional NO_x emissions and over 600 tons per year more of VOC emissions (and as much as 1,100 tons per year of additional NO_x emissions and 1,700 tons per year of additional VOC emissions under the No Action Alternative (A)).[28] The USFS must demonstrate as part of this DEIS that these significant emissions increases, and in particular the significant increase in NO_x emissions, will not threaten the area's compliance with the ozone NAAQS.

The USFS must establish strict and enforceable, state-of-the-art mitigation measures that essentially do not allow for any incremental impact in ozone concentrations in the area in order to protect human health and to avoid future violations of the ozone NAAQS. These mitigation measures should be considered, in detail, as alternatives in the DEIS pursuant to NEPA. In order to protect human health and to fulfill its responsibility to provide for compliance with the ozone standard in this DEIS, the USFS must ensure that ozone concentrations do not increase further and instead make a plan within this DEIS to keep ozone below harmful levels. Accordingly, the USFS should fully consider the CASAC recommendations when evaluating the human health impacts from ozone concentrations in the region and consider, in detail, alternatives in the DEIS to prevent levels from rising above not only the ozone NAAQS, but the CASAC's science-based 60-70ppb threshold.

Since the modeling performed for the DEIS does not simulate wintertime ozone it is even more critical that the USFS consider a background concentration that reflects the higher concentrations of ozone seen during these wintertime inversion events.

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researchers and air quality managers at USU/EDL, Alpine Geophysics, ENVIRON, UDEQ and EPA, August 7, 2012, included as Exhibit 16.

[26] USFS White River National Forest Planned Development Area Oil and Gas Ozone Impact Analysis, URS Project 22241970, January 2011, p. 3-16, included as Exhibit 17.

[27] *See, e.g.*, EPA Final Ozone NAAQS Regulatory Impact Analysis, March 2008, p. 2-1, included as Exhibit 18.

[28] USFS TSD Tables 5-5 and 5-7 at 5-4 and 5-6.

In Wyoming, the BLM is partnering with cooperating agencies, operators, the environmental community and the public to implement an Adaptive Environmental Management (AEM) process.[29] This process will, among other things, include mechanisms for continual monitoring and assessment of impacts by periodically reviewing mitigation measure effectiveness, validating predictive models with field observations and impact monitoring and then making necessary adjustments to mitigation measures, as needed. Due to increasingly high ozone levels in northwest New Mexico, the Farmington, New Mexico Resource Management Plan (RMP) developed a strategy in which the BLM joined with other air quality control agencies in the area to create the Four Corners Ozone Task Force. The goal of this task force is to develop a plan that would prevent ozone levels from violating the standard. Those efforts culminated in a report that lays out voluntary mitigation options for power plants, oil and gas sources and other major sources of emissions in the area.[30] In addition, a technical work group on San Juan County ozone action will be initiated if ozone levels in San Juan County exceed 95% of the federal ozone standard. The USFS should consider taking similar cooperative steps in the White River National Forest and surrounding BLM field offices (*e.g.*, Colorado River Valley Field Office, White River Field Office, Little Snake Field Office, Grand Junction Field Office, etc.) so as to ensure regional coordination for this regional air quality issue.

Particulate Matter Emissions in the Area are High

The USFS presents 2008 background concentration data in the DEIS for particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$) from monitors in "Western Colorado Communities".[31] In addition, the USFS presents PM_{10} data in the DEIS from 2007 to 2010 from an industrial monitor in the Piceance Basin.[32] The only background concentration data that the USFS presents in the DEIS for particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) are from the Grand Junction monitor in 2008.[33] The PM_{10} background concentrations from the "Western Colorado Communities" presented in Table 4-1 of the DEIS Technical Support Document (TSD) are based on the maximum 24-hour average concentration monitored in 2008 and range from 65 micrograms per cubic meter ($\mu g/m^3$) in Aspen to 210 $\mu g/m^3$ in Parachute (compared to the 24-hour average NAAQS for PM_{10} of 150 $\mu g/m^3$). The PM_{10} background concentrations from the

[29] *See* Pinedale Anticline FRMP, Appendix C, Adaptive Environmental Management Process, available online at http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/pfodocs/anticline.Par.6236.File.dat/017app-c.pdf, included as Exhibit 19.
[30] *See* http://www.nmenv.state.nm.us/aqb/4C/TaskForceReport.html, included as Exhibit 20.
[31] USFS TSD Table 4-1 at 4-2.
[32] USFS TSD Table 4-2 at 4-2.
[33] USFS TSD Table 4-1 at 4-2.

industrial site in rural western Colorado presented in Table 4-2 of the DEIS TSD are based on the second highest 24-hour average PM_{10} concentrations in the years 2007 through 2010 and range from 23 $\mu g/m^3$ in 2007 to 66 $\mu g/m^3$ in 2010. In addition, the following PM_{10} monitoring data from 2010 from Parachute, Clifton, Grand Junction, Crested Butte, Mount Crested Butte and Delta show continued, high PM_{10} background concentrations in the area.

2010 PM_{10} Monitoring Data (Source: EPA AirExplorer)

Site	ID	Monitor Notes[1]	1st High PM_{10} 24hr [$\mu g/m^3$][2]	2nd High PM_{10} 24hr [$\mu g/m^3$][2]
Parachute	08-045-0005	FRM Other	107 LC	49 LC
Clifton	08-077-0019	FRM Special Purpose	163 LC	75 STP
Grand Jct	08-077-0017	FRM SLAMS	132 LC	64 STP
Grand Jct	08-077-0018	FRM SLAMS	171 STP	131 STP
Mt Crested Butte	08-051-0007	FRM SLAMS	168 STP	123 STP
Crested Butte	08-051-0004	FRM SLAMS	174 STP	87 STP
Delta	08-029-0004	FRM SLAMS	125 STP	115 STP

TABLE NOTES:
[1] Monitor notes include information on whether or not the monitor is a Federal Reference Monitor (FRM), the owner, if other than CDPHE (*e.g.*, National Park Service (NPS)), and the monitor type (*e.g.*, state and local air monitoring stations (SLAMS), Special Purpose monitor, etc.).
[2] STP indicates standard temperature and pressure, LC indicates local conditions

Only the monitoring site in Parachute recorded a maximum 24-hour average PM_{10} concentration above the NAAQS of 150 $\mu g/m^3$ in 2008 but the monitors in Clifton, Grand Junction, Crested Butte and Mount Crested Butte have all recorded maximum 24-hour average PM_{10} concentrations higher than the NAAQS since 2008. And Grand Junction, Mount Crested Butte and Delta all have recorded a second high value greater than 100 $\mu g/m^3$ with a highest second high value recorded in Grand Junction in 2010 of 131 $\mu g/m^3$. According to EPA data, the monitor in Grand Junction (08-077-0017) is considered a "violating monitor[] in [an] area[] not previously designated as non-attainment for the PM_{10} standard".[34] This indicates that PM_{10} concentrations in these areas are already high and the USFS must ensure that additional oil and gas development under the proposed leasing alternatives would not threaten these areas' compliance with the NAAQS.

[34] EPA, Design Value data 2009-2011, http://www.epa.gov/airtrends/values.html, included as Exhibit 21.

The $PM_{2.5}$ background concentration for Grand Junction in Table 4-1 of the DEIS TSD is based on the maximum 24-hour average concentration from 2008 and is reported as 27.8 $\mu g/m^3$. More recent monitoring data from Grand Junction indicate that these 2008 data from Grand Junction may not be reflective of potentially higher concentration conditions. In 2009 and 2010, the first high 24-hour average concentrations in Grand Junction were 59.1 $\mu g/m^3$ and 43.3 $\mu g/m^3$, respectively. These concentrations both exceed the 24-hour average NAAQS value of 35 $\mu g/m^3$. Even the 98th percentile 24-hour average concentration for these monitors—41 $\mu g/m^3$ and 37.3 $\mu g/m^3$, respectively—both still exceed the 24-hour NAAQS. Both of these concentrations were observed in wintertime (January). The maximum recorded 24-hour average $PM_{2.5}$ concentration in 2011 in Grand Junction was 24 $\mu g/m^3$, also in winter.

In addition to wintertime ozone, wintertime $PM_{2.5}$ is a growing concern near oil and gas development. In oil and gas development areas in northeast Utah, air quality monitors have monitored several exceedances of the 24-hour average $PM_{2.5}$ NAAQS. A monitor in Vernal, Utah was operated by the Utah Department of Air Quality (UDAQ) from December 2006 through mid-December 2007 and recorded several very high values of $PM_{2.5}$ during that time, including six exceedances of the 24-hour $PM_{2.5}$ NAAQS and a maximum 24-hour average $PM_{2.5}$ concentration of 63 $\mu g/m^3$.[35] UDAQ collected additional $PM_{2.5}$ data in Vernal and Roosevelt from January 21, 2009 through March 5, 2009.[36] During that time, there were three recorded exceedances of the 24-hour average $PM_{2.5}$ NAAQS in Roosevelt with 24-hour average concentrations reaching 42 $\mu g/m^3$ and four recorded exceedances in Vernal with 24-hour average concentrations as high as 60.9 $\mu g/m^3$.[37]

Speciation studies completed on samples collected in Vernal and Roosevelt found that the sources that contribute to the high concentrations (organic and elemental carbon sources) are different than those seen in the urban areas of the Wasatch Front and Cache Valley (mostly ammonium nitrate from combustion sources (NO_x)).[38] The large fraction of carbon material found in the samples from the Uinta Basin (up to 80% of the $PM_{2.5}$ by mass), according to the recent air

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[35] *See* data from the State's "Particulate PM2.5 Data Archive" at http://www.airmonitoring.utah.gov/dataarchive/archpm25.htm ("VL" for Vernal monitor), Jan 2007 data included as Exhibit 22.

[36] September 3, 2009 letter from EPA Region 8 to David Garbett, SUWA, Re $PM_{2.5}$ Monitor in Vernal, Utah, included as Exhibit 23.

[37] September 3, 2009 letter from EPA Region 8 to David Garbett, SUWA, Re $PM_{2.5}$ Monitor in Vernal, Utah, included as Exhibit 23.

[38] *See* Energy Dynamics Laboratory, Utah State University Research Foundation, Final Report: Uinta Basin Winter Ozone and Air Quality Study December 2010-March 2011, EDL/11-039, June 14, 2011, p. 71, included as Exhibit 14.

quality studies conducted in the Uinta Basin, indicates a "likelihood of strong regional contributions of the oil and gas industry to the atmospheric hydrocarbon (VOC) burden of the Uinta Basin's airshed."[39]

It is possible that the high concentrations of $PM_{2.5}$ recorded in Grand Junction in 2009 and 2010 are due, in part, to the secondary formation of $PM_{2.5}$ (*e.g.*, sulfates and nitrates), as opposed to directly emitted [primary] PM (*e.g.*, road dust and wood smoke). The high values occurred during the wintertime and could potentially be associated with inversions that limit dispersion and provide conditions (*e.g.*, high relative humidity) that contribute to the formation of secondary $PM_{2.5}$ in the atmosphere. Since it is possible that the monitored high values are due to gaseous pollutants that form fine particles after reacting with other compounds in the air during wintertime inversions then it would be very important for the USFS to consider these wintertime $PM_{2.5}$ background concentrations in its air quality impact assessment.

In 2006, EPA lowered the short-term $PM_{2.5}$ standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ because scientific information showed that the pollutant is a health concern at levels lower than what the previous standard allowed.[40] $PM_{2.5}$ 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. $PM_{2.5}$ is also a major contributor to visibility impairment. See the EPA's staff paper on particulate matter (EPA-452/R-05-005a, December 2005) as well as the EPA's Air Quality Criteria Document for Particulate Matter (EPA/600/P-99/002aF and EPA/600/P-99/002bF, October 2004) for more detailed information on the health effects of $PM_{2.5}$.[41] Even $PM_{2.5}$ concentrations lower than the current NAAQS are a concern for human health. The CASAC, in their letter to the EPA on the revised $PM_{2.5}$ standard, unanimously recommended that the 24-hour $PM_{2.5}$ standard be lowered from 65 $\mu g/m^3$ to 30-35 $\mu g/m^3$ and that the annual standard be lowered from 15 $\mu g/m^3$ to 13-14 $\mu g/m^3$.[42] EPA set the standard on the high end of the CASAC recommended range for the short-term standard and chose not to lower the annual standard at all. In response, CASAC made it clear that

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[39] Energy Dynamics Laboratory, Utah State University Research Foundation, Final Report: Uinta Basin Winter Ozone and Air Quality Study December 2010-March 2011, EDL/11-039, June 14, 2011, p. 71, included as Exhibit 14.

[40] 71 FR 61236, effective December 18, 2006, included as Exhibit 24.

[41] *See* http://www.epa.gov/ttn/naaqs/standards/pm/data/pmstaffpaper_20051221.pdf, included as Exhibit 25a, and http://cfpub2.epa.gov/ncea/cfm/recordisplay.cfm?deid=87903, included as Exhibits 25b and 25c.

[42] EPA-CASAC-LTR-06-003, Clean Air Scientific Advisory Committee Recommendations Concerning the Final National Ambient Air Quality Standards for Particulate Matter, September 29, 2006, http://yosemite.epa.gov/sab/SABPRODUCT.NSF/1C69E987731CB775852571FC00499A10/$File/casac-ltr-06-003.pdf, included as Exhibit 26.

their recommendations were based on "clear and convincing scientific evidence" and that the EPA's decision not to lower the annual standard does not provide for "an adequate margin of safety … requisite to protect the public health" as required by the CAA and, furthermore, that their recommendations were "consistent with the mainstream scientific advice that EPA received from virtually every major medical association and public health organization that provided their input to the Agency".[43] EPA is currently proposing to strengthen the annual standard to a level within the range of 12 to 13 $\mu g/m^3$.[44] This strongly suggests that USFS should consider, in detail, an alternative in the DEIS pursuant to NEPA that constrains 24-hour and annual $PM_{2.5}$ concentrations within the ranges identified by the CASAC.

The USFS has an obligation, under NEPA, to evaluate all potential health effects from exposure to increased pollution under the various alternatives of this DEIS. The fact that the EPA has set the $PM_{2.5}$ standards at levels that CASAC asserts is not adequate to protect human health should not limit the USFS to using only EPA's standards. The USFS must assure adequate protection of human health from exposure to $PM_{2.5}$ in the area and could certainly use the CASAC recommendations as a guide for achieving this protection.

Major sources of $PM_{2.5}$ emissions from oil and gas development include products of combustion (*e.g.*, from compressor engines and drill rig engines used during natural gas development) as well as travel on unpaved roads and fugitive dust from construction activities during well development. The amount of growth allowed under any of the leasing alternatives in this DEIS is cause for concern with respect to the health effects of an increase in $PM_{2.5}$ levels in the WRNF unless the USFS can assure the public that there will be adequate mitigation of the $PM_{2.5}$ emissions contributing to concentrations in the area.

The USFS's Proposed Action (Alternative C) would allow an additional 433 tons per year of PM emissions in the area (and up to 979 tons per year of PM emissions under the No Action Alternative (A)).[45] Given the already high background concentrations of PM in the area from existing sources this amount of development certainly has the potential to contribute to future violations of the PM NAAQS, depending on where and when the proposed growth in emissions occurs.

Aspen has long faced air quality impacts from PM sources and continues to implement mitigation measures to control PM emissions. Any threat to the attainment of the PM NAAQS in the Aspen maintenance area would have direct

[43] *Id.*
[44] 77 FR 38890, June 29, 2012, included as Exhibit 27.
[45] USFS DEIS TSD Tables 5-5 and 5-7 on pages 5-4 and 5-6.

consequences on the local citizens and governments of Aspen. Aspen was designated a "moderate" PM_{10} nonattainment area in 1990 pursuant to § 107(d)(4)(B) of the Clean Air Act. The EPA approved an attainment/maintenance plan for Aspen in 2003 and is in the process of reviewing a revised maintenance plan for the area.[46] The latest version of the plan includes the following control measures designed to ensure attainment of the NAAQS through 2023: (1) woodburning and restaurant emissions controls; (2) street sanding controls; (3) street sweeping requirements; (4) paid parking requirements to reduce traffic; and (5) transit measures (e.g., expansion of the bus fleet by 14 buses, establishment of a 400 space Park 'n Ride lot and a 250 space intercept parking lot, and establishment of cross-town and intercept lot shuttle services).[47] As part of the approved maintenance plan, the following contingency measures can be recommended to local officials and the Air Quality Control Commission for consideration, if needed. Section 175(A)(d) of the Clean Air Act requires that the maintenance plan contain contingency provisions to assure that the state will promptly correct any violation of the PM_{10} NAAQS that may occur after the redesignation of the area to attainment/maintenance. Contingency measures are designed to quickly bring the area back into compliance with the PM_{10} NAAQS. According to the maintenance plan revision approved by the Air Quality Control Commission:

> It is likely that no federal or state monies will be available to fund the implementation of the selected contingency measure(s). Most, if not all, of the costs will be borne by local citizens and governments, local businesses, and state government agencies.[48]

The contingency measures approved for the revised maintenance plan include: (1) Increased street sweeping requirements; (2) More stringent street sand specifications; (3) Reducing the use of street sanding materials only to key areas selected by the City of Aspen for safety reasons; (4) Re-implementing the following measures (but only if they are not being implemented at the time the contingency measures are triggered): expansion of the bus fleet; establishment of additional Park 'n Ride lot spaces and intercept parking lots; and cross-town shuttle services; (5) Transportation control measures designed to reduce vehicle miles traveled; and (6) "Other emission control measures appropriate for the area based on the consideration of cost-effectiveness, PM_{10} emission reduction potential, economic and social considerations, or other factors that the state

[46] The original maintenance plan was approved by EPA in 2003: 68 FR 26212, May 15, 2003, Effective July 14, 2003, included as Exhibit 28. The revised maintenance plan was approved by the Colorado Air Quality Control Commission December 16, 2010 and is being processed by EPA.
[47] 68 FR 26214, May 15, 2003, included as Exhibit 28.
[48] Revised PM_{10} Maintenance Plan for the Aspen Attainment/Maintenance Area, CDPHE, approved by the Air Quality Control Commission on December 16, 2010, included as Exhibit 29.

deems appropriate".[49] The USFS proposal to allow leasing for further oil and gas development in the area should fully consider the impact of emissions from that development on maintenance of the PM_{10} NAAQS in Aspen.

Other future growth in emissions in the surrounding areas is also cause for concern when considered in combination with the USFS's proposed leasing. In fact, the BLM's draft Resource Management Plan for the Colorado River Valley Field Office (CRVFO) predicts 24-hour average and annual average cumulative $PM_{2.5}$ impacts under Alternative D (the Alternative that allows for the maximum resource use) above the NAAQS.[50] These impacts are predicted to occur on and near the northwestern portion of the WRNF.[51] The CRVFO DRMP also predicts maximum cumulative 24-hour average PM_{10} impacts for Alternative A (the No Action Alternative) above the NAAQS. [52] Again, these impacts are predicted to occur on and near the northwestern portion of the WRNF.[53] The CRVFO DRMP also identifies concentrations above the NAAQS predicted under Alternatives B (the Preferred Alternative), C and D outside the CRVFO – *i.e.*, "in an area near the South Taylor Project Mine (located along the border of the White River and the Little Snake Field Offices)".[54] This location is just a few miles west of the northwestern corner of the WRNF. The BLM's White River Field Office (WRFO) DRMP update also predicts cumulative PM_{10} and $PM_{2.5}$ impacts that exceed the NAAQS in similar locations near to the WRNF.[55] These significant PM impacts demonstrate the need for careful consideration of the proposed PM impacts in an area already threatened by impacts from oil and gas development. If the USFS and the BLM are going to allow for continued growth in oil and gas development in the WRNF and the CRVFO they must also establish strict and enforceable measures to control PM emissions (and their precursors) from these sources so that the impacted areas will continue to be in attainment of all PM standards.

Visibility and other Air Quality Related Values in Several Class I Areas Are Already Being Impacted by Growth in the Oil and Gas Industry in the Area

Several recent modeling analyses performed by the BLM for project-specific EISs, Environmental Assessments (EA) and RMPs assessed visibility impacts in the Class I areas that are also of concern for the USFS DEIS. Those analyses indicate that visibility in several Class I and sensitive Class II areas is threatened by ongoing development.

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[49] Revised PM_{10} Maintenance Plan for the Aspen Attainment/Maintenance Area, CDPHE, approved by the Air Quality Control Commission on December 16, 2010, included as Exhibit 29.
[50] BLM CRVFO DRMP TSD Tables 4-10 and 4-11, included as Exhibit 30.
[51] *See,* BLM CRVFO DRMP TSD Figure 4-4 at 4-24, included as Exhibit 30.
[52] BLM CRVFO DRMP TSD Tables 4-8, included as Exhibit 30.
[53] *See,* CRVFO DRMP TSD Figure 4-2 at 4-20, included as Exhibit 30.
[54] BLM CRVFO DRMP TSD at 4-19, included as Exhibit 30.
[55] BLM WRFO DRMP TSD Figures 4-3 and 4-4 at 4-22 and 4-25, included as Exhibit 31.

The BLM's CRVFO DRMP predicted significant visibility impacts at Class I and sensitive Class II areas in and near the WRNF. Specifically, the BLM's cumulative modeling under Alternative D (maximum resource use) indicates that cumulative impacts are predicted to result in a 1.0 deciview (dv) change in visibility 68 days out of the year at Flat Tops Wilderness Area (Class I), 24 days at Maroon Bells-Snowmass Wilderness Area (Class I), 29 days at Mt Zirkel Wilderness Area (Class I), 16 days at Eagles Nest Wilderness Area (Class I) and 13 days at West Elk Wilderness Area (Class I), as well as an additional 7 to 350 days at *every single one* of the sensitive Class II areas assessed (e.g., Colorado National Monument (32 days), Dinosaur National Monument (209 days), Big Mountain View (140 days), Holy Cross View (8 days), Holy Cross Wilderness View (7 days), Rabbit's Ear View (31 days) and Roan Cliffs View (350 days)).[56]

BLM's recently released WRFO DRMP also predicts significant visibility impacts at Class I and sensitive Class II areas in and near the WRNF. Specifically, the BLM's maximum modeled direct and cumulative impacts show a 1.0 dv change in visibility at multiple days in the Flat Tops Wilderness Area (Class I), Maroon Bells-Snowmass Wilderness Area (Class I), Mt Zirkel Wilderness Area (Class I), Eagles Nest Wilderness Area (Class I), Arches National Park (Class I), Colorado National Monument (Class II), Dinosaur National Monument (Class II), Big Mountain View (Colorado Scenic View), Rabbit's Ear View (Colorado Scenic View) and Roan Cliffs View (Colorado Scenic View) as well as cumulative impacts at multiple days above 1.0 dv change in visibility at Holy Cross View (Colorado Scenic View) and Holy Cross Wilderness View (Colorado Scenic View).[57]

The Little Snake Field Office RMP showed impacts to visibility from project sources alone using refined modeling at Flat Tops Wilderness Area (Class I), Mount Zirkel Wilderness Area (Class I), Eagles Nest Wilderness Area (Class I) and Dinosaur National Monument (Class II) areas, when considering a 0.5 deciview (dv) change in visibility.[58]

The BLM's far-field modeling analysis for the West Tavaputs Plateau oil and gas development EIS in Utah indicated that the impacts from project sources alone would result in 7 days above 1.0 dv change in visibility at Dinosaur National Monument, considered a sensitive Class II areas. This same area would see over over 53 days above a 0.5 dv change in visibility. Cumulative impact modeling predicted numerous visibility impacts in every single Class I and sensitive Class

[56] BLM CRVFO DRMP Table 4.2.1-16 at 4-42, included as Exhibit 32.
[57] BLM WRFO DRMP TSD Table 4-18 at 4-35, included as Exhibit 31.
[58] Little Snake Field Office Proposed RMP and Final EIS TSD at 3-23, August 2010, http://www.blm.gov/co/st/en/fo/lsfo/plans/rmp_revision/rmp_docs.html, included as Exhibit 33.

II area assessed, except three. Many of these areas are the same areas that have the potential to be impacted from the proposed leasing in the WRNF: Flat Tops Wilderness Area (Class I), Maroon Bells-Snowmass Wilderness Area (Class I), West Elk Wilderness Area (Class I), Dinosaur National Monument (Class II), Colorado National Monument (Class II), and the Raggeds Wilderness Area (Class II).[59]

In the final EA for the five oil shale Research Development and Demonstration (RD&D) test sites in the Piceance Basin in Colorado, the BLM showed that there will be significant adverse effects on visibility at the Flat Tops Wilderness Area Class I area when considering all oil shale research projects along with the ExxonMobile Piceance Development Project activities. Specifically, the BLM's analysis predicted there would be greater than a 1.0 dv change in visibility on 13-20 days.[60] Thus, the potential air quality impacts of the oil shale RD&D sites are already quite significant with respect to visibility in the Flat Tops Wilderness Area, which is also predicted to have impacts from the proposed leasing in the WRNF.

In all of these cases the visibility impacts predicted by the BLM were likely underestimated due to deficiencies in the emissions inventories as well as assumptions used in the modeling analyses.[61] And while the BLM has used a change of 1.0 dv to denote visibility impairment in these RMPs, a threshold of 0.5 dv is more protective of visibility in Class I areas. All of the Federal Land Managers (*i.e.*, those agencies with an affirmative responsibility under the Clean Air Act for protecting the air quality related values of mandatory Class I areas) including the USFS consider a 0.5 dv change to be a Limit of Acceptable Change threshold.[62] Thus the potential significant impacts to visibility from ongoing development in the areas impacted by the proposed leasing are likely even more than those briefly summarized above. This DEIS must fully consider these existing visibility concerns along with the impacts of the increases in air pollutants

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[59] BLM, West Tavaputs Final EIS, Appendix J, Air Quality Technical Report, Table 6-8, http://www.blm.gov/ut/st/en/fo/price/energy/Oil_Gas/wtp_final_eis.html, included as Exhibit 34.

[60] *See*, for example, Shell Oil Shale Research, Development and Demonstration Projects Environmental Assessment (CO-110-2006-117-EA), August 2006 at 150, included as Exhibit 35.

[61] *See, e.g.*, January 13, 2012 Comments on the Air Quality Analysis for the Draft Environmental Impact Statement for the Colorado River Valley Field Office Resource Management Plan (M. Williams), May 1, 2008 Comments on the Air Quality Analysis for the West Tavaputs Plateau Natural Gas Full Field Development Plan Draft EIS (M. Williams), September 15, 2006 Comments on Environmental Assessment for the Shell Oil Shale Research, Development and Demonstration Projects, CO-110-2006-117-EA, Regarding Air Quality Impacts (V. Stamper and M. Williams), included as Exhibits 36a-c.

[62] *See* U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service. 2010. Federal land manager's air quality related values workgroup (FLAG) phase I report—revised (2010). Natural Resource Report NPS/NRPC/NRR—2010/232. National Park Service, Denver, Colorado. p. 23, included as Exhibit 37.

that contribute to visibility impairment (*e.g.*, sulfates, nitrates, dust, etc.) that will come from the proposed oil and gas leasing allowed under the various proposed alternatives.

In addition to visibility, other air quality related values (*e.g.*, sulfur and nitrogen deposition) are indicating that there are ecosystem impacts in Class I areas potentially impacted by the proposed leasing on the WRNF. The deposition impact assessments for the CRVFO and WRFO DRMPs show nitrogen and sulfur deposition impacts from direct project sources at certain Class I and sensitive Class II areas that could be considered significant, depending on the significance criteria used. When compared to the National Park Service's Class I area "Deposition Analysis Thresholds" of 0.005 kg/ha-yr for both nitrogen and sulfur deposition, the CRVFO and WRFO DRMPs predicted significant impacts on nitrogen deposition at the Flat Tops Wilderness Area (Class I), Maroon Bells-Snowmass Wilderness Area (Class I) and Dinosaur National Monument (Class II).[63]

All of these existing air quality concerns in the study area must be acknowledged and addressed in this DEIS. The USFS cannot proceed with approving oil and gas leasing in the area without assuring the public that allowing such development would not further exacerbate the NAAQS exceedances and the visibility impairment and ecosystem impacts already occurring in the area.

III. The USFS's Analysis Predicts Significant Air Quality Impacts

The USFS's Air Quality Modeling Analysis Predicts Significant NO_2 Impacts

The USFS's far-field modeling analysis assessed NO_2 concentrations from the proposed oil and gas leasing scenario under Alternative A (No Action) and Alternative C (Proposed Action). Cumulative far-field modeling for Alternatives A and C predicted maximum 1-hour NO_2 concentrations at Raggeds Wilderness Area and in Rifle that are significantly above the 1-hour NO_2 NAAQS of 100 ppb.[64] According to the DEIS, additional post-processing of 1-hour NO_2 results was performed for sites where the maximum 1-hour NO_2 concentrations exceeded the NAAQS.[65] The analysis at these locations – namely, Rifle and Raggeds Wilderness Area – showed that "the 1-hour NO_x standard is predicted

[63] BLM CRVFO DRMP TSD Table 4-19 and BLM WRFO DRMP TSD Table 4-19 at 4-40, included as Exhibit 30.
[64] USFS DEIS TSD at 7-26.
[65] *See,* USFS DEIS TSD at 7-29 and February 22, 2012 Memo from Howard Gebhart (Air Resource Specialists, Inc.) to Andrea Holland (USFS) and Amy Platt (EPA) regarding WRNF 1-hour NOx Modeling Results Calculated Using the 98th Percentile Concentration, included as Exhibit 38.

to be exceeded at a single receptor [Raggeds Wilderness Area] that is less than 1 km away from a local NO_x source."[66] The DEIS does not identify this predicted cumulative NO_2 exceedance anywhere else in the analysis (*e.g.*, in Chapter 2 of the DEIS the comparison of air quality indicators for the various alternatives indicates there are no exceedances for any alternative).[67] The USFS cannot simply ignore these significant modeled impacts even if they are largely due to another source when the air analysis indicates that the proposed leasing would result in increased NO_2 concentrations at this location (i.e., the modeling analysis predicts an increase in NO_2 concentration at the Raggeds Wilderness Area receptor as a result of direct impacts from the proposed leasing under both Alternatives A and C with up to an additional 8 $\mu g/m^3$ attributed to the leasing alternatives).[68]

The DEIS discusses rural background NO_2 concentrations but then does not consider these concentrations when comparing modeled concentrations with the NAAQS. Specifically, the DEIS reports 1-hour average NO_2 background concentrations based on the 98th percentile of monitored values from 2007 through 2010 at the Piceance Basin monitoring station operated by EnCana Oil and Gas.[69] These values range from 4 to 8 ppb. It is not acceptable to simply leave out the background concentration when determining compliance with the NAAQS. EPA has issued recent guidance on combining modeled results and monitored background concentrations to determine compliance with the 1-hour NO_2 NAAQS and the USFS must adhere to this guidance.[70]

Specifically, when determining compliance with the 1-hour NO_2 NAAQS, the USFS should add the overall highest (not 98th percentile) hourly representative background concentration to the modeled design value that is based on the form of the standard (*i.e.*, the 98th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled). Recent maximum monitored 1-hour average NO_2 concentrations in Rangely have been as high as 28 ppb in 2011.[71] According to the EPA's Guideline on Air Quality models, "[b]ackground air quality includes pollutant concentrations due to: (1) Natural sources; (2) nearby sources other than the one(s) currently under consideration; and (3) unidentified sources." See 40 CFR 51, Appendix W, Section 9.2.1. A representative background concentration for NO_2 – one that considers background sources not included in the modeling analysis – should be added to the modeled NO_2 concentration and used to compare with the NAAQS

[66] USFS DEIS TSD at 7-29.
[67] USFS DEIS Table 13 at 2-70.
[68] USFS DEIS TSD Table 7-4 and Table 7-25.
[69] USFS DEIS TSD Table 4-2.
[70] EPA MEMO, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard", June 28, 2010 at 18, included as Exhibit 39.
[71] EPA Air Explorer, 2011. http://www.epa.gov/airexplorer/

in determining whether there are significant NO_2 impacts from the alternatives proposed in the DEIS.

The Ozone Modeling Analysis Presented in the DEIS Predicts Significant Ozone Impacts in the Region

The ozone modeling analysis presented in the DEIS predicts significant ozone impacts. According to the Air Resources Specialist Report:

> The predicted maximum ozone concentration would be 108 ppb and would occur in July in Routt County. The second highest ozone concentration in July would be 104 ppb and would occur in Jackson County.[72]

While neither of these events occurs in the WRNF a closer look at the modeling results for other high episode days shows modeled ozone concentrations above the NAAQS in the WRNF. Specifically, modeled predictions for April 28 show maximum daily average ozone concentrations as high as 89 ppb occurring in the Piceance Basin and extending southward.[73] This modeled event shows concentrations consistently above the NAAQS throughout western Pitkin County, Mesa County, Eagle County, Garfield County and Rio Blanco County with widespread concentrations across central Garfield County extending northeast through the eastern portion of Rio Blanco County consistently exceeding 85 ppb. In addition to the extensive WRNF lands that overlap with this area of high ozone concentrations, other public lands located along the borders of Pitkin, Eagle and Garfield Counties overlap with this area of high ozone concentrations, such as: Thompson Creek Open Space (Crystal Valley Ranch), Venner Open Space, Rubin Open Space, Red Wind Point Open Space, Penny Hot Springs Open Space, Sawmill Hill Open Space, Emma Open Space, all managed by Pitkin County, as well as Conservation Easement Lands managed by Pitkin County in both Pitkin and Garfield Counties, such as Jerome Park, East Mesa/John Nieslanik, Cold Mountain Ranch, Thompson Creek Ranch, Crystal Island Ranch, Crown Mountain Ranch and Middle Ranch. And again on April 18 modeling predicted widespread ozone concentrations above the NAAQS throughout the WRNF.[74] Results from this modeling event show maximum daily average ozone concentrations above the NAAQS throughout the entirety of Pitkin County and

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[72] Air Resources Specialist Report, Oil and Gas Leasing Decision NEPA, White River National Forest, May 3, 2011. Andrea Holland. P. 20, included as Exhibit 2.

[73] *See* White River National Forest Planned Development Area (WRNF-PDA) Oil and Gas Ozone Impact Analysis, URS Corp., January 2011, Figure 3-11 at 3-27 *and* BLM CRVFO DRMP TSD Figure 5-20 at 5-64, included as Exhibit 17.

[74] *See* White River National Forest Planned Development Area (WRNF-PDA) Oil and Gas Ozone Impact Analysis, URS Corp., January 2011, Figure 3-12 at 3-28 *and* BLM CRVFO DRMP TSD Figure 5-21 at 5-65, included as Exhibit 17.

Eagle County with concentrations as high as 85 ppb in a large area of eastern Pitkin County.

Both the USFS's WRNF DEIS and the BLM's CRVFO DRMP indicate that oil and gas emissions from the proposed development scenarios "do not appear to cause the high ozone concentrations" shown in the modeling results for these high concentration days.[75] To support this assumption, the DEIS analysis includes an assessment of the difference in predicted ozone concentrations with and without the planned development sources in the WRNF DEIS on the two highest predicted ozone concentration days – July 17 and July 15 – when maximum daily average ozone concentrations were predicted to be108 ppb in Routt County and 104 ppb in Jackson County, respectively. On these days, ozone concentrations when considering the WRNF planned development sources were predicted to increase in the western and northern portions of the planned development area by up to 0.03 ppb. At the locations where this increased impact from WRNF planned development sources occurred, overall ozone concentrations were predicted to be around 65 ppb. Based on this information, the DEIS concludes that, "[c]onsequently, oil and gas emissions in the WRNF-PDA are not expected to contribute to the areas of highest ozone concentrations."[76] However, there is no assessment of the increase in ozone concentrations due to the planned development sources on other days when ozone concentrations are predicted to exceed the NAAQS, for example, during episodes other than the specific April and July episodes described in the DEIS analysis. Given the extent of the predicted ozone exceedances in the WRNF it is imperative that the USFS include a more thorough analysis of the contribution to ozone concentrations from the planning area sources on *all* days when ozone concentrations are close to or exceed the NAAQS. Any incremental increase in ozone concentrations attributed to the WRNF planned development sources has the potential to exacerbate the worsening ozone situation in the region, depending on when and where the increased impacts occur.

And any additional impact from the proposed leasing on areas already experiencing ozone exceedances further underscores the need for rigorous mitigation measures to protect the impacted areas from the threat of nonattainment status. Of concern, for example, are the ozone monitors in Pitkin County (*e.g.,* Ajax Mountain) and southeastern Garfield County (*e.g.,* Sunlight

[75] *See, e.g.*, White River National Forest Planned Development Area (WRNF-PDA) Oil and Gas Ozone Impact Analysis, URS Corp., January 2011 at 3-26 *and* BLM CRVFO DRMP TSD at 5-63, included as Exhibit 17.
[76] White River National Forest Planned Development Area (WRNF-PDA) Oil and Gas Ozone Impact Analysis, URS Corp., January 2011 at 3-29, included as Exhibit 17.

and Wilson) that are already recording exceedances of the NAAQS.[77] This area of northwestern Pitkin County and southeastern Garfield County includes publically owned lands (*e.g.,* Pitkin County Open Space and Conservation Easement Lands) and population areas along the Highway 82 corridor (*e.g.*, Aspen, Carbondale, etc.) some of which are not within the WRNF boundary. This area, over time, has made many transportation-oriented commitments to reduce air quality impacts from travel on Highway 82 and in the Aspen PM_{10} Maintenance Area.[78] These commitments, in addition to addressing PM_{10} emissions, also influence NO_x emissions in the area and are therefore also impacting regional ozone concentrations. Any additional impacts to regional ozone concentrations from oil and gas development sources of NO_x on the WRNF could impact this area's existing air resources management commitments and any future commitments that may be needed to ensure continued air quality protection in the area.

It is important to point out that none of the modeling performed for the USFS's WRNF DEIS or for the BLM's CRVFO DRMP accounts for wintertime ozone formation. According to the DRMP for the CRVFO, "[w]inter months generally show poorer model performance, particularly from December through February".[79] While the DEIS analysis does briefly acknowledge that high winter ozone concentrations have been monitored in some oil and gas areas in Wyoming and Utah, ozone modeling for the DEIS was only performed during April and July.[80] Numerous ozone exceedances have been monitored in the region in May and June and the USFS should extend modeling to include those months so as to ensure worst case conditions are fully accounted for.[81] But most importantly, the USFS should coordinate with others involved in developing and assessing the modeling capabilities for predicting winter ozone formation.[82] EPA

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[77] EPA AirExplorer data show ozone NAAQS exceedances at the Ajax Mountain monitor (08-097-0002) in 2009, 2010 and 2011, at the Sunlight Mountain monitor (08-045-0016) in 2010 and 2011 and at the Wilson monitor (08-045-0017) in 2010 and 2011.

[78] *See, e.g.*, Colorado Department of Transportation (Region 3) and Federal Highway Administration (Colorado Division) State Highway 82/Entrance to Aspen Environmental Reevaluation Air Quality Technical Report, October 3, 2006, pp. 14-15, included as Exhibit 40. *See, also*, Aspen's PM_{10} Maintenance Plan provisions at 68 FR 26214, May 15, 2003, included as Exhibit 28.

[79] BLM CRVFO DRMP TSD at 5-11, included as Exhibit 30.

[80] USFS DEIS at 3-121.

[81] *See, e.g.,* Monitored O_3 exceedances from EPA AirExplorer: May 2010 and May 2011 at the Wilson Monitor (USFS, 08-045-0017), May 2011 at the Sunlight Mountain Monitor (USFS, 08-045-0016), June 2011 at the Silt-Collbran Monitor (USFS, 08-077-0022), May 2011 at the Ajax Mountain Monitor (USFS, 08-097-0002) and June 2012 in Palisade (CDPHE, 08-077-0020).

[82] *See, e.g.,* Energy Dynamics Laboratory, Utah State University Research Foundation, Final Report: Uinta Basin Winter Ozone and Air Quality Study, EDL/11-039, June 14, 2011, included as Exhibit 14.

should be consulted on the best course of action for protecting air quality in the winter in the oil and gas development areas covered by the DEIS.

In addition to the fact that the model predicted significant ozone exceedances, the model was shown to under-predict concentrations in some situations and, specifically, on the highest concentration days. While this under-prediction was not mentioned in the WRNF DEIS, the DRMP for the CRVFO stated:

> The model tends to under-predict ozone during July. As described in the MPE Report (BLM- URS 2009), the model under-predicted ozone on July 17 at the Gothic and Dinosaur NM monitors.[83]

Based on findings from a recent study of VOC emissions from oil and gas sources in the Colorado Front Range, emission inventories may underpredict fugitive emissions from oil and gas sources.[84] The Colorado Front Range study concludes that fugitive emissions in Weld County in 2008 were likely underestimated by a factor of two.[85] It is also therefore likely that VOC emissions used in inventories during that same time period also likely underestimate emissions (since they are based on similar estimation techniques). The CRVFO ozone analysis that is adapted for use in this DEIS is based on emissions inputs from WRAP Phase II and III inventories.[86] The base year emissions are based on year 2006 (although the CRVFO analysis points out that the WRAP inventory data are actually from 2005).[87] Phase III emissions inventory data were used "when sufficient Phase III data exist to achieve needed baseline to future year consistency" (i.e., when 2018 data were available).[88] The CRVFO analysis does specifically state that WRAP Phase III data were used for the Piceance Basin.[89] Therefore, the potential for underestimated fugitive VOC emissions in the CRVFO analysis (and, therefore, the WRNF DEIS analysis) is likely since the ozone modeling was based on inventory data from a similar time period and, therefore, since the inventory data may significantly underestimate VOC emissions from that time period, the ozone concentrations predicted for the CRVFO analysis (and WRNF DEIS analysis) likely also underestimate impacts.

The DEIS points out in several places that a maximum daily ozone concentration

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[83] BLM CRVFO DRMP TSD 5-60. See also TSD 5-69, included as Exhibit 30.
[84] Pétron, G., et al. (2012), Hydrocarbon emissions characterization in the Colorado Front Range: A pilot study, J. Geophys. Res., 117, D04304, doi:10.1029/2011JD016360, included as Exhibit 41.

[85] *Id.* at 18.
[86] *See*, BLM CRVFO DRMP TSD at 5-29, included as Exhibit 30.
[87] *Id.* at 5-28.
[88] *Id.* at 5-29.
[89] *Id.*

above 75 ppb at a specific location on a specific day does not indicate an ozone violation.[90] However, any modeled exceedance of the ozone NAAQS should be considered a significant impact for the DEIS, regardless of whether there are three years worth of available monitoring data for use in determining the area's official attainment status under the CAA. And, as discussed earlier, since concentrations below the NAAQS are known to pose health threats, the USFS should consider lower concentrations as potentially significant impacts. The USFS has a basic obligation to "provide full and fair discussion of significant environmental impacts", where in evaluating the significance of the impact, the responsible official must consider "[t]he degree to which the proposed action affects public health or safety." See 40 C.F.R. §§ 1502.1 and 1508.27(b)(2).

Modeled results must be evaluated with care given the fact that: (1) the model performance evaluation showed some under-prediction in certain situations; (2) none of the modeling accounts for wintertime ozone conditions; and (3) the model inventory may underestimate fugitive VOC emissions. Given the likelihood that modeled concentrations may, in fact, under-predict ozone impacts and the fact that there have been recent monitored ozone exceedances in the area, the DEIS must contain enforceable VOC and NO_x mitigation measures that ensure modeled emissions from the proposed leasing do not contribute to *any* exceedances of the NAAQS at any modeled receptors throughout the region. And again, the USFS should fully consider the CASAC recommendations when evaluating the human health impacts from ozone concentrations in the region.

Finally, it's important to point out that the USFS does not fully stand behind the ozone analysis presented in the DEIS. Specifically, the USFS admits a lack of comprehensive review of the ozone modeling analysis contained within the DEIS:

> The USFS and EPA were unable to provide a complete review of this modeling effort because not all the documentation behind the model was made available to both agencies. As such, the results below represent the best available values to indicate ozone impacts from potential oil and gas development on the White River National Forest. Complete documentation of the ozone modeling effort is expected to be publically available when the BLM's CRVFO publishes their Resource Management Plan.[91]

The USFS must complete a comprehensive review of the ozone modeling analysis presented in the DEIS, including disclosing the limitations and assumptions in the "difference method" used to assess WRNF-specific impacts

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[90] *See, e.g.,* White River National Forest Planned Development Area (WRNF-PDA) Oil and Gas Ozone Impact Analysis, URS Corp., January 2011 at 3-22, included as Exhibit 17.

[91] Air Resources Specialist Report, Oil and Gas Leasing Decision NEPA, White River National Forest, May 3, 2011. Andrea Holland. P. 19, included as Exhibit 2.

and in the underlying CRVFO analysis.[92] This information from its own assessment, and from EPA's assessment, should be disclosed to the public prior to taking any final action on the DEIS.

The USFS's Air Quality Modeling Analysis Predicts Significant Visibility and Ecosystem Impacts

The USFS's far-field direct project and cumulative impact analyses at Class I and sensitive Class II areas show significant visibility impacts. Specifically, the USFS's far-field modeling indicates that direct impacts from Alternative A will result in over 700 days above a 0.5 dv change in visibility including 198 days at Maroon Bells-Snowmass Wilderness Area (Class I), 103 days at Flat Tops Wilderness Area (Class I), 98 days at Raggeds Wilderness Area (Class II), 131 days at Mt Sopris (Colorado Scenic View), 68 days at South Fork (Colorado Scenic View) and 67 days at Windy Point (Colorado Scenic View).[93] These same areas would see cumulative impacts that result in a change in visibility ranging from 77-307 days at *every single one* of the Class I, sensitive Class II and Colorado Scenic View areas assessed.[94] The USFS's visibility analysis of the Proposed Action (Alternative C) shows no significant visibility degradation from direct impacts but shows cumulative impacts, again, that result in a 0.5 dv change in visibility at *every single one* of the Class I, sensitive Class II and Colorado Scenic View areas assessed.[95] The DEIS states, "[c]umulative visibility impacts resulting from existing and projected future sources are not insignificant but would not be a result of the proposed development of Forest Service land under Alternative C."[96] In the DEIS the USFS describes the cumulative visibility impacts as an important factor to consider, even if direct impacts are relatively insignificant:

> It is important to realize that a vast amount of existing sources already degrade visibility, and that the potential direct impacts from individual projects, albeit small in many cases, are adding to existing degradation. Even though the visibility analysis for individual projects may show only a small, or even relatively insignificant, amount of visibility degradation when considered alone, when the impacts from all the existing and proposed

[92] The DEIS describes the "difference method" used to determine the impact on ozone concentrations due to oil and gas emissions in the WRNF planned development area as one where emissions associated with the WRNF planned development area were removed from the inventory for the CRVFO DRMP analysis and the resulting ozone concentrations from two runs of the model – one with and one without the WRNF planned development sources – were compared to determine the projected impact of WRNF planned development source emissions.
[93] USFS DEIS TSD Table 7-19 at 7-22.
[94] USFS DEIS TSD Table 7-20 at 7-23.
[95] USFS DEIS TSD Table 7-41 at 7-48.
[96] USFS DEIS TSD at 7-48.

> sources are added together, the effects on visibility can be substantial. Therefore, WRNF requested that the cumulative impacts from existing and other RFFAs be addressed in this study to provide FLMs, stakeholders and other interested parties a more complete picture of what could happen to visibility in these public areas."[97]

This big-picture approach is warranted and supported by the law. The picture of what could happen to visibility in these public areas clearly illustrates the need for more comprehensive action. Since NEPA requires that the USFS provide for compliance with CAA requirements the USFS must not authorize leasing if it will cause or contribute to adverse impacts to visibility in Class I areas. This is necessary to meet USFS's obligation under NEPA to ensure the professional and scientific integrity of the DEIS, as well as its obligations under the Clean Air Act to not only prevent future impairment of visibility, but to also remedy existing impairment. See 40 CFR 1502.24, 42 U.S.C. 7491(a)(1). Specifically, under the Clean Air Act Congress declares "as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution."[98] The USFS, therefore, cannot allow for *any* increase in emissions that would contribute to *any* changes in visibility – even if the changes, when considered in isolation, are insignificant – at any of the locations assessed since significant cumulative impacts are predicted at all locations.

The deposition impact assessment shows direct effects on nitrogen and sulfur deposition at certain Class I and sensitive Class II areas that are considered significant. When compared to the National Park Service's Class I area "Deposition Analysis Thresholds" of 0.005 kilograms per hectare per year (kg/ha-yr) for both nitrogen and sulfur deposition, the DEIS predicts significant impacts on nitrogen and sulfur deposition at Flat Tops Wilderness Area (Class I), Maroon Bells-Snowmass Wilderness Area (Class I), West Elk Wilderness Area (Class I), Raggeds Wilderness Area (Class II), as well as significant nitrogen impacts at Holy Cross Wilderness Area (Class II), under Alternative A and predicts significant nitrogen deposition impacts at Maroon Bells-Snowmass Wilderness Area (Class I) under Alternative C.[99] And, in fact, the DEIS acknowledges these significant impacts in the Alternatives Comparison Table in Chapter 2 of the DEIS but then fails to include an enforceable mitigation strategy for ensuring that there will be no significant ecological impacts from the leasing proposal. The USFS must present a more thorough analysis of the nitrogen and sulfur deposition impacts at affected Class I areas and propose an alternative that includes

[97] USFS DEIS TSD at 7-21.
[98] CAA § 169A(a)(1), 42 U.S.C. 7491(a)(1).
[99] USFS DEIS TSD Tables 7-13 and 7-34 at 7-15 and 7-40.

adequate and enforceable mitigation measures that will ensure no significant impacts to air quality related values will occur from the proposed leasing.

The USFS's Air Quality Modeling Analysis Does Not Assure the Prevention of Significant Deterioration of Air Quality

The USFS has not properly analyzed whether the proposed leasing plan will prevent significant deterioration (PSD) of air quality, as required by the Clean Air Act. The USFS must complete an analysis to determine how much of the incremental amount of air pollution allowed in clean air areas (*i.e.*, PSD increment) has already been consumed in the affected area and how much additional increment consumption will occur due to the proposed leasing. Without this analysis, the USFS is not adequately ensuring that air quality will not deteriorate more than allowed under the CAA. However, even without the proper analysis (one that looks at the impact of *all* increment consuming and increment expanding sources in the area in addition to the proposed action sources), the USFS's analysis shows that modeled concentrations from cumulative sources exceed the allowable 24-hour average Class I area $PM_{2.5}$ increment in Eagle's Nest Wilderness Area under Alternatives A and C.[100,101] This and other PSD increments may, therefore, also be exceeded when considering all other increment consuming and increment expanding sources in the area that impact the same area impacted by the proposed leasing. $PM_{2.5}$, PM_{10} and NO_2 impacts must be further evaluated with a proper increment consumption analysis – one that includes all increment-affecting sources – and compared to the applicable annual average and 24-hour average increments for these pollutants.

The USFS states that the PSD increment demonstrations, in general, are "provided on an informational basis to evaluate the extent of environmental effects and do not constitute a regulatory consumption analysis".[102] However, it is the USFS's responsibility to assess PSD increment consumption in order to meet its obligations under NEPA to provide for compliance with all Federal CAA requirements. The USFS must consider the PSD increments as important and legally binding CAA requirements and it must provide for compliance with these requirements in the DEIS. Since emissions from major stationary sources which commenced construction or modification after the applicable "major source baseline date" and emissions increases from minor, area and mobile sources that occurred after the relevant "minor source baseline date" affect the allowable increment, it is impossible to tell how much of the modeled cumulative

[100] USFS DEIS TSD Tables 7-3 and 7-24 at 7-4 and 7-28.
[101] EPA recently finalized the Agency's proposed $PM_{2.5}$ increments, which went into effect on October 20, 2011. *See* 75 FR 64865, Oct. 20, 2010, included as Exhibit 42.
[102] *See, e.g.,* USFS DEIS at 3-143.

concentrations consume increment.[103] The correct way to determine compliance with the PSD increments is to complete a modeling analysis of all increment consuming and increment expanding sources that impact the same area impacted by the proposed development. The USFS is required to "provide for compliance with" all CAA requirements, and cannot authorize an action that would violate the PSD increments, which are a CAA requirement under Section 163.

IV. The USFS's Air Quality Analyses Are Not Complete and Likely Under-predict Air Quality Impacts

The USFS's own modeling, as described in the previous section, shows numerous adverse air quality impacts. However, the modeling, including the inputs and the way in which the USFS performed the modeling analyses, is not adequate to fully assess the potential impacts from the proposed leasing on an area already impacted by industrial growth. The result of the deficiencies in the modeling is that the adverse air quality impacts from the development are likely worse than what is disclosed in the DEIS. The areas of greatest concern are discussed in more detail below.

The USFS Has Not Accounted for Existing Leases in Its Analysis of the Proposed Action

The DEIS only includes an analysis of the impacts of Alternatives A (No Action) and C (Proposed Action). According to the DEIS:

> The impacts from any of the chosen alternatives would be bracketed by the range of impacts analyzed for Alternatives A (No Action) and C (Proposed Action). Therefore, alternatives B and D were not explicitly analyzed in this air quality assessment.[104]

The USFS presents Alternative C as the alternative that would result in the least impact to air quality. The USFS analysis of Alternative C in the DEIS assesses the air quality impacts of the proposed future leasing but fails to include the impacts that would also occur from existing leases. Specifically, the impacts from Alternative C in the DEIS appear to be based on the development of up to 228

[103] The major source baseline dates are January 6, 1975 for SO_2 and PM_{10} and February 8, 1988 for NO_2 (40 CFR 52.21(b)(14)(i)). The minor source baseline dates in Colorado differ by pollutant and by [baseline] area and were triggered on the date that a complete PSD permit application was received by the State (or by the EPA for sources proposing to locate in Indian Country). See definitions of "major source baseline date", "minor source baseline date" and "baseline area" in 40 CFR 52.21(b)(14)(i), 52.21(b)(14)(ii) and 52.21(b)(15).

[104] USFS DEIS TSD at viii.

new wells.[105] Alternative B, the alternative that would prohibit any new leasing on the WRNF, considers the impacts of up to 487 wells that would be developed under existing leases on the WRNF.[106] The impacts of these existing leases must be accounted for in the modeling analysis under all alternatives. Ignoring the impacts from existing leases in the analysis of Alternatives C and D underestimates total impacts from allowable development on the WRNF. Since the DEIS does not explicitly analyze the impacts under Alternative B from existing leases it is impossible to know what the total impact would be from these existing leases when considered along with the new leasing proposed under alternatives C and D. As it stands, the DEIS depicts the preferred alternative (C) as the alternative that will have the least environmental impact when in reality this alternative could result in the impacts currently disclosed under Alternative C plus those potential impacts that will occur under Alternative B from existing leases.[107] Therefore, the modeled impacts under Alternative C presented in the DEIS significantly underestimate the potential air quality impacts and the USFS must disclose the full impacts from the proposed new leasing along with potential development that could occur under existing leases on the WRNF.

The USFS Has Not Completed a Near-Field Modeling Assessment to Determine If There Will Be Significant Near-Field Impacts From the Proposed Leasing

The DEIS does not include an assessment of near-field air quality impacts from the proposed leasing. According to the USFS,

> Because this is a programmatic analysis, near-field analyses were not performed due to the requirements of specific and detailed emission source locations. Near-field analyses, which include hazardous air pollutants (HAPs) will be performed for proposed projects where this level of detail will be available.[108]

The USFS is putting off an analysis of near-field impacts – and any associated mitigation measures that may be needed to ensure there will be no adverse impacts from the proposed leasing – until such time as more specific information

[105] USFS DEIS Table 10 at 2-55.
[106] USFS DEIS Table 8 at 2-47.
[107] In fact, given the number of proposals currently pending before the BLM and the USFS to drill, unitize, or suspend existing leases, it seems very likely that industry will not allow many existing leases to expire. For example, Antero has proposed to unitize 8 leases it owns that are set to expire in 2013; SG Interests has proposed to unitize 16 leases that it owns that are set to expire in 2013; SG and Antero have also submitted APDs on leases set to expire in 2013; WillSource Enterprise has requested a suspension of its leases in the Willow Creek area. All told, these proposals implicate nearly half of the 60 leases that the USFS assumes will expire next year in analysis of Alternatives C and D.
[108] USFS DEIS at 3-114.

is available. The USFS cannot put off such an analysis and then only commit to completing a near-field analysis for those projects where sufficient details are known. The USFS must unequivocally commit to a detailed near-field analysis of impacts prior to *any* development of resources on the WRNF.

A near-field analysis is necessary for the USFS, and the public, to understand the potential human health effects and environmental impacts of the activities associated with oil and gas development and in order for the agency to comply with federal statutes and regulations. To accomplish this, the USFS must commit to a full analysis of the direct, indirect and cumulative impacts on air quality that could occur. In order to comply with 40 C.F.R. §1502.24 (to ensure the professional and scientific integrity of the air quality analysis), the air quality analysis should include a near-field modeling analysis to assess localized air quality impacts. Specifically, the DEIS should include a near-field modeling analysis of localized maximum ambient air impacts in order to assess whether future oil and gas development activities would comply with the NAAQS and the PSD Class II increments. The maximum emission rates from all sources over the averaging times of the standard for which compliance is being assessed should be modeled. The modeling analysis should be based on at least one year of quality-assured, on-site, representative meteorological data or five years of meteorological data from the closest meteorological station representative of the area. See, e.g., Sections 9.3.a., 9.3.1.2., and 9.3.3.2. of EPA's Guidelines on Air Quality Models at 40 C.F.R. Part 51, Appendix W. For the NAAQS analysis, appropriate background concentrations reflective of current air quality in the area should be added to the modeling results.

The USFS's claim that sufficient specific data are not available on future development projects is not supported by evidence that the USFS either cannot obtain the needed information without exorbitant cost or cannot present a credible scientific estimation of the needed data based on methods generally accepted in the scientific community. These methods of dealing with unavailable data are required when addressing incomplete or unavailable information under NEPA and must be thoroughly exercised before abandoning a more rigorous analysis. See 40 C.F.R. § 1502.22. The USFS likely has a reasonable idea of the areas of high oil and gas development potential (see, *e.g.*, the Oil and Gas Occurrence Potential map in the WRNF Reasonably Foreseeable Development Scenario report from September 2010)[109] and certainly has the capability to determine the maximum well density that could be allowed under the DEIS based on the land available for leasing under the various alternatives and could therefore perform a modeling analysis of the emissions increases that could credibly occur under the various alternatives of the DEIS. And, in fact, the USFS

[109] WRNF Reasonably Foreseeable Development Scenario, September 2010, Figure 7 at A-7, included as Exhibit 43.

has prepared an inventory of construction-related and operational emissions for all leasing alternatives for use in the far-field assessment completed for the DEIS.[110]

Other planning actions taken under NEPA in the area have included near-field assessments of air impacts when project-specific details have not yet been specified. For example, for the CRVFO RMP update, the BLM completed a near-field, far-field and cumulative impact analysis using air dispersion models to evaluate the impacts from the various development alternatives, although it must be noted that the BLM's analysis did not adequately assess air quality impacts.[111] While notably flawed, the CRVFO RMP is proof that a more rigorous evaluation of near-field impacts from likely air pollution sources in the area for the WRNF DEIS can also be done and, in fact, must be done in order to comply with NEPA. The BLM also performed a comprehensive air quality dispersion modeling analysis, at the request of EPA, for the Little Snake RMP update, including a quantitative near-field assessment of impacts.[112] Since the USFS went so far as to describe and quantify the emissions from oil and gas development under the various leasing alternatives, is seems clear that a quantitative near-field modeling analysis is achievable and therefore must be completed as part of this DEIS.

Finally, the USFS cannot rely on another agency to fulfill its NEPA requirements, as suggested in the DEIS:

> It is expected that a more detailed modeling analysis, including near-field impacts, will be conducted in the future as part of the air permitting analysis for new sources under the purview of the Colorado Department of Public Health and Environment (CDPHE) and/or site-specific NEPA assessment. These analyses will be completed after the site specific locations and other data are developed.[113]

The USFS is required under NEPA to analyze and disclose all significant air quality impacts, regardless of whether another agency might address an adverse environmental impact in the future (*e.g.*, the State). Reliance on the State's permitting process cannot be substituted for the USFS's obligations under NEPA to provide for compliance with the NAAQS. The fact that the State has a legal responsibility to assess NAAQS compliance for permitted sources does not mean

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[110] USFS DEIS TSD Section 5.2 at 5-4 through 5-14 and Appendix D White River National Forest Oil and Gas Emissions Projections (Alternatives A, B, C and D).
[111] *See,* January 13, 2012 Comments on the Air Quality Analysis for the Draft Environmental Impact Statement for the Colorado River Valley Field Office Resource Management Plan (M. Williams), included as Exhibit 36a.
[112] Letter from EPA to BLM, "Little Snake Resource Management Plan Draft EIS, Craig, Colorado, CEQ # 2007004," August 16, 2007, included as Exhibit 44.
[113] USFS DEIS TSD at 1-2.

that the USFS is relieved of its responsibilities under NEPA to provide for compliance with CAA requirements and to fully describe the impacts of the proposed development and identify mitigation measures to prevent adverse impacts.

The USFS Has Not Used Representative Background Concentrations When Determining if There Will Be Significant Impacts From the Proposed Leasing

Background concentrations for NO_2, PM_{10}, $PM_{2.5}$, CO and ozone are discussed in the DEIS but are not used to determine the significance of modeled impacts when compared with the NAAQS.[114] Specifically, the DEIS describes the assumptions for background concentrations employed in the modeling as follows:

> Each of the selected development alternatives (Alternatives A and C) were modeled separately as were potential direct and cumulative emissions inventories. CALPUFF concentrations for potential direct and indirect project emissions were then summed with cumulative emission sources to yield the total impact associated with each alternative. Since all known industrial emission sources in the modeling domain were explicitly included, an additional background concentration for criteria pollutants was not necessary (or would be expected to be small).[115]

Background air monitoring data is generally added to the results of a cumulative source modeling analysis in determining compliance with the NAAQS. Unless the USFS can demonstrate that the impacts of *all* existing sources are reflected in the modeling analysis, and show that the modeling reflects maximum concentrations in the area, the USFS must add a background concentration – one that is reflective of all existing sources in or affecting the region that are not included in the modeling – to the modeled concentration when comparing impacts to the NAAQS. With the large amount of oil and gas development going on in the area it is critical that the USFS use a background concentration that is reflective of the nearby oil and gas sources and all other background sources. According to the EPA's Guideline on Air Quality models, "[b]ackground air quality includes pollutant concentrations due to: (1) Natural sources; (2) nearby sources other than the one(s) currently under consideration; and (3) unidentified sources." See 40 C.F.R. 51, Appendix W, § 8.2.1.[116] Based on a review of the model inventories for the DEIS, the USFS modeling analysis does not account for all of these sources in its modeling and, therefore, the analysis for the DEIS must add a representative background concentration to its modeled concentration when comparing impacts to the NAAQS.

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[114] *See, e.g.,* USFS DEIS TSD Tables 4-1 and 4-2 at 4-2.
[115] USFS DEIS TSD at 6-1.
[116] 70 FR 68218, November 9, 2005, included as Exhibit 45.

The DEIS Modeling Analysis Assumes Mixing Height Parameters That May Result in Underpredicted Impacts

A review of the modeling assumptions provided in Appendix E of the DEIS TSD reveals that the maximum mixing height is based on a value other than the default parameter. Specifically, the modeling assumes a maximum over-land mixing height of 4,500 meters instead of the default mixing height of 3,000 meters.[117] Since this represents a fairly significant change in this parameter (*i.e.*, a 50% increase in height) over the default value, the USFS should include a justification, based on recent data applicable to the specific conditions in the WRNF, for why a higher maximum mixing height is justified. In general, shallow mixing heights contribute to higher pollutant concentrations due to the lower dilution that occurs in the atmosphere under those conditions. In the Uinta Basin vertical meteorological measurements during wintertime inversion events were as low as 20-80 meters.[118] In addition to providing more specific information on why the maximum mixing height was revised upwards, the USFS must also address why the minimum mixing height was not revised downward to account for the very shallow mixing heights measured in the nearby Uinta Basin.

The DEIS Likely Underpredicts PM Concentrations

Comparisons with the $PM_{2.5}$ NAAQS in the DEIS should be based on the highest modeled concentration, not the high second high modeled concentration, as indicated in the DEIS.[119] According to recent guidance from EPA, demonstrating compliance with the 24-hour $PM_{2.5}$ NAAQS requires the use of the average of the 1st highest modeled 24-hour average concentration over the five meteorological years modeled to be added to the 98th percentile monitored value.[120] According to EPA, "[c]ombining the 98th percentile monitored value with the 98th percentile modeled concentrations for a cumulative impact assessment would result in a value that is below the 98th percentile of the combined cumulative distribution and would therefore not be protective of the NAAQS".[121] The USFS should use the

[117] USFS DEIS TSD Appendix E at E-10.
[118] Energy Dynamics Laboratory, Utah State University Research Foundation, Final Report: Uinta Basin Winter Ozone and Air Quality Study, EDL/11-039, June 14, 2011 at 7, included as Exhibit 14.
[119] USFS DEIS TSD at 7-11
[120] *See* February 26, 2010 MEMO from Tyler Fox, EPA Air Quality Modeling Group to Erik Snyder, Lead Regional Modeler EPA Region 6, Regarding "Model Clearinghouse Review of Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS", http://www.epa.gov/ttn/scram/guidance/mch/new_mch/MCmemo_Region6_PM25_NAAQS_Compliance.pdf, included as Exhibit 46.
[121] *See* February 26, 2010 MEMO from Tyler Fox, EPA Air Quality Modeling Group to Erik Snyder, Lead Regional Modeler EPA Region 6, Regarding "Model Clearinghouse Review of Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS" at 2,

average of the 1st highest 24-hour average concentration over the meteorological years modeled when comparing concentrations with the NAAQS for $PM_{2.5}$.

Only details of the operation emission inventory are provided in the DEIS so it is impossible to know if the inventory for construction emissions presented in the DEIS is based on reasonable assumptions.[122] Any control measures modeled for the DEIS must be included as enforceable requirements in any final action taken on resource development in the WRNF. For example, it is not uncommon to see inventories for construction-related emissions for oil and gas development projects based on fugitive dust control measures that assume 50% control of fugitive dust on unpaved roads. Unless assumed control measures are established as enforceable mitigation measures the modeling must be based on uncontrolled, year-round fugitive dust emissions. It is critical that the USFS fully and accurately assess all potential PM emissions from the significant travel on unpaved roads that is associated with oil and gas development. PM emissions from construction sources make up the overwhelming majority of PM emissions in the DEIS with PM emissions from construction comprising over 98% of all PM emissions under all Alternatives.[123] The USFS must make public the underlying assumptions for the modeled emissions.

The emissions inventory in the DEIS shows an incorrect total for PM construction emissions under Alternative A. Specifically, Table 5-5 of the TSD (p. 5-4) presents total PM construction emissions for Alternative A of 461.7 tons per year, instead of 961.7 tons per year. While the total PM emissions from construction and operation in the same table appear correct, the USFS should double check that the correct construction emissions were input into the model.

Finally, the USFS must also take into account the particulate matter impacts from the transportation changes designated in the DEIS. All of the Alternatives in the DRMP include additional miles of temporary road construction, with the USFS's Proposed Alternative (C) totaling 49 miles, and projected increases in traffic based on potential well pad construction.[124] The additional roads and increased travel will contribute to fugitive dust and must be included in the USFS's assessment of air quality impacts. To accurately and fully understand the impact of travel on new roads and on increased travel on existing roads, the USFS must model the air quality impacts from fugitive dust and tailpipe emissions from these sources in the DEIS.

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http://www.epa.gov/ttn/scram/guidance/mch/new_mch/MCmemo_Region6_PM25_NAAQS_Compliance.pdf, included as Exhibit 46.

[122] USFS DEIS TSD Appendix D.

[123] USFS DEIS TSD Tables 5-5 through 5-8 at 5-4 through 5-7.

[124] USFS DEIS at 2-75.

Finally, the $PM_{2.5}$ modeling conducted by the USFS for the DEIS only considered primary $PM_{2.5}$ (directly emitted from combustion point sources and from fugitive sources). Emissions of NO_x, VOCs, SO_2 and ammonia can form, after emitted into the atmosphere, into $PM_{2.5}$ and this could potentially be a significant component of ambient $PM_{2.5}$ concentrations. Estimates of $PM_{2.5}$ formation from these precursors should also be included in the USFS's modeling analyses.

The fraction of $PM_{2.5}$ concentrations in the ambient air that is due to the secondary formation of $PM_{2.5}$ (*e.g.*, sulfates and nitrates), as opposed to directly emitted [primary] $PM_{2.5}$ (*e.g.*, as a product of combustion) is dependent on many factors. However, the presence of strong temperature inversions that limit dispersion and provide conditions that contribute to the formation of secondary $PM_{2.5}$ in the atmosphere can increase secondary $PM_{2.5}$ formation. Due to the potential for wintertime temperature inversions in the region, the USFS must seriously consider the contribution from secondary $PM_{2.5}$ to total $PM_{2.5}$ concentrations in the area. All of the sources of the primary pollutants that contribute to secondary $PM_{2.5}$ formation—*e.g.*, NO_x, SO_x, VOC and ammonia—from sources in the area should be accounted for in an assessment of $PM_{2.5}$ impacts.

The USFS must address how it will account for secondary $PM_{2.5}$ impacts from the proposed project development. EPA's Support Center for Regulatory Atmospheric Modeling (SCRAM) provides various resources for modeling the impacts of secondary $PM_{2.5}$. For example, EPA's recently-developed model based on the Community Multi-scale Air Quality (CMAQ) model in support of the development of the $PM_{2.5}$ NAAQS has been shown to "reproduce the results from an individual modeling simulation with little bias or error" and "provides a wide breadth of model outputs, which can be used to develop emissions control scenarios".[125] The Comprehensive Air quality Model with extensions (CAMx) is another tool available to assess secondary $PM_{2.5}$ formation. CAMx has source apportionment capabilities and can assess a wide variety of inert and chemically reactive pollutants, including inorganic and organic $PM_{2.5}$ and PM_{10}. The Regional Modeling System for Aerosols and Deposition (REMSAD) can also model concentrations of both inert and chemically reactive pollutants on a regional scale, "including those processes relevant to regional haze and particulate matter".[126] These are just some examples of current models, identified by EPA, with the capability to assess secondary $PM_{2.5}$ impacts. With adequate testing (using existing regional monitoring data to ensure accuracy) these models could be used in the NEPA context. An alternative to these grid models would be

[125] *See* February 2006 Technical Support Document for the Proposed PM NAAQS Rule (available at: http://www.epa.gov/scram001/reports/pmnaaqs_tsd_rsm_all_021606.pdf), included as Exhibit 47.
[126] *See* EPA, http://www.epa.gov/scram001/photochemicalindex.htm, included as Exhibit 48.

for the USFS, in cooperation with EPA, to develop a screening point source model—like CALPUFF—to look at near-field $PM_{2.5}$ primary and secondary impacts.

It is important that the USFS use the available tools to fully assess the impact of emissions from the development project that contribute to secondary $PM_{2.5}$ formation. Resulting $PM_{2.5}$ concentrations will be higher when considering the additional impacts from secondary $PM_{2.5}$. Considering the already high $PM_{2.5}$ concentrations in the area (*e.g.*, background concentrations presented in the DEIS that are almost 80% of the 24-hour average $PM_{2.5}$ NAAQS[127]) the secondary $PM_{2.5}$ impacts are critical to understanding the best way to mitigate health impacts from fine particle pollution from the proposed leasing.

The DEIS Does Not Include a Comprehensive Regional Inventory for Use in Determining Existing and Reasonably Foreseeable Cumulative Air Quality Impacts

In addition to a comprehensive emissions inventory of the various development and operation sources anticipated under the proposed leasing alternatives, the USFS must also prepare an inventory of all existing and reasonably foreseeable air pollution sources expected to impact the same areas impacted by emissions from the proposed development. These sources include any State- and Federal-permitted sources, any state Oil and Gas Conservation Commission permitted wells as well as all reasonably foreseeable development (RFD) sources (*e.g.*, other NEPA projects, proposed major sources, etc.). The USFS must include all emissions from NEPA projects and RMPs in other areas in Colorado and northeastern Utah that could be impacting the same area as the impacted areas of the proposed development. The remaining development in any NEPA-approved projects in the impacted area must be included in the RFD inventory.

The regional inventory used to determine cumulative impacts for the WRNF DEIS includes an inventory of non-oil and gas sources that is based on 2009 data from the Colorado Department of Public Health and Environment (CDPHE).[128] According to the DEIS, the inventory excludes certain sources in order to achieve a "manageable number" of sources for the modeling.[129] The sources left out of the modeling include fugitive PM sources (*e.g.*, gravel pits, mines, mineral crushing/processing operations) with emissions less than 25 tons per year and sources where the total NO_x, SO_2 and PM_{10} emissions was estimated to be less than 10 tons per year. The DEIS does not disclose how many of the inventoried

[127] USFS DEIS TSD Table 4-1 presents 24-hour average background $PM_{2.5}$ data from Grand Junction from 2008: 27.8 $\mu g/m^3$ / 35 $\mu g/m^3$ = 79.4%.
[128] USFS DEIS TSD at 5-15 through 5-16.
[129] USFS DEIS TSD at 5-16.

sources were eliminated based on these criteria but it is assumed that is a measurable amount since the goal was to reduce the modeled sources to a more manageable number. The DEIS justifies these exclusions by saying that the impacts from fugitive PM emissions tend to be localized with small and low to the ground emission points and that their contribution to visibility impacts was insignificant compared with other NO_x and SO_2 sources.[130] The DEIS must disclose the cumulative emissions from these excluded sources in order for the public to be able to evaluate the USFS's decision to leave them out of the analysis. It is possible that while these sources, individually, would not appear to be significant that the cumulative impact of these sources could be large enough to be a significant factor when determining cumulative PM impacts. The location of these sources is important in determining if they would, collectively, contribute to impacts. The USFS must determine whether there are multiple sources located in close proximity to eachother or to other significant sources before excluding sources based solely on their individual emissions regardless of where the emissions occur. And while PM may not be a primary contributor to the visibility impacts assessed in the DEIS, the fact that monitored background PM_{10} concentrations in the area are high and the model predicts that cumulative short-term $PM_{2.5}$ concentrations already consume more than the available PSD increment in Eagles Nest Wilderness Area means that cumulative increases in PM emissions, even if individually small, could result in significant impacts depending on where the sources are located and when emissions occur in conjunction with other sources. The USFS should provide a more detailed justification as to why these sources do not contribute to cumulative impacts.

The oil and gas emissions inventory compiled for the cumulative impact assessment is based on 2020 Piceance Basin emissions projections.[131] This inventory is assumed to include all relevant cumulative source emissions, including "any emissions from RFFA projects identified for the WRNF EIS".[132] And while details of how the 2020 Piceance Basin emissions estimates were developed are provided in the DEIS there is no confirmation that all the relevant RFFA sources are included in the inventory. Appendix B of the TSD includes "RFFA projects considered for this analysis" but the data in Appendix B appear to only be used for determining spatial allocations in the modeling and the actual emissions estimates for the specific RFFA projects are "assumed" to be included in the 2020 Piceance Basin inventory without any verification that this is, in fact,

[130] USFS DEIS TSD at 5-16.

[131] Morris R., et.al. 2009. *2015 and 2020 Ozone Projections for the Denver Area*. Prepared by Environ International Corporation and Alpine Geophysics LLC, July 15, 2009, included as Exhibit 49.

[132] USFS DEIS TSD at 5-15.

the case.[133] The USFS must provide a detailed inventory of the oil and gas sources used in the cumulative impact analysis.

Appendix B of the DEIS TSD compiles a list of the Reasonably Foreseeable Future Actions by BLM Field Office and USDA National Forest and includes approved and proposed projects for the Grand Mesa, Uncompahgre and Gunnison National Forests, White River National Forest, Colorado River Valley Field Office, Kremmling Field Office, White River Field Office and Little Snake Field Office planning areas.[134] Since the DEIS states that the emissions from these projects are assumed to be included in the 2020 Piceance Basin inventory from 2009 it is highly unlikely that the inventoried data are based on the worst-case impacts to air quality from those planning areas that have not yet finalized updates to their RMPs. For example, since the CRVFO and WRFO have proposed but not yet finalized a specific development Alternative, the USFS must model impacts based on the proposed Alternative that results in the worst-case air quality impacts, not on the Alternative that is the preferred alternative under those current draft proposals. The USFS must specify the magnitude of emissions included in the cumulative analysis for the individual Field Offices and National Forests.

Specifically with regard to the potential cumulative impacts from the CRVFO, the USFS must ensure that potential development is based on worst-case development scenarios. Based on a review of the Reasonably Foreseeable Development (RFD) inventory in the BLM's CRVFO DRMP and the 2008 RFD for the Glenwood Springs Field Office, it is likely that BLM significantly underestimated reasonably foreseeable development potential in the CRVFO planning area. For example, industry estimates for the 2008 RFD inventory indicate the potential for over 16,000 new coalbed methane wells in the Mesaverde Gas Play alone. Specifically, the 2008 RFD reports the following about the Mesaverde Gas Play:

> Most of the major oil and gas operators in the [Glenwood Springs Field Office] area are interested in this play. This play includes all production from the Mesaverde Group, including the Corcoran, Cozzette, and Rollins Sandstone Members of the Iles Formation and the Williams Fork Formation. The latter includes the Cameo coal zone. The large majority of the oil and gas reserves within the GSFO are in this play, which extends across all of the high potential area of the GSFO. It is assumed that this play will continue to be developed on 10-acre spacing using multi-well

[133] USFS DEIS TSD at 5-15.
[134] USFS DEIS TSD Appendix B.

pads. *Industry input has predicted approximately 16,230 wells to be drilled in this play over the life of the Plan Revision*.[135] [*emphasis added*]

However, the alternatives assessed in the BLM's CRVFO DRMP grossly underestimate the number of wells in the area when considering this information. Even Alternative D, the maximum resource use alternative, assesses less than 16,000 wells for all BLM and non-BLM sources during the planning period (including all BLM project sources, BLM non-project sources, Roan Plateau sources, non-BLM Federal, State and private sources).[136] And the BLM's Preferred Alternative (B) assesses less than 11,000 wells.[137] Clearly, the BLM has significantly underestimated the number of potential wells in the CRVFO planning area if there is the potential for over 16,000 new coalbed methane wells to be drilled in the Mesaverde gas play, alone. The USFS must assess all reasonably foreseeable development in the BLM planning areas that overlap with the WRNF and must include the Mesaverde gas play along with the other plays identified by industry in the 2008 RFD unless BLM and the USFS will be specifically limiting the number of new wells to the estimate used in the RFD analyses.[138] The WRNF RFD Scenario specifies that "[o]f the 872 wells projected for WRNF lands in the Glenwood Springs FO, 694 would target the Mesaverde play, 150 would target unspecified reservoirs in currently unleased areas, and 28 would target the currently undeveloped Niobrara play."[139] However, based on the industry estimates for the Mesaverde play this number could be significantly underestimated and the USFS must base its analysis on the highest estimated development scenario.

In addition, the cumulative impact analysis must include the most recent estimates for development potential for the Roan Plateau. The BLM's CRVFO DRMP RFD inventory is based on development estimates for the Roan Plateau that suggest that BLM is not considering more recent industry estimates for up to 3,200 wells atop the Roan Plateau.[140] The leases sold to date for the Roan

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[135] BLM, Reasonable Foreseeable Development: Oil and Gas in the Glenwood Springs Field Office (GSFO) Administrative Boundary Area, July 31, 2008 at 15, included as Exhibit 50.
[136] BLM CRVFO DRMP TSD Table 2-2, 15,664 wells under Alternative D, included as Exhibit 30.
[137] BLM CRVFO DRMP TSD Table 2-2, 10,965 wells under Alternative B, included as Exhibit 30.
[138] *E.g.,* additional plays identified by industry in the 2008 RFD inventory include the Wasatch gas play, Niobrara gas play, Coalbed Natural gas play (Williams Fork Formation coal zones), and gas plays east of the Grand Hogback. BLM, Reasonable Foreseeable Development: Oil and Gas in the Glenwood Springs Field Office (GSFO) Administrative Boundary Area, July 31, 2008 at 15-17, included as Exhibit 50.
[139] WRNF Reasonably Foreseeable Development Scenario, September 2010 at 21, included as Exhibit 43.
[140] *See, e.g.,* Bill Barrett Corporation's statement to investors that there are up to 3,200 potential drilling sites on the Roan Plateau mesa. Reported in the Denver Post, September 2, 2009, Roan Plateau Wells Could Exceed 3,000, and in the Grand Junction Daily Sentinel, August 22, 2009, Barrett May Drill 3,200 Wells Atop Roan Plateau, included as Exhibits 51a and 51b.

Plateau do not limit drilling to a specific number of wells and, therefore, the cumulative inventory should fully assess the 3,200 wells possible atop the Plateau.

Also, the USFS must ensure that all of the RMPs that were updated under the 2008 Final Programmatic EIS for oil shale and tar sands leasing and that impact the WRNF (as well as the areas outside the WRNF that are impacted by the planned development under the DEIS) are fully considered in the cumulative inventory and that RFD information for the upcoming PEIS update for oil shale and tar sands development (expected in 2012) is included as information becomes available.[141] This would include, for example, the additional electrical power needs for in-situ oil shale production. Under the 2008 PEIS, BLM assumed that a combination of construction of new power plants and expansion of existing power plants would occur and that future in-situ projects would require somewhere around 2,400 megawatts (MW) of additional electricity generation capacity when commercial production levels of 200,000 barrels of oil shale per day are reached.[142] The USFS must ensure that the air quality impacts from potential oil shale development in the region are fully considered in the cumulative impact analysis.

The USFS must be scrupulous in its cumulative impact analysis for this and future analyses for the area in order to ensure that the development is not improperly segmented. That is to say, the USFS must – for this EIS and for all future project-specific EISs and EAs in the area – perform a comprehensive cumulative impact assessment so as not to allow individual projects to proceed that would contribute to cumulative impacts in the area.

The Far-Field Modeling Analysis Does Not Evaluate Impacts at All Class I, Sensitive Class II and Population Exposure Areas that Could Be Affected by the Proposed Leasing

The DEIS assesses far-field impacts at the following Class I, sensitive Class II and population exposure areas:

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[141] In 2008, the BLM published a Final PEIS that amended 12 resource management plans in Utah, Colorado, and Wyoming to make approximately 2 million acres of public lands potentially available for commercial oil shale leasing and development and 430,000 acres potentially available for tar sands leasing and development. These RMPs included the Glenwood Springs, Grand Junction and White River Field Offices in Colorado; the Moab, Monticello, Price, Richfield and Vernal Field Offices and the Grand Staircase-Escalante National Monument in Utah; and the Kemmerer, Rawlins and Rock Springs Field Offices in Wyoming.

[142] Final BLM Oil Shale and Tar Sands PEIS at 4-14. http://ostseis.anl.gov/documents/fpeis/vol1/OSTS_FPEIS_Vol1_Ch4.pdf, included as Exhibit 52.

Class I, Sensitive Class II and Population Exposure Areas Considered in the DEIS

Designated Area	Designation	FLM
Black Canyon of the Gunnison National Park	Class I	NPS
Eagles Nest Wilderness Area	Class I	USFS
Flat Tops Wilderness Area	Class I	USFS
Maroon Bells-Snowmass Wilderness Area	Class I	USFS
Rocky Mountain National Park	Class I	NPS
Mount Zirkel Wilderness Area	Class I	USFS
Rawah Wilderness Area	Class I	USFS
West Elk Wilderness Wilderness Area	Class I	USFS
Colorado National Monument	Class II	NPS
Dinosaur National Monument	Class II	NPS
Holy Cross Wilderness Area	Class II	USFS
Raggeds Wilderness Area	Class II	USFS
Rifle	Class II	n/a*
Glenwood Springs	Class II	n/a*
Eagle	Class II	n/a*

* Population centers

According to the DEIS:

> The receptors used in the CALPUFF analysis included designated Class I and Class II areas of concern. Receptor grid coordinates for Class I areas modeled were obtained from the NPS Convert Class I Areas utility (NPS Convert Class I Areas MDAC v2.6). Additional receptors were derived for the selected Class II areas using 2 km spacing. Finally, receptors were placed at three population centers: Rifle, Glenwood Springs, and Eagle, and additional receptors were also placed for the evaluation of acid deposition at nine (9) high mountain lakes (See Table 6-1) and at four (4) scenic vistas for evaluation of potential visibility effects (See Table 6-2).[143]

The DEIS analysis leaves out some other Class I, sensitive Class II and population exposure areas that could potentially be impacted by the proposed leasing and other reasonably foreseeable sources. Specifically, the DEIS analyses should expand the far-field modeling domain to consider impacts to the following areas:

[143] USFS DEIS TSD at 6-3.

Additional Areas that Should Be Considered in the DEIS

Designated Area	Designation	FLM
Collegiate Peaks Wilderness Area	Class II	USFS
Hunter-Fryingpan Wilderness Area	Class II	USFS
Ptarmigan Peak Wilderness Area	Class II	USFS
Sarvis Creek Wilderness Area	Class II	USFS
Aspen	Class II	n/a*
Carbondale	Class II	n/a*

* Population centers

Not only should these areas been included in the analysis, but the USFS should make sure the modeling domain captures all other sources of air pollution that are impacting these areas.

The DEIS Should Look at Cumulative Hazardous Air Pollutant Impacts from the Proposed Leasing

The USFS must assess the cumulative hazardous air pollutant (HAP) impacts to the exposed population as part of this DEIS. The USFS's HAP assessment must be a cumulative one, not just an analysis of the incremental risk associated with the leasing development, which would be imposed on top of existing health risks in the area. In its August 23, 2011 proposed rule to control emissions from the oil and gas sector under New Source Performance Standards and Standards of Performance for Hazardous Air Pollutants, EPA identified the most common organic HAPs from oil and gas sources as n-hexane and BTEX compounds (benzene, toluene, ethylbenzene and xylenes).[144] At a minimum, the USFS should include an analysis of the health impacts of the following potential HAPs associated with oil and gas development: benzene, toluene, ethylbenzene, xylene, n-hexane and 1,3-butadiene,[145] formaldehyde and secondary formaldehyde[146] as well as diesel exhaust. In particular, the cancer risk associated with diesel exhaust emissions may be significant. EPA's health assessment for diesel exhaust found that long-term exposure to diesel exhaust

[144] EPA, Proposed Rule, Oil and Natural Gas Sector: New Source Performance Standards and Standards of Performance for Hazardous Air Pollutants Reviews, August 23, 2011, at 52745, included as Exhibit 53.
[145] *See* EPA's *Locating and Estimating Air Toxic Emissions* documents at http://www.epa.gov/ttnchie1/le/ for more info on 1,3-butadiene and other HAPs listed here, L&E Document for 1,3-butadiene included as Exhibit 54.
[146] This would include the contribution of other VOCs emitted from development projects to the formation of secondary formaldehyde in the atmosphere downwind from the points of emission.

poses lung cancer risks while short-term exposures can cause lung irritation and inflammation.[147]

V. The DEIS Does Not Sufficiently Address Greenhouse Gas Emissions and Climate Change Impacts From the Proposed Development

The DEIS includes estimates for carbon dioxide (CO_2) emissions for all Alternatives based on the environmental analysis completed for the Hells Gulch II natural gas development project in the WRNF in 2008.[148] Greenhouse gas (GHG) emission estimates for the USFS's Proposed Alternative (C) are 71,889 metric tons per year of carbon dioxide equivalent (TPY CO_{2eq}) and 210,106 TPY CO_{2eq} for Alternative A.[149]

The Council on Environmental Quality (CEQ) has released new (2010) draft guidance on how NEPA should consider and evaluate greenhouse gas emissions and climate change. The draft guidance outlines how federal agencies should consider climate change issues under NEPA. Under this draft guidance, the agency should quantify and disclose its estimate of the expected, annual direct and indirect greenhouse gas emissions. Specifically, where a proposed action is anticipated to cause direct, annual emissions of 25,000 metric tons or more of CO2-equivalent greenhouse gas emissions, a quantitative and qualitative assessment is required together with the consideration of mitigation measures and reasonable alternatives to reduce greenhouse gas emissions.[150]

For all alternatives, project emissions of CO_{2eq} clearly exceed the 25,000 tons per year threshold for completing a quantitative and qualitative assessment of impacts, including consideration of mitigation measures.[151] Therefore, this type of assessment should be included in the DEIS. The DEIS should also quantify methane emissions.

EPA has commented, in recent NEPA reviews, that an analysis of reasonable alternatives be performed that includes an assessment of potential means to

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[147] EPA, *Health Assessment Document for Diesel Engine Exhaust*, May 2002, 1-3, available at http://www.epa.gov/ttn/atw/dieselfinal.pdf, included as Exhibit 55. *See also*, http://www.catf.us/projects/diesel/dieselhealth/.
[148] USFS DEIS at 3-150.
[149] USFS DEIS Table 36 at 3-152.
[150] Note that, land management agencies should not be granted a pass from NEPA's duty to evaluate impacts and consider alternatives to mitigate GHG emissions. Indeed, the activities contemplated by the DEIS show precisely why land management agencies should evaluate and consider alternatives to mitigate GHG emissions, in particular methane emissions.
[151] USFS DEIS Table 36 at 3-152.

mitigate project-related greenhouse gas emissions.[152] Specifically, EPA suggested assessing carbon capture and sequestration technologies, measures from BLM's Supplemental Information Report for the eight EAs in Montana, North Dakota and South Dakota and EPA's GasSTAR technologies.[153] These measures should be considered as alternatives pursuant to NEPA in the DEIS and, moreover, should be enforced through lease stipulations or mandatory conditions of approval.

The DEIS should include a quantitative assessment of the impacts from greenhouse gas emissions, and in particular methane emissions, from the proposed development and mitigation measures for reducing impacts from methane emissions. This assessment should consider the full-sweep of likely greenhouse gas emissions sources if the DEIS's proposed action moves forward. The USFS should ensure that its inventory of GHG sources is based on the best available quantification methods. Given the uncertainty in many of the estimation methods for greenhouse gas emissions from the natural gas industry, the USFS should rely on the most up to date estimation methods and tools and should consult the emissions estimate methodologies finalized by EPA in its recent Greenhouse Gas Reporting Rule for Petroleum and Natural Gas Systems (40 C.F.R. Part 98, Subpart W).[154]

Importantly, as detailed below, the USFS's 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"). 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.[155] Although it has a relatively short atmospheric lifetime of about 12 years, methane is nonetheless a potent greenhouse gas. EPA assumes that each molecule of methane is 21 times as potent as carbon dioxide (CO_2) over a 100-year time horizon, a global warming potential (GWP) based on the Intergovernmental Panel on Climate Change's Second Assessment Report from

[152] January 7, 2011, EPA, Comments on the Gasco Uinta Basin Natural Gas Development Project Draft EIS, CEQ # 20100386, included as Exhibit 56.
[153] BLM's Climate Change Supplemental Informational Report for the eight EAs in Montana, North Dakota and South Dakota – http://www.blm.gov/mt/st/en/prog/energy/oil_and_gas/leasing/leasingEAs.html, included as Exhibit 57.
[154] 75 FR 74458, November 30, 2010, included as Exhibit 58.
[155] U.S. Emissions Inventory 2007: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005, included as Exhibit 59.

1996.[156] However, more recent peer-reviewed science indicates that methane is 33 times as potent as CO_2 over 100 years and 105 times as potent as CO_2 over 20 years.[157] Methane, thus, is a prime contributor to short-term climate change over the next few decades and a prime target for near-term GHG reductions. And, in fact, there are many proven technologies and practices already available to reduce significantly the methane emissions from oil and gas operations. These technologies also offer opportunities for significant cost-savings from recovered methane gas. Indeed, reducing methane emissions is important to not only better protect the climate, but to prevent waste of the oil and gas resource itself and the potential loss of economic value, including royalties.

There is a large body of scientific work documenting the adverse impacts to public health and welfare from climate change caused by greenhouse emissions, such as methane. More recently, scientific studies have also demonstrated that these same methane emissions contribute to the formation of ground-level ozone.[158] Specifically, the U.S. Climate Change Science Program recently reported that methane reductions accomplish the dual goal of addressing climate change and ozone pollution.[159] Methane reductions have a direct impact on both climate change and ozone pollution. In addition, many of the proven methane emission controls for the oil and gas sector also reduce hazardous air pollutants (HAP). The associated air quality benefits that result from reductions in VOC and HAP emissions are a huge co-benefit of methane reduction technologies.

In fact, the recent air quality studies in the Uinta Basin in Utah found evidence that elevated methane concentrations from nearby oil and gas operations could be contributing to ozone formation:

> [T]he CH_4 concentrations measured at the Red Wash [air monitoring] site (2.7-5.5 ppm) were significantly above the Northern Hemispheric background levels. CH_4 is usually considered non-reactive due to its relative slow reaction rates, but at levels observed at the Red Wash site,

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[156] http://www.epa.gov/cleanenergy/documents/sources/2008_GHG_Fast_Facts.pdf, included as Exhibit 60.

[157] Shindell *et al.*, "Improved Attribution of Climate Forcing to Emissions," Science 2009 326 (5953), p. 716 (www.sciencemag.org/cgi/content/abstract/326/5953/716), included as Exhibit 61.

[158] *See, e.g.*, Arlene M. Fiore *et al.*, "Characterizing the Tropospheric Ozone Response to Methane Emission Controls and the Benefits to Climate and Air Quality," Journal of Geophysical Research Vol. 113, April 30, 2008, p.1 ("[I]n the presence of nitrogen oxides (NO_x), tropospheric CH4 [methane] oxidation leads to the formation of O_3 [ozone]."), included as Exhibit 62.

[159] *See* Hiram Levy II *et al.*, U.S. Climate Change Science Program Synthesis and Assessment Product 3.2, "Climate Projections Based on Emissions Scenarios for Long-Lived and Short-Lived Radiatively Active Gases and Aerosols", September 2008, p. 65, http://www.climatescience.gov/Library/sap/sap3-2/final-report/ (finding that reducing methane emissions "lead[s] to reduced levels of atmospheric ozone, thereby improving air quality" and "lead[s] to reduced global warming"), included as Exhibit 63.

> CH_4 could be a significant player in atmospheric photochemistry of ozone formation.[160]

There are numerous existing control technologies for oil and gas emission sources that achieve cost-effective reductions in methane emissions. For example, compressor rod-packing technologies can reduce methane emissions by more than 90%, the use of no bleed pneumatic devices can practically eliminate methane emissions, the use of dry seals in centrifugal compressors can reduce methane emissions by 99%, zero emission dehydrators virtually eliminate methane emissions, the use of vapor recovery units at crude oil and condensate storage tanks can reduce methane emissions by at least 98%, and significant salable gas can be recovered with the use of reduced emissions completions (or "green completions"). The USFS should include a comprehensive set of actions to address greenhouse gas emissions and consider these actions in an alternative in the DEIS – an alternative that would mandate these actions as a lease stipulation.

The DEIS should seriously explore the impact of emissions of methane from the leasing and potential mitigation methods to reduce the associated impacts. The DEIS inventories some GHG emissions from the proposed project but then fails to seriously investigate the many cost-effective alternatives available to avoid or minimize the GHG impacts from the project as required by 40 C.F.R. § 1502.1, 40 C.F.R. § 1502.14 and 40 C.F.R. § 1502.16.

VI. The USFS Must Include Adequate Plans to Protect Air Quality in the Area as Part of This DEIS

The USFS has not fully evaluated the air quality impacts of the alternatives proposed in the DEIS and has failed to propose enforceable mitigation measures to assure no adverse impacts on air quality will occur in the affected area. The USFS must fulfill its obligations under NEPA to disclose whether the proposed leasing on the WRNF will cause significant impacts (*e.g.*, Clean Air Act (CAA) violations), and to consider mitigation under NEPA to prevent any such significant impacts. (40 C.F.R. § 1502.14(f), 40 C.F.R. § 1502.16(h)). The Air Resource Specialists Report commits to developing mitigations at a later date:

> As part of this leasing decision, no specific project with emissions is proposed, so no direct effects to air resources would occur. Mitigations to reduce emission impacts to the NAAQS and AQRV's will be developed

[160] Energy Dynamics Laboratory, Utah State University Research Foundation, Final Report: Uinta Basin Winter Ozone and Air Quality Study December 2010-March 2011, EDL/11-039, June 14, 2011, p. 97, included as Exhibit 14.

> during project specific analyses to protect air resources within the planning area. Based on the modeling results for this analysis, reducing NO_X emissions from future oil and gas development will be an important step in protecting AQRV's in nearby Class I wilderness areas.[161]

And in the DEIS the USFS states that "[a]dditional mitigation measures to reduce nitrogen deposition impacts of potential future natural gas development on the WRNF will be addressed at the site- specific NEPA stage."[162] In fact, the only mention of specific mitigation measures is in the Air Resources Specialist Report when referring to the Forest Plan guideline to:

> Reduce the impacts to air quality and loss of energy resources by only allowing flaring of gas from oil wells during production testing of wells. Connection to a pipeline or reinjection will be required once production is established. Exceptions will be considered on a case-by-case basis.[163]

A more comprehensive approach is critical given the growth in emissions in the region and the current air quality concerns. This DEIS must include a near-field modeling assessment, in addition to the far-field and cumulative assessment provided, and must include a set of comprehensive mitigation measures, based on the modeling results, that ensure there will be no adverse impacts to air quality from the proposed leasing alternatives.

As an example, the CRVFO DRMP laid out air quality management actions to control emissions from oil and gas sources in the project area under the proposed alternatives.[164] These management actions include the following air quality controls for the Agency's Preferred Alternative (B): (1) 94% reduction in fugitive dust from roads; (2) the use of Tier 4 engines for all new and existing drill rig engines and hydraulic fracturing pump engines; (3) reduced emissions completions combined with flaring during well completions that cannot use reduced emissions completions; (4) twice daily watering during construction activities; (5) electric compression at compressor stations; (6) NO_x (1.0 gram/hp-hr), CO (2.0 g/hp-hr), and VOC (0.7 g/hp-hr) emission limits for field compression; (7) 90% VOC control from dehydrators; and (8) 95% VOC control from condensate tanks and produced water tanks.[165] These measures should

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[161] Air Resources Specialist Report Oil and Gas Leasing Decision NEPA, White River National Forest, Andrea Holland, May 3, 2011 at 36, included as Exhibit 2.
[162] USFS DEIS at 3-138.
[163] Air Resources Specialist Report Oil and Gas Leasing Decision NEPA, White River National Forest, Andrea Holland, May 3, 2011 at 1, included as Exhibit 2, White River National Forest Land and Resource Management Plan, Chapter 2, page 2-3, Guideline #4, 2002 revision, included as Exhibit 1. http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_000999.pdf
[164] BLM CRVFO DRMP TSD Table 2-3, included as Exhibit 30.
[165] BLM CRVFO DRMP TSD Table 2-3, included as Exhibit 30.

also be considered as mitigation measures for the DEIS in order to minimize impacts to health and the environment from the proposed leasing on the WRNF.

In addition to the measures proposed by the BLM in the CRVFO, there are other reduction measures that can bring significant reductions in emissions that should also be considered by the USFS. On August 16, 2012, EPA finalized revisions to the New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) for the oil and natural gas sector (77 FR 49489, August 16, 2012, effective October 15, 2012). EPA's revision includes a review of the current NSPS for VOC and SO_2 emissions from natural gas processing plants and of the current NESHAP for HAP emissions from for the oil and natural gas production and natural gas transmission and storage sectors and finalizes amendments to the existing NSPS and NESHAP for emissions sources not currently addressed. Additional requirements finalized by EPA that the USFS should consider as appropriate mitigation measures for the DEIS include:

1) Gas bleed limits of 6 standard cubic feet per hour for pneumatic controllers used at well sites;
2) 95% reduction in VOC emissions from centrifugal compressors using wet seals and operational standards for reciprocating compressors (*e.g.*, replacement of rod packing in reciprocating compressors to minimize VOC emissions); and
3) 95% control of emissions from dehydrators

With the promulgation of this rule for the oil and gas NSPS/NESHAP all new sources are subject to these increased requirements, with full implementation of this control program expected in 2015. These rules will require significant emission reductions from new oil and gas sources in the production, processing, and storage and transmission sectors.

The USFS should also consider the latest mitigation information and recommendations from the Uinta Basin winter air quality study. Specifically, the interim findings suggest the use of targeted control strategies for ozone, as follows:

> [T]he reactivity of the VOC mixture can affect the optimal ozone control strategy, and it may be possible to reduce ozone levels more effectively by identifying targeted control strategies for high reactivity VOC, such as aromatic, aldehyde and alkene species.[166]

[166] 2012 Uintah Basin Winter Ozone & Air Quality Study – Summary of Interim Findings, Ongoing Analyses, Additional Recommended Reasearch, and Possible Mitigation Strategies, Prepared by

And in addition to direct VOC control, EPA's Natural Gas STAR Program has compiled detailed information on many Natural Gas STAR partners that have implemented various emission control technologies or practices and achieved cost effective methane reductions (that would also reduce VOC emissions as a co-benefit in many cases and would also help to address ozone). The BLM's Best Management Practices (BMPs), California's Air Resources Board's Clearinghouse of Non-CO_2 Greenhouse Gas Emission Control Technologies and the Four Corners Air Quality Task Force Mitigation Measures for oil and gas are also good examples of mitigation strategies that should be considered as alternatives in the DEIS.[167] Wyoming DEQ has implemented specific permitting requirements for oil and gas sources with additional requirements in areas of high oil and gas development.[168] Colorado also has additional requirements for oil and gas sources that impact the ozone levels in the Denver area.[169] In light of the aforementioned oil and gas emissions control programs, the USFS should also consider mitigation options to:

1) Require the use of plunger lift systems and well monitoring technology to improve operational systems during well cleanup operations;
2) Encourage the use of alternative energy sources to power no-bleed pneumatic devices where electrical power from the grid is not available;
3) Require leak detection and repair at all possible locations (such programs are well documented by Gas STAR partners for reducing methane emissions and are requirements in some counties in California such as South Coast Air Quality Management District, San Joaquin Valley Air Pollution Control District and Santa Barbara County);[170]
4) Require 98% control efficiency at storage vessels; and

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researchers and air quality managers at USU/EDL, Alpine Geophysics, ENVIRON, UDEQ and EPA, August 7, 2012, included as Exhibit 16.

[167] BLM, Air Resource BMPs, www.blm.gov/bmp, included as Exhibit 64a, ARB, http://www.arb.ca.gov/cc/non-co2-clearinghouse/non-co2-clearinghouse.htm, included as Exhibit 64b, and Four Corners Air Quality Task Force, http://www.nmenv.state.nm.us/aqb/4C/Docs/4CAQTF_Report_FINAL.pdf, included as Exhibit 20.

[168] Wyoming DEQ, http://deq.state.wy.us/aqd/oilgas.asp, March 2010 Oil and Gas Production Facilities Chapter 6, Section 2 Permitting Guidance included as Exhibit 65.

[169] Colorado Oil and Gas Conservation Commission, http://cogcc.state.co.us/, Colorado Department of Public Health and Environment, http://www.cdphe.state.co.us/ap/oilgas.html, included as Exhibit 66.

[170] SCAQMD, Rule 1173: Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants," http://www.aqmd.gov/rules/reg/reg11/r1173.pdf, included as Exhibit 67a, San Joaquin Valley Air Pollution Control District, Rule 4401: Steam Enhanced Crude Oil Production Wells," http://www.valleyair.org/rules/currntrules/R4401%20Clean%20Rule.pdf, included as Exhibit 67b, and Santa Barbara County, Rule 331: Fugitive Emissions Inspection and Maintenance, http://www.arb.ca.gov/DRDB/SB/CURHTML/R331.HTM, included as Exhibit 67c.

5) Require 98% control efficiency at dehydrators.

In addition, the USFS should consider implementing an adaptive management strategy. The BLM is implementing such a strategy in the Upper Green River Basin in Wyoming.[171] The BLM is also proposing a similar, more comprehensive strategy in the White River Field Office DRMP update. Specifically, for the WRFO the BLM is proposing a comprehensive Air Resources Management Plan that identifies specific management goals, objectives and actions and is carried out through an ongoing and adaptive process, involving input from stakeholders (*e.g.*, EPA and the State), that includes the use of periodic tracking of emissions data and monitoring data to determine the need for additional air modeling and mitigation strategies.[172] The WRFO DRMP includes an extensive list of emissions reductions strategies, including many of the strategies already mentioned.[173] The USFS should consider adopting a similar strategy for the WRNF to ensure ongoing protection of air resources.

Beyond that, the USFS should consider alternatives that would satisfy the CASAC recommendations for ozone and PM. The many additional mitigation measures in this section provide reasonable and technically feasible means of reducing emissions to achieve those recommendations.

The USFS has not fully evaluated the air quality impacts from the activities analyzed under the DEIS for oil and gas leasing on the WRNF and has not proposed adequate enforceable mitigation measures to assure no adverse impacts on air quality will occur in the affected area. The USFS must meet its statutory obligation to provide for compliance with the CAA and related laws and, more fundamentally, to ensure air resource protection throughout the WRNF and all other affected areas in the region.

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[171] *See, e.g.*, the NO_x emissions threshold of 693.5 tons per year established in the 2000 Pinedale Anticline ROD to ensure that emissions do not exceed the EIS scope of analysis. *See, e.g.,* June 2008 Pinedale Anticline Final SEIS at 1-4, included as Exhibit 68.

[172] BLM WRFO DRMP Appendix J Air Resources Management Plan, August 2012. http://www.blm.gov/co/st/en/BLM_Programs/land_use_planning/rmp/white_river/ogdraftrmpa.html included as Exhibit 69.

[173] BLM WRFO DRMP Appendix J Air Resources Management Plan, August 2012, Table J-1 at J-7 through J-11. http://www.blm.gov/co/st/en/BLM_Programs/land_use_planning/rmp/white_river/ogdraftrmpa.html included as Exhibit 69.