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A FORCE FOR NATURE

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Shannon Hoefeler
El Segundo Mine Lease by Application EA
Bureau of Land Management
Farmington Field Office
6251 College Blvd., Suite A
Farmington, NM 87402
shoefeler@blm.gov

Re: Comments on El Segundo Mine Coal Lease by Application Environmental Assessment and Unsigned Finding of no Significant Impact

Dear Ms. Hoefeler:

WildEarth Guardians submits the following comments on the Bureau of Land Management's ("BLM's") draft Environmental Assessment ("EA") for the El Segundo Coal Mine Lease by Application (hereafter "El Segundo coal lease") and the Agency's unsigned Finding of no Significant Impact ("FONSI"). We incorporate by reference all previously submitted comments to the BLM on the El Segundo coal lease, including our September 4, 2012 comments.

We request that the BLM reject the proposed lease. If the Agency decides to continue to move forward with issuing the proposed lease, we request that an Environmental Impact Statement ("EIS") be prepared. An EIS is necessary given the BLM's analysis does not demonstrate that the impacts of the proposed lease will be insignificant and given a number of uncertainties around the impacts that the BLM has inadequately addressed.

As an initial matter, we are incredibly concerned that the BLM has never before analyzed or assessed the impacts of the El Segundo coal mine under the National Environmental Policy Act ("NEPA"), raising serious concerns that an EA is not the appropriate level of NEPA analysis. BLM's own NEPA manual indicates that "approval of any mining operation where the area to be mined, including any area of disturbance, over the life of the mining plan is 640 acres or larger in size" normally requires the preparation of an EIS. BLM NEPA Handbook, Section 7.2. Here, the BLM concedes that leasing the El Segundo coal lease will lead to mining. Furthermore, not only is the lease 640 acres in size, but the BLM indicates that its approval will lead to at least 448 acres of mining impacts (likely much more taking into account other disturbances associated with mining the lease) and will facilitate the development of the overall 15,000 acre El Segundo coal mine. Given that the El Segundo mine is a large industrial facility and has lately produced more coal than any other coal mine in New Mexico, it would appear that, based on context and intensity, the impacts of issuing the proposed coal lease are significant.[1] If BLM decides not to prepare an EIS, the Agency must explain how its decision poses no significant impacts whatsoever, even when considering the indirect and cumulative impacts of the El Segundo mine and related activities.

We also note at the outset that the BLM has prejudiced an objective analysis and the selection of reasonable alternatives under its EA, contrary to NEPA. As the Agency plainly notes in its November 19, 2013 "Dear Reader" letter, the BLM already sold the El Segundo coal lease to Peabody Natural Resources Company on August 14, 2013. Despite this, the EA states that the proposed action is to "lease the Project Area and to mine its federal coal reserves." EA at 2-1. Here, the "Project Area" (i.e., the El Segundo coal lease area) has already been leased, meaning BLM's EA is not only inaccurate, it's misleading and belies any assertion that BLM could possibly make an objective and well-informed decision.

Although the BLM apparently has yet to issue the proposed lease, the reality is that the BLM has already committed resources before analyzing and assessing potentially significant impacts and rigorously exploring alternatives, contrary to NEPA. It is telling that under BLM's own coal leasing regulations, the Agency has a mandatory duty to issue a lease after a high bid is accepted from a bidder. *See* 43 C.F.R. § 3422.4(a). To this end, we have every reason to conclude that the BLM's decision in this case will be to authorize the El Segundo coal lease as proposed with no modifications whatsoever. This post-hoc approach to NEPA effectively turns this bedrock environmental law into a sham. Worse, it indicates that BLM's attempts to adequately analyze and assess environmental impacts in the EA are nothing short of bureaucratic smoke and mirrors.

Our concerns, however, are not relegated solely to the environmental impacts of the El Segundo coal lease. By failing to objectively analyze and assess the environmental impacts of the proposed coal lease, we are concerned that the BLM has not adequately assessed the fair market value of the proposed coal lease in accordance with the Mineral Leasing Act, 30 U.S.C. § 201(a). Indeed, under the BLM's Economic Evaluation of Coal Properties Handbook at H-3070-1, the BLM appraises coal property based on either the "Comparable Sales" approach or the "Income" approach. BLM Handbook, H-3070-1.III. Given the lack of adequate comparable lease sales in the area (not only have there not been recent lease sales in the region, but all other subbituminous coal mines feed only one coal-fired power plant), it would appear that the BLM

[1] It is noteworthy that the Office of Surface Mining Reclamation and Enforcement's NEPA manual states that an EIS is normally required for coal mining operations where "the environmental impacts of the proposed mining operation are not adequately analyzed in an earlier environmental document covering the specific leases or mining activity," where the area to be mined is "1280 acres or more" or annual production is "5 million tons or more," and where "mining and reclamation activities will occur fro 15 years or more. U.S. Department of Interior, Departmental Manual, 516 DM 13.4(4). Here, the impacts of mining at El Segundo have not been adequately analyzed in an earlier environmental document, the area to be mined at the El Segundo mine will be greater than 1,280 acres and the El Segundo mine already produces more than five million tons annually, and mining and reclamation will last beyond 2030. Thus, there is even more justification for the preparation of an EIS.

would be obligated to follow the income approach. Among other factors that must be considered under the income approach are, "Capitol Cost Elements," which include, among other things, "premining studies" on "environmental" expenditures related to the "cost of developing baseline environmental data and establishing mitigation protocol and monitoring activities to ensure compliance with Federal and State regulations." BLM Handbook, H-3070-1, Section III.B.4.a.1. In other words, environmental costs matter in assessing fair market value. The fact that the BLM is presuming fair market value prior to adequately analyzing and assessing environmental impacts is a strong indication that the Agency is not ensuring it is recovering fair market value for the El Segundo coal lease in accordance with the Mineral Leasing Act.

In light of this, we request that before the BLM takes any further action on the El Segundo coal lease, the Agency refund Peabody's deposit in accordance with 43 C.F.R. § 3422.4(e), declare the results of the lease sale held on August 14, 2013 to be null and void, and objectively determine whether it is appropriate to offer the proposed coal lease for sale and issuance. If the BLM determines it is appropriate to offer the proposed lease for sale and issuance, then the Agency must schedule a new lease sale, re-notice accordingly, and conduct a new competitive lease sale. Only by taking these steps can the BLM ensure the environmental and economic integrity of any decision related to the El Segundo coal lease.

Our additional concerns are as follows:

I. The BLM Does not Appear to be Following its Competitive Coal Leasing Procedures

The BLM's competitive coal leasing handbook states that the Agency must request comments and schedule a public hearing on a draft environmental analysis for a coal lease by application, and that notices of a public hearing "must be published in the *Federal Register*." BLM Handbook, H-3070-1, Chapter 3, Section III.B.4.a.1; *see also* 43 C.F.R. § 3425.3(a). Here, it does not appear that the BLM is intending to schedule a public hearing on its draft EA or to public notice of the public hearing in the Federal Register. Although the BLM is soliciting public comment, the Agency appears to be falling short of its duty to ensure an adequate public hearing and adequate public notice in the Federal Register. Before the BLM can take any action on the proposed lease by application, it must follow its coal leasing handbook and provide adequate notice and opportunity for public comment.

Although we concede that this situation is unique in that the BLM has already sold the El Segundo lease, yet failed to prepare an adequate environmental analysis, it underscores the need for the BLM to declare the results of the August 13, 2013 lease sale null and void, to refund Peabody's money, and to hold a new lease sale if the Agency so chooses to continue to move forward with the proposed coal lease. If BLM does not do so, the Agency's rules and handbook remain clear that notice of a draft EA for a coal lease must be published in the Federal Register.

We are further concerned that the draft EA and unsigned indicate the District Manager will be the decisionmaker for the proposed lease by application. Under the BLM's competitive coal leasing handbook, the State Director is the one charged with approving an EA and FONSI.

See BLM Handbook, H-3070-1, Chapter 3, Section III.E.6. It is unclear how the District Manager can serve as the decisionmaker when the BLM's own handbook clearly states that the State Director is ultimately responsible for the decision to offer a lease by application for sale and issuance.

II. The BLM Does not Appear to Have Conducted an Adequate Coal Leasing Suitability Analysis

We are concerned that the BLM has not adequately assessed whether the area of the proposed El Segundo coal lease should be made available and is otherwise suitable for coal leasing.

As an initial matter, BLM is required to apply four key criteria to assessing whether lands should be made available for leasing within a planning area. These criteria include "development potential," an assessment of suitability, a multiple use analysis, and surface owner consultation. *See* BLM Handbook, H-3070-1, Chapter 1, Section I. Although these criteria should normally be applied during land use planning (i.e., in the preparation of a resource management plan ("RMP"), 43 C.F.R. § 3420.1-4(e), in this case it does not appear that the BLM fully applied these four criteria in the development of the 2003 Farmington Field Office RMP. In fact, at the time the RMP was adopted, the BLM stated, "no new coal mines are currently proposed[.]" Farmington RMP Final Environmental Impact Statement at 4-40. Yet the El Segundo coal mine, which began operation in 2008 (*see* EA at 1-2), clearly is a new mine and the proposed lease is clearly meant to facilitate the expansion of this new mine. Here, the BLM must not only assess whether leasing is appropriate under the four criteria, but it also appears that the Agency must supplement the RMP Final Environmental Impact Statement in light of its failure to adequately analyze and assess coal mining impacts at the planning level, in accordance with 40 C.F.R. § 1502.9(c).

More significantly is that it does not appear the BLM assessed the appropriateness of leasing based on the unsuitability criteria as required by 43 C.F.R. § 3420.1-4(e)(2). These criteria, set forth at 43 C.F.R. § 3461.5, prohibit leasing in a number of circumstances, including where bald and golden nest sites and concentration areas, where there are falcon nest sites, where there exists high priority habitat for migratory birds, where there exists high interest wildlife and plant species, and where mining would "materially damage" the quantity or quality of water in surface or underground systems that would supply alluvial valley floors. The EA does not assess whether the lands proposed for leasing are suitable in accordance with these criteria.

We are particularly troubled by the EA's disclosure that current mining activities have caused golden eagles and prairie falcons to abandon nest sites within the permit boundary for the El Segundo coal mine. *See* EA at 4-15. This indicates that already, the El Segundo mine has impacted lands that should be unsuitable for mining. Furthermore, this disclosure indicates that Peabody has violated Surface Mining Control and Reclamation Act ("SMCRA") rules at 30 C.F.R. § 816.97(c), which prohibit the taking of golden eagles, as well as the Bald and Golden Eagle Protection Act, which also prohibits the taking of golden eagles, including their nests, 16 U.S.C. § 668(a).

III. The EA Fails to Adequately Analyze and Assess Coal Combustion Impacts

A. The EA Fails to Analyze the Impacts of Coal Combustion as a Connected Action or in the Alternative an Indirect Impact

The EA discloses that coal mined from the proposed lease will be burned in power plants. *See* EA at 5-8—5-9. The EA specifically highlights the fact that coal from El Segundo is burned in power plants in Arizona, including the Cholla, Springerville, and Apache power plants, as well as the nearby Escalante power plant in New Mexico. *See id*. The EA emphasizes that coal mined from the El Segundo coal lease will be burned in the southwestern United States. *See* EA at 5-9. Despite the fact that the BLM acknowledges the coal proposed for leasing will be combusted, the EA addresses these impacts as "cumulative" impacts, rather than as a connected action or, in the alternative, an indirect impact. This violates NEPA.

Under NEPA, the direct, indirect, and cumulative impacts of connected actions must be analyzed in the same NEPA document. This is to ensure that potentially significant impacts are not overlooked or otherwise minimized when determining whether an action will have a significant impact on the environment. As the 10th Circuit Court of Appeals has explained, "[o]ne of the primary reasons for requiring an agency to evaluate 'connected actions' in a single NEPA analysis is to prevent agency from minimizing the potential environmental consequences of a proposed action (and thus short-circuiting NEPA review) by segmenting or isolating an individual action that, by itself, may not have a significant environmental impact." *Citizens' Committee to Save our Canyons v. U.S. Forest Service,* 297 F.3d 1012, 1029 (10th Cir. 2002) (citations omitted).

An action is "connected" if it is "closely related" to other actions and is identified based on three factors in NEPA's implementing regulations. Actions are "connected" if they:

> (i) automatically trigger other actions which may require environmental impact statements.
> (ii) cannot or will not proceed unless other actions are taken previously or simultaneously.
> (iii) are interdependent parts of a larger action and depend on the larger action for their justification."

40 C.F.R. § 1508.25(a)(1). To determine whether actions are connected, the 10th Circuit applies the "independent utility test," which asks whether "each of the two projects *would* have taken place with or without the other" *Wilderness Workshop v. U.S. Bureau of Land Mgmt.*, 531 F. 3d 1220, 1229 (10th Cir. 2008) (emphasis added) (quoting *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 969 (9th Cir. 2006).

Here, the impacts of coal combustion are clearly connected to the BLM's proposal to offer for sale and issuance the El Segundo coal lease. Notably, combustion of coal mined from the El Segundo lease would not take place without BLM issuance of the lease to Peabody. The combustion of coal from the El Segundo coal lease thus has no "independent utility" as it cannot and will not take place without the BLM's issuance of the proposed lease. If BLM adopted a "no action" alternative, the coal that would be sold as part of El Segundo lease would not be mined or burned as Peabody would have no right to access the coal.

Despite this, the EA identifies coal combustion impacts as a "cumulative" action. *See* EA at 5-8—5-10. Even then, the EA only identifies potential air quality impacts associated with coal combustion, falling short of identifying impacts associated with coal combustion waste production and disposal, water quality impacts associated with coal combustion, and other impacts related to the operation and maintenance of coal combustion facilities. This is problematic. By addressing coal combustion impacts only as "cumulative," the EA fails to adequately analyze and assess the direct and indirect impacts of the El Segundo coal lease. The BLM thus has no basis for asserting that the impacts of the proposed lease will not be significant.

At a minimum, the EA must address the impacts of coal combustion as an indirect impact of the proposed coal lease. Under NEPA rules, an indirect impact is one that is "caused by the action and [is] later in time or farther removed in distance, but [is] still reasonably foreseeable." 40 C.F.R. § 1508.8(b).

The need to address coal combustion impacts as a connected action or indirect impact is critical to ensuring that the impacts of the BLM's proposed action are rigorously analyzed and assessed. Here, if coal combustion is considered simply as a cumulative impact, the BLM will overlook analyzing and assessing important potentially significant impacts.

A key example is with water quality impacts. If BLM limits it analysis assessment of direct and indirect water quality impacts only to the effects of developing the El Segundo coal lease, then the Agency would completely overlook the water quality impacts associated with coal combustion as they would not be "cumulative" in nature. Indeed, water quality impacts associated with the operation and maintenance of the Springerville power plant would not contribute to cumulative impacts in the direct vicinity of the El Segundo lease area. In fact, water quality impacts associated with development of the lease area would impact the Rio Grande watershed, while impacts associated with coal combustion at Springerville would impact the Little Colorado watershed. It is notable that the EA does not address the water quality impacts associated with coal combustion.

B. The Air Quality Impacts of Coal Combustion are not Adequately Analyzed or Assessed

The EA does not adequately analyze and assess the air quality impacts of coal combustion activities. Notably, the EA makes no effort to disclose emissions associated with coal combustion activities or to actually analyze and assess impacts to pollutant concentrations, such as ozone, particulate matter, sulfur dioxide, and nitrogen dioxide.

The BLM asserts in the EA that "The coal lease would not result in additional coal emission from client power plants for reasons listed below[.]" EA at 5-9. Although it is unclear what the "reasons listed below" are, BLM's assertion defies reality. Indeed, it is difficult, if not impossible to believe that burning the coal mined as part of the El Segundo coal lease would not result in additional air emissions at coal-fired power plants. If coal is burned, it produces emissions, and although the BLM may believe coal burning will happen regardless of whether the El Segundo lease is issued, this does not change the fact that the El Segundo coal will not be burned if it is not leased. In essence, no burning means no emissions. Unless the BLM demonstrates the El Segundo coal will somehow spontaneously combust in place and produce emissions, regardless of whether or not it is issued, the BLM has no basis for asserting that issuance of the El Segundo coal lease will not result in air emissions from coal combustion facilities.

BLM also appears to argue that emissions associated with coal combustion are "difficult to project." EA at 5-8. Although NEPA does not provide for a "difficulty" exemption that allows a federal agency to forego an adequate analysis or assessment of impacts, there is simply no basis for the Agency's assertion here. Although the BLM claims that it is difficult to determine how much coal from the El Segundo lease will be burned in any given power plant at any given time, the BLM can reasonably estimate emissions based on Peabody's projected production rates for the El Segundo lease (set forth in Table 2.2-3 of the EA), as well as by assessing emissions from power plants that have long-term contracts with Peabody. An analysis may be perceived as "difficult" by the BLM, but it is not impossible or out of the question. Indeed, the U.S. Environmental Protection Agency ("EPA") has emissions data for all U.S. coal-fired power plants available on its Air Markets Program Database website, http://ampd.epa.gov/ampd/, and Environment and Compliance History Online database, http://echo.epa.gov/.[2] Furthermore, given that an understanding of these emissions is necessary to ensure a well-informed decision and to justify a FONSI, it would seem that the BLM would be able and willing to prepare this analysis. If not, then the BLM would have to concede that the air quality impacts of coal combustion are "highly uncertain," strongly indicating that the impacts are significant. *See* 40 C.F.R. § 1508.27(b)(4).

The BLM must analyze and assess the emissions that will be created as coal from the El Segundo lease is mined and burned, and analyze and assess how these emissions will affect air quality in order to comply with NEPA and justify a FONSI.

C. The BLM Cannot Rely on the Theory that the Mere Regulation of Air Pollution, Water Contaminants, or Other Substances Renders Impacts Insignificant

The BLM appears to assert in the EA that the environmental impacts of coal combustion will not be significant because any impacts will be sufficiently regulated. For instance, with regards to air quality impacts of coal combustion, the BLM states, "It is assumed that emissions will be regulated and, if necessary, controlled to satisfy both federal and state standards—regardless of the source of fuel." EA at 5-9. This approach to analyzing and assessing air quality impacts, or other environmental impacts for that matter, is completely off base and defies NEPA.

[2] The BLM could also just ask Peabody for relevant and necessary information in accordance with 43 C.F.R. § 3425.1-7(d).

Indeed, the BLM has no basis for asserting that simply because something is regulated, such as air pollution, that the impacts are not significant. With regards to air pollution, facilities, such as power plants, are often allowed to release pollution in amounts that can still negatively impact public health and the environment and pose potentially significant impacts. Power plants frequently release air pollution that can cause or contribute to exceedances or violations of national ambient air quality standards, or that otherwise can endanger public health.

A key example of the flaws in BLM's logic is with the issue of coal combustion waste, or coal combustion by-products. Currently, coal combustion waste is not regulated as hazardous waste under federal law or Arizona law. *See*, http://www.netl.doe.gov/technologies/coalpower/ewr/coal_utilization_byproducts/states/arizona.html. Thus, current regulation, or lack thereof, would seem to be an extremely poor indicator of the significance of the impacts of producing, disposing, and managing coal combustion waste. It is telling that the EA does not even address the impacts of coal combustion by-product production, disposal, and management. This is a major oversight as available information indicates that the coal-fired power plants in Arizona dispose of large amounts of coal combustion waste, often in ponds that are rated as "high" to "significant" hazards. *See* Exhibit 1, Earthjustice, "Arizona and Coal Ash Disposal in Ponds and Landfills."

D. The BLM Cannot Rely on the Theory that Ongoing Coal Combustion Impacts are Insignificant or Otherwise do not Require Analysis and Assessment

The BLM finally seems to assert that coal combustion activities somehow pose insignificant impacts by virtue of the fact that they are ongoing. For example, the EA notes that, "The power plants in question were in operation before the El Segundo mine began production[.]" EA at 5-9. The fact that coal-fired power plant operation may be ongoing has no bearing on the potentially significant impacts of power plant operation. An action may be ongoing, yet still pose significant impacts. If the impacts of a significant action somehow became "insignificant" simply because of the passage of time, then no significant impacts would ever occur. We are skeptical that this simplistic assessment holds true.

Regardless, BLM's assertion that issuance of the El Segundo coal lease will somehow lead to no coal combustion impacts by virtue of the preexisting nature of coal combustion facilities ignores the fact that the coal, once burned, will produce air emissions, waste byproduct, and contribute to water pollution. Unless coal mined as part of the El Segundo coal lease somehow has physics-defying properties that enable it to be mined and combusted, yet produce no air, water, or waste byproducts, BLM has no basis to assert that the ongoing coal combustion activities pose insignificant impacts solely by virtue of their preexistence.

IV. The EA Fails to Adequately Analyze and Assess Air Quality Impacts

A. The EA Provides no Information on Emissions from Indirect Activities

The EA provides no emissions data from indirect activities related to the development of the El Segundo coal lease, including locomotive emissions, coal dust emissions from coal trains, emissions from conveyors, emissions from crushers, emissions from coal silos and train loading, vehicle traffic to and from the mine (both of heavy equipment and worker traffic), emissions from stationary internal combustion engines on-site (e.g., generators, conveyor engines, etc.), and emissions from mining activities in other parts of the coal mine. The EA does not address emissions from these activities raising concerns that the BLM has not adequately analyzed and assessed the direct and indirect air quality impacts of the El Segundo coal lease.

Although it is unclear why the BLM overlooked these emission sources, it appears that the BLM may believe that it was only obligated to analyze and assess only the air quality impacts associated with direct mining of the proposed lease. Indeed, the air quality analysis in Appendix D only addresses emissions associated directly with the mining of the El Segundo coal lease. It does not address emissions associated with any indirect activities and their impacts.

This is a significant flaw in the EA. NEPA requires federal agencies to analyze and assess indirect impacts. Here, the impacts of coal handling, processing, hauling, shipping, and even related mining activities at the El Segundo coal mine are clearly indirect impacts. Coal mined from the El Segundo coal lease will need to be processed and shipped by rail. Furthermore, before Peabody can even access the El Segundo coal lease, it will need to mine lands adjacent to the lease area.

The failure to address these emission sources means that the EA does not demonstrate that impacts to air quality, in particular national ambient air quality standards ("NAAQS") will not be significant.

B. The EA Does not Adequately Analyze and Assess PM_{10} Impacts

The EA asserts that NAAQS will be protected, yet discloses that a number of PM_{10} exceedances have occurred over the years. *See* EA at 3-3. The BLM, however, disregards these exceedances as "exceptional events." While it is unclear on what basis the BLM has concluded that these exceedances were somehow "exceptional," the Agency's claims appear dubious given that these exceedances have occurred so frequently. In fact, as the EA discloses, between 2008 and 2010, 15 exceptional events occurred, including 11 in 2010. The reasons cited include "high winds" and "temperature inversion." Given the frequently that these events occurs, it appears that they are not "exceptional," but rather normal.

Regardless, the EPA has promulgated rules and detailed guidance regarding the handling of air quality data influenced by "exceptional events." It does not appear as if BLM's assessment of whether the disclosed PM_{10} exceedances were truly "exceptional events" was guided by these rules and guidance. For example, EPA rules state that exceptional events do not include "stagnation of air masses or meteorological inversions, a meteorological event involving high temperatures or lack of precipitation, or air pollution relating to source noncompliance." 40 C.F.R. § 50.1(j). Here, according to the EA, two of the claimed "exceptional events" were due to inversions, which the EPA's rules explicitly state cannot be considered an "exceptional event." Furthermore, there is no disclosure in the EA as to whether the source was complying with any and all particulate matter control requirements. EPA rules also require that for an "exceptional event" to be valid, a state must solicit public comment on the claimed event and prohibits the submission of an "exceptional event" claim later than three years following the end of the calendar quarter in which the exceedance was recorded. *See* 40 C.F.R. § 50.14(c)(3). In this case there is no indication that New Mexico provided any public notice or opportunity to comment on any claimed "exceptional event" at the El Segundo coal mine, meaning that, contrary to the BLM's assertions otherwise, the recorded PM_{10} exceedances are not excusable.

C. The EA Does not Adequately Analyze and Assess Impacts to the Nitrogen Dioxide Ambient Air Quality Standards

The EA does not adequately analyze and assess impacts to the 1-hour nitrogen dioxide NAAQS because the BLM did not model the impacts to NO_2 concentrations. In the EA, the BLM simply asserts that impacts to the 1-hour NO_2 will "not increase." EA at 4-2. This is not an analysis or assessment of impacts. For one thing, it fails to shed any light on how current activities are affecting the 1-hour NO_2 NAAQS. For all we know, exceedances and/or violations of the 1-hour NO_2 NAAQS may already be occurring; simply "not increasing" these impacts does not mean that such impacts are insignificant. Furthermore, BLM's assertion is belied by the fact that mining the El Segundo lease will lead to more mining activity than would otherwise occur, meaning there would, in fact, be increased impacts to NO_2 concentrations. BLM's assertion otherwise defies its own disclosures in the EA. The EA clearly states that more mining will occur as a result of the El Segundo lease being issued, in some cases by more than a million tons annually.

Although the EA cites 1-hour NO_2 monitoring data showing compliance with the NAAQS, these monitors are all more than 100 miles away and provide no insight into the local impacts of mining operations to 1-hour NO_2 concentrations. As a short-term standard, the 1-hour NO_2 NAAQS is meant to assess health impacts near sources, not far. This is especially the case where stack heights, or the source of the emissions, are close to the ground. Here, it is highly unlikely that NO_2 emissions from the El Segundo mine will impact monitors more than 100 miles away. This further underscores the need for the BLM to conduct dispersion modeling. This should be not be a difficult task. The Forest Service recently prepared dispersion modeling to analyze the NO_2 impacts of oil and gas leasing and development on the Fishlake National Forest in Utah. *See* Exhibit 2, U.S. Forest Service, "Fishlake National Forest Oil and Gas Leasing Final Environmental Impact Statement, Supplemental Air Quality Modeling Report: 1-hr NO_2 and 1-hr SO_2" (Sept. 2012).

We are especially concerned over the impacts of blasting activities to the 1-hour NO_2 NAAQS. The EA indicates that blasting emissions just related to the development of the El Segundo coal lease could amount to 26.42 tons per year in 2020. Given that the EA estimates 12 blasts in the El Segundo coal lease area in 2020, this would mean a total of 2.2 tons of NO_2 for every blast that year. Given that blasts likely last an hour or less, this is an extremely large amount of air pollution in a very short amount of time, raising concerns that short-term impacts to ambient NO_2 concentrations could easily exceed the NAAQS. To put this into context, the Cholla power plant, which burns coal from the El Segundo mine, released 9,299 tons of nitrogen oxides in 2012. *See* Exhibit 3, EPA, "Emissions—Unit Level Data Report, Cholla" (Dec. 18, 2013). Assuming that the plant operated 8,760 hours that year (the maximum possible for the entire year), this would amount to 1.06 tons of nitrogen oxides per hour, more than 50% less nitrogen oxides per hour than what blasting produces. In other words, on an hourly basis, blasting produces more nitrogen oxides, including nitrogen dioxide, than coal-fired power plants.

The BLM must address deficiencies in the analysis of NO_2 impacts in order to support a FONSI.

V. The EA's Analysis and Assessment of Cumulative Impacts is Flawed

We have two primary concerns over the EA's analysis and assessment of cumulative impacts in Chapter 5 of the EA.

To begin with, the Cumulative Impacts Assessment Area does not appear to encompass the area that will be directly and indirectly impacted by the El Segundo coal lease. Specifically, this area appears only to encompass the area of northwestern New Mexico. It does not encompass areas in Arizona that will be impacted directly, indirectly, and cumulatively by coal transport and coal combustion. This is a significant flaw as the direct and indirect impacts of BLM's leasing action will not be confined just to northwestern New Mexico. As explained above, the direct and indirect impacts will extend to coal combustion activities in Arizona. Even the BLM acknowledges this in the EA. Without addressing potentially significant cumulative impacts in this area as well, the BLM has no basis to assert that, cumulatively, the impacts of the El Segundo coal lease will not be significant. Among the cumulative actions in Arizona that must be addressed are the operation and maintenance of power plants (including the Apache, Cholla, Coronado, Navajo, and Springerville power plants) and other industrial facilities (including natural gas compressor stations and the Catalyst paper mill).

Secondly, we are concerned that a basic perception underlying BLM's analysis of cumulative traffic, transportation, and other effects is fundamentally flawed. The BLM asserts in the EA that, "No cumulative effects to traffic and transportation are expected to occur, as there would be no increase in traffic levels, including use of rail lines, associated with the Proposed Action above the current baseline." EA at 5-7. It is specious for the BLM to argue that impacts will not be "increased." The EA itself discloses that development of the El Segundo coal lease will lead to the additional mining of up more than one million tons of coal annually by 2016. In 2017, it is expected the mine will reach a peak production rate of nearly 10 million tons annually. Development of the El Segundo coal lease will clearly lead to the transport of more coal than would otherwise be transported, as well as greater traffic and other impacts associated with the development of this added coal. Regardless, even if the El Segundo coal lease did not "increase" impacts, this does not mean there are no cumulative impacts associated with transportation, traffic, and other activities. We find it difficult to believe that coal is not currently being transported from the El Segundo mine to power plants in the southwest, and that this activity poses absolutely no impacts to the environment. Even if the El Segundo coal lease serves only to maintain existing and ongoing activities, this is an impact that must be addressed in the context of analyzing and assessing cumulative impacts.

The BLM must address these deficiencies in the analysis and assessment of cumulative impacts. The Agency must broaden its cumulative impacts assessment area and acknowledge that there will be increased transportation, traffic, and other impacts associated with the El Segundo coal lease and analyze and assess cumulative impacts accordingly.

VI. The EA Does not Address Potentially Significant Impacts to the Chaco Canyon Landscape

We are concerned that the EA does not adequately analyze and assess impacts to the nearby Chaco Culture National Historical Park, as well as Chaco Culture outliers. We are particularly concerned that the EA appears to not adequately analyze and assess visual impacts as observed from Chaco Canyon and the outliers, as well as analyze and assess how the proposed lease may impact the night skies of Chaco in light of the fact that the National Historical Park was recently certified as an International Dark Sky Park. *See* Exhibit 3, National Park Service, "International Dark Sky Park," website available at http://www.nps.gov/chcu/naturescience/darkskypark.htm (last accessed Dec. 18, 2013). Lights from the El Segundo coal mine would seem to pose potentially significant impacts to the ability of Chaco Culture to maintain its dark skies certification, as well as to continue to provide unmatched stargazing opportunities. The EA must at least address this new information and analyze and assess how mining of the El Segundo coal lease, including ongoing mining operations, will affect the dark skies around Chaco Culture National Historical Park.

VII. The BLM's Fair Market Value Assessment Appears Flawed

We are concerned that the BLM has not accurately analyzed the fair market value of the proposed lease. When the BLM originally sold the El Segundo coal lease, it accepted a bid of approximately 25 cents per ton. However, it appears that this bid is significantly lower than the actual value of the coal.

According to data from the Energy Information Administration ("EIA"), coal from the El Segundo mine has been selling for an average of $2.195 per mmBtu. This is based on the average of fuel cost reports available from EIA form 923 for 2012 and 2013. These forms are available at http://www.eia.gov/electricity/data/eia923/. Given that the average Btu content of the El Segundo coal lease is 9,300 per pound (*see* EA at 5-9), and that the amount of coal comprising the lease is 9.2 million tons, this means the value of the coal may be as high as $375,608,400.[3] This amounts to around a value of around $40.83 per ton for the El Segundo coal lease. This is 162 times higher than Peabody's bid on the El Segundo lease.

In light of this, it is difficult to understand how 25 cents per ton represents fair market value, or how 25 cents per ton ensures maximum economic recovery. To put this into context, 25 cents per ton is 162 times lower than the actual value of the coal. Although it is unclear what the cost of producing the coal is, Peabody has indicated that El Segundo is one of the most productive mines in the southwestern U.S. given its low overburden ratios. *See* http://www.peabodyenergy.com/content/277/Publications/Fact-Sheets/El-Segundo-Mine. It is unclear how 25 cents per ton amounts to fair market value given that the coal sells for 162 times

[3] Although interestingly, when the BLM proposed to sell the El Segundo lease, it disclosed the average Btu content was 9,856 Btu/pound. *See* 78 Fed. Reg. 41420 (July 10, 2013).

more than this price and given the productivity of the El Segundo mine. To this end, we request the BLM reassess the fair market value of the proposed coal lease and reassess whether 25 cents per ton truly ensures a fair return for the American public and maximum economic recovery.

Thank you for the opportunity to comment.

Sincerely,

Jeremy Nichols
Climate and Energy Program Director
WildEarth Guardians
1536 Wynkoop, Suite 301
Denver, CO 80202
(303) 437-7663
jnichols@wildearthguardians.org

Exhibit 1

Earthjustice, "Arizona and Coal Ash Disposal in Ponds and Landfills."

Arizona and Coal Ash Disposal in Ponds and Landfills

Summary:[1]

Plant	Operator	Site	County
Apache Station Combustion Waste Disposal Facility	Arizona Electric Power Coop Inc	10 ponds	Cochise
Cholla Power Station	Arizona Public Service Co	4 ponds	Navajo
Navajo (SRP) Power Station	Salt River Project Ag I & P Dist	landfill*	Coconino
Coronado Power Station	Salt River Project Ag I & P Dist	1 pond/landfill*	Apache
Springerville Generating Station	Tucson Electric Power Co.	landfill*	Apache
H Wilson Sundt Generating Station	Tucson Electric Power Co.	landfill*	Pima

*indicates one or more coal ash landfills.[2]

Amount of coal ash generated per year: 2.7 million tons. Arizona ranks 14th in the country for coal ash generation. [3]

The U.S. EPA has not yet gathered information on coal ash disposal in landfills, so a detailed breakdown is not yet available. However, according to a 2007 EPA risk assessment, two surface impoundments and landfills in Arizona—the Cholla station and the Springerville station—have no liners.[4]

Information on Arizona Coal Ash Ponds

Number of Coal Ash Ponds: 15 ponds at 3 plants.[5]

Pond Ratings: Nine rated "high hazard." One rated "significant hazard."[6]

Age of Ponds: 5 ponds are over 30 years old.[7] All ponds built in 1995 are rated "high hazard." The age of these ponds makes it unlikely that they have safeguards like liners and leachate collection systems.

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[1] United States Environmental Protection Agency (U.S. EPA). Database of coal combustion waste surface impoundments (2009). Information collected by EPA from industry responses to Information Collection Request letters issued to the companies on March 9, 2009.
[2] U.S. Department of Energy's Energy Information Administration, Form EIA-767, Annual Steam-Electric Plant Operation and Design Data. 2005.
[3] U.S. EPA and United States Department of Energy (U.S. DOE). *Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004* (August 2006).
[4] RTI International. *Human and Ecological Risk Assessment of Coal Combustion Wastes, Draft* (August 6, 2007), prepared for the US Environmental Protection Agency.
[5] U.S. EPA. Database of coal combustion waste surface impoundments (2009).
[6] *Id.*
[7] *Id.*

Capacity and releases: The EPA surface impoundment database contains storage capacity data for seven of the 15 ponds in AZ. For these seven sites, located at the Apache Station, the Cholla Station and the Coronado Station, storage capacity is 21,537 acre feet.
Damage Cases: According to the U.S. EPA damage case assessment, potential damage cases in Arizona include: [8]

- Arizona Public Service Co., Cholla Steam Electric Generating Station. "Monitoring data at this site show levels of sulfate, total dissolved solids, chloride, and fluoride in excess of their secondary MCLs. These exceedances are found in a well located directly at the foot of the fly ash pond. The affected aquifer has 'naturally poor water quality,' but no background or up-gradient data are available."[9]

[8] U.S. EPA. *Coal Combustion Waste Damage Case Assessments* (July 9, 2007).
[9] *Id.*

Exhibit 2

U.S. Forest Service, "Fishlake National Forest Oil and Gas Leasing Final Environmental Impact Statement, Supplemental Air Quality Modeling Report: 1-hr NO_2 and 1-hr SO_2" (Sept. 2012).

Fishlake National Forest

Oil & Gas Leasing Final Environmental Impact Statement

Supplemental Air Quality Modeling Report: 1-hr NO_2 and 1-hr SO_2

Prepared for:
US Forest Service
Fishlake National Forest
Contact: Rob Hamilton

Prepared by:
JBR Environmental Consultants, Inc.
7669 W. Riverside Drive, Suite 101
Boise, ID 83714
Contact: David Strohm
208.853.0883

September 2012

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Abbreviations and Acronyms

AP-42	US EPA Guidance document on air pollution emission factors
EIS	US Environmental Impact Statement
DEIS	Draft US Environmental Impact Statement
FEIS	Final US Environmental Impact Statement
EPA	United States Environmental Protection Agency
FLAG	Federal Land Managers' Air Group
ISCST3	US EPA Industrial Source Complex air quality model, version 3
MMbtu	Million British Thermal Units (btu); units of heat measurement
Mscf	Million standard cubic feet; measurement unit for gas volume
NOx	Nitrogen oxides
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
FNF	Fishlake National Forest
NO_2	Nitrogen dioxide
NWS	National Weather Service
O&G	Oil and Gas
PM_{10}	Particulate matter less than 10 microns in diameter
ROI	Radius of Impact
SOx	Sulphur oxides
SO_2	Sulfur dioxide
UDAQ	Utah Division of Air Quality
UDEQ	Utah Department of Environmental Quality
$\mu g/m^3$	Micrograms per meter cubed
USGS	United States Geological Survey
USFS	United States Forest Service
WRAP	Western Regional Air Partnership

1.0 PURPOSE

This modeling report describes an air quality modeling analysis prepared to address comments received by the Fishlake National Forest (FNF) on their Draft Oil & Gas (O&G) Leasing Environmental Impact Statement (DEIS) submitted in February 2010. The specific comment this report addresses is the request to evaluate 1-hour nitrogen dioxide (NO_2) and 1-hour sulphur dioxide (SO_2) impacts, which were not included in the February 2010 modeling analysis. This analysis is meant to act as an addendum to the initial modeling report submitted with the DEIS. As a result, this modeling effort will follow the general modeling methodologies outlined in the DEIS modeling report. That approach has been reviewed and commented upon by federal and State of Utah representatives.

Unlike a project specific modeling analysis, the modeling completed for this project utilizes a screening methodology to quickly estimate potential impacts of O&G development emissions at the leasing/exploration stage. This screening methodology was developed and verified for 1-hr nitrogen oxides (NOx) and sulphur oxides (SOx) for this project. The screening methodology will help Forest Service staff in their planning, by identifying whether impacts from potential future development scenarios will safely be below impact thresholds, or if further analysis will be required before air quality impacts can be shown to be within acceptable ranges.

The analyses described in this report will support the Final Environmental Impact Statement (FEIS) process by preparing a 1-hr NOx and SOx screening tool that land managers may use to estimate air quality impacts associated with potential development. The analyses are based upon conservative estimates of emissions from potential Oil & Gas activity and the atmospheric dispersion of those emissions. As a result of this conservatism, projects shown by this screening method to have impacts within acceptable ranges would clearly meet air quality impact limits in a site specific impact analysis. For all other potential future development of O&G activities identified in the leasing EIS, project specific air quality analyses would be required using appropriate project and site specific information in order to more closely identify potential impacts. While the screening method provides an efficient tool for land managers making leasing decisions it does not represent a full regulatory air quality impact analyses that may be required to permit future, individual O&G activities under existing state and federal air quality regulations.

The modeling analyses described in this report will only address 1-hour NOx and 1-hour SO_2 impacts and will act as an addendum to the modeling report provided with the FNF's DEIS.

2.0 BACKGROUND / OVERVIEW

2.1 Oil & Gas Leasing Activity

The FNF evaluated O&G leasing across its domain in a DEIS submitted in 2010. The proposed actions and alternatives in that EIS were structured to conservatively evaluate potential impacts from a range of O&G activities the United States Forest Service (USFS) considers reasonably foreseeable, and not any project specific development. The DEIS provided specific definitions of proposed actions and/or alternatives.

The analysis in this modeling report is meant to amend the DEIS modeling report to allow for the assessment of impacts for the new 1-hr NOx and 1-hr National Ambient Air Quality Standards (NAAQS). As with the previous modeling if the conservative analyses in this modeling report clearly documents impacts within acceptable ranges set by air quality regulations, Federal Land Manager's Air Group (FLAG) guidance, or a leasing EIS, then additional modeling or impact assessments may not be needed. If a future development scenario is proposed which cannot be shown by the screening tables to meet those acceptable impact thresholds, then the proposed development could not be justified by these screening analyses. Instead, any such development would require a follow-up National Environmental Policy Act (NEPA) analysis and refined air quality analyses that would include project and site specific information in order to further identify potential impacts.

2.2 Initial Screening Model Analysis

The initial aspect of the dispersion modeling analyses described here was to prepare a representative screening analysis that can be used by the USFS personnel to quantifiably estimate potential impacts of O&G exploration planning and leasing. The potential emissions associated with Oil & Gas exploration and possibly subsequent development of those resources are conservatively estimated. The dispersion of those emissions was also conservatively estimated using worst-case screening meteorological data develop in the USEPA's MAKEMET program. The result is a screening analysis that shows maximum potential impacts associated with a given level of Oil & Gas activity. The maximum potential impact estimates from the screening analyses can be compared to benchmark ambient air standards, increments, and thresholds in order to determine if the conservative screening analyses show that an action being considered meets state and federal impact limits. Because the screening analysis is based upon conservative assumptions, a site specific analysis of impacts associated with a specific proposal could show lower impacts than those conservatively estimated in the screening analyses presented here.

The results of these analyses are normalized sets of conversion factors in tables for various source / receptor elevation differences at 22 graduated source / receptor distances. The tables indicate the predicted impacts in $\mu g/m^3$ for each 1 lb/hr of emissions. The details of the conversion factor tables were described in the DEIS modeling protocol for this project after refinement with USFS Air Program Manager, Bud Rolofson. The screening values can be applied to subsequent O&G development scenarios by estimating the air emissions (in lbs/hr) anticipated from those scenarios and multiplying them by the table screening values to determine a screening estimate of potential ambient air quality impacts. Those impacts can be compared against applicable air quality standards, increments, and thresholds to provide an initial estimate of a range of management options based upon air quality impacts. Ambient air potential impact information will allow land managers to estimate the potential for air quality impacts for subsequent levels of O&G development projects.

2.3 Two Oil & Gas Development Scenarios for Evaluation of Initial Screening Table

After initial development of the screening model runs, the reasonableness of the screening tables were confirmed with site specific analyses of USFS identified potential development scenarios to ensure their reasonableness for development scenarios consistent with forest service (FS) expectations. The two potential development scenarios recommended to be considered are:

1. Scenario 1 -- Individual exploratory wells: over the next 15 years, 45 wells are estimated on the Fishlake NF. This scenario spans a period of three weeks for construction, three months of drilling activity, and two weeks of reclamation.
2. Scenario 2 -- A 10 to 15-well directional drilling development which features two to three well pads.

The USFS notes that primary energy development is expected to be for crude oil, however, natural gas could likely be found as well. The USFS has surmised gas will not be found in volumes that would support commercial development. Gas might be flared onsite or produced in quantities to either fuel onsite engines or support limited development, storage, and transport via trucks.

Air quality modeling was performed for each of these development scenarios to assess potential criteria air quality pollutant (1-hr NO_x, and 1-hr SO_2) concentrations. That information was used to confirm the representativeness, conservatism, and accuracy of the screening modeling analyses. Those specific development scenario model analyses confirmed the conservative nature of the screening runs in most scenarios by showing that predicted air quality impacts from actual development scenarios were lower than the conservative estimates from the screening tables prepared in this analysis. Therefore, impact estimates from the screening tables can be considered as conservative estimate based upon that level of activity as long as the activity occurs consistent with the assumptions included in the screening analyses.

3.0 MODELING METHODOLOGY

3.1 Brief Description of AERMOD Modeling Programs

AERMOD, which is utilized by Utah Division of Air Quality (UDAQ) to assess impacts for minor sources, was used to conservatively estimate impacts in the near field (within 50 kilometers of the activity being modeled). AERMOD also represents the United States environmental Protection Agency's (EPA) preferred model for impacts assessments within 50km of a facility. AERMOD was applied as recommended in USEPA's Guideline on Air Quality Models and consistent with USEPA's clarification memorandum for 1-hr NOx and SOx.

AERMOD does not include any air chemistry analyses; it simply tracks emissions without chemical transformations during transport in the near field based upon meteorological data from local observation stations.

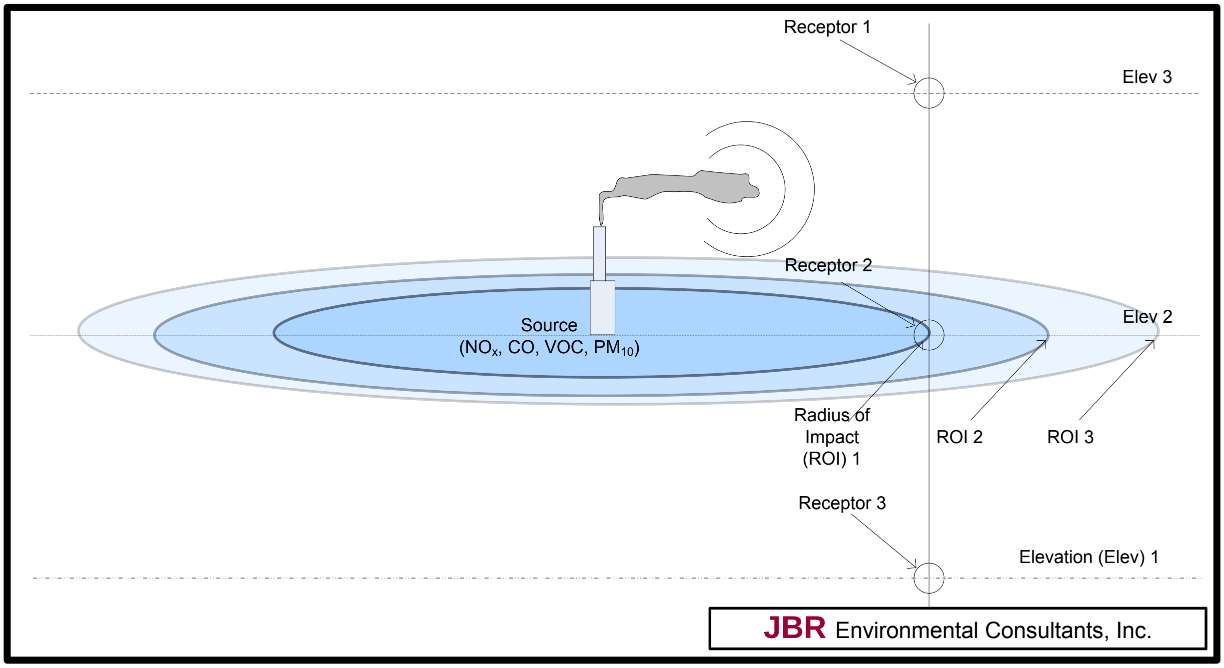
3.2 General Screen Approach for this Analysis

Figure 3.2-1 on the following page visually depicts the screening modeling approach for the AERMOD runs.

Impacts for each pollutant were evaluated at a set of predetermined elevations in relation to the source and radius of impact (ROI, circles of increasing radius centered around the source). In the screening table runs, seven elevation scenarios were considered - one more than proposed in the project's modeling protocol based upon comments received from UDAQ. The 22 ROI utilized were unchanged from those proposed in the DEIS modeling protocol. At the intersection of each of the seven elevations and the 22 ROIs, a receptor is identified. Receptors are defined as the locations where quantitative air quality impacts are predicted.

Various types of receptor grids can be used by defining points on a polar coordinate system (see Figure 6.0-1), a Cartesian (x-y) coordinate system, or a combination of both systems. The receptor locations are documented in the receptor network section below. Maximum model predicted impact values on each radius from the source were reported and included in the screening tables (see Appendix A).

Figure 3.2-1 Modeling Methodology



3.3 Testing Applicability of Initial Screening Table

To evaluate applicability of the screening table results, AERMOD modeling was also performed for the specific development scenarios defined in Section 2.0 of this report. Those specific development scenarios were modeled at locations the Fishlake NF identified as conceivable for O&G development.

The emission sources and emission rates for these runs were identified based upon expectations for future development provided by the Fishlake NF. The section below provides more detail on model emission sources. The model emissions were distributed across the development area consistent with USFS descriptions of the development scenarios.

4.0 MODEL SOURCE DATA

4.1 Equipment Considerations for Preparing Emission Inventories

Assessments of equipment needed to support oil exploration and/or oil field development with some possibility of gas resources were prepared generally, and also specifically, for the two development scenarios. An inventory of emissions from all emission sources identified to support the potential oil (and possibly gas) development was prepared. Conservative assumptions were made of the type, size, and number of pieces for each equipment type, consistent with guidance from the USFS and the USEPA. Although natural gas was not expected to be found in economical quantities, a heated oil/gas/water separator, a compressor to move developable gas, and a gas flare were assumed in each oil field development scenario.

As recommended by the USEPA, emissions from mobile and stationary combustion sources assume that engines associated with the potential development meet emission standards from recent EPA tiered emission limits. Generally, equipment was assumed to meet the minimum tiered emission requirements from approximately the last five years, allowing flexibility to the operator because of the comparatively small size of potential development activity anticipated. EPA reviewed and approved the engine emission estimates before the modeling analyses were performed. EPA indicated that more recent engines would likely be required for resource development larger in scale or concentration than the scenarios considered in this analysis.

Emission estimates assume that all vehicular travel is on unpaved surfaces, and that there is no electrical power service onsite, so all major equipment onsite is fossil fuel fired.

In the screening modeling analyses, all model sources were assumed to be collected at a central point, with grid origin with relative coordinates (0,0). That gridding allowed the screening model results to be used to estimate impacts from a variety of development options, from simple projects like an individual exploratory well to more complicated ones like expansive well field developments.

Table 4.1-1 below documents the types of equipment associated with air emissions under the screening model scenario. The emission data from the screening modeling analyses includes the total onsite emissions associated with potential development normalized at 1.0 pound per hour.[1] These emissions are allocated proportionally among equipment and emission stacks as point sources (stacks) or area sources (areas from which non-stack fugitive emissions like dust occur) consistent with regional development scenarios. To be conservative, the emissions profile shown here assumes oil extraction efforts for each scenario, with a small component consistent with gas flaring or processing. The screening model emissions were allocated in model emissions sources listed in Table 4.1-1 with associated stack parameters. The emissions values found in Table 4.1-1 represent the normalized screening emission rates. They represent the proportion of overall emissions of the pollutant from that source in the screening model, not the actual total emissions calculated for each piece of equipment.

[1] In the screening model, the emissions entry for each source represents the percentage of the emissions of that pollutant for that source. The sum of the normalized emissions for the entire development is 100%, or 1.00 lb/hr.

Table 4.1-1 Screening Model Sources and Source Parameters

Point Source ID	Source Description	Easting (X)	Northing (Y)	Stack Height	Temp	Exit Velocity	Stack Diam.	NOx	SO_2
		(m)	(m)	(ft)	(°F)	(fps)	(ft)	(lb/hr)	(lb/hr)
DRE	Drill Rig Engine	0.0	0.0	15.0	950.0	75.0	1	0.2950	0.0024
WP1	Well Pump	0.0	0.0	10.0	775.0	45.0	0.667	0.4610	0.9954
RICE / Turbine emission totals								0.7561	0.9978
Flare	Exploration Flare	0.0	0.0	85.0	1000.0	51.0	1.5	0.0384	0.0000
Flare	Production Flare	0.0	0.0	85.0	1000.0	51.0	1.5	0.0852	0.0000
HT1	Heater Treater	0.0	0.0	20.0	180.0	15.0	0.67	0.0332	0.0014
Use or Flare NG emission totals								0.1568	0.0014
DHY1	Dehydrator	0.0	0.0	30.0	200.0	8.0	1	0.0033	0.0001
CM1	Compressor Engine	0.0	0.0	25.0	760.0	95.0	1	0.0768	0.0007
NG development emission totals								0.0802	0.0008
Dust: Ground dist, vehicles, etc …				Release Height	Radius of Circle	Number of Vertices	Initial Vertical Dimen.		
Area Circle Source ID				(ft)	(ft)		(ft)		
	Fugitives	0.0	0.0	10.0	300.0		20	0.0070	0.0000
TOTAL EMISSIONS								**1.000**	**1.000**

► The uppermost shaded **table section** includes **stack emissions from reciprocating engines or turbines**. This emission category includes well pumps needed to extract oil as well as onsite well drilling rigs with diesel powered drilling engines. Consistent with emissions from regional oil development fields, the total onsite emissions from this source category represented the majority of emissions in the normalized screening model analysis. The emissions of SO_2 from the well pumps, approved by EPA reviewers, are conservative because they are from the US EPA Guidance document on air pollution emission factors (AP-42) emission factor guidance document from before recent efforts to reduce diesel fuel sulfur content. This is unlike the AP-42 emission factors for the larger well drilling engine which accounted for the low sulfur fuel that will be required during the project's operational phase.

► The first unhighlighted section includes **emissions associated with processing or using natural gas** expected to be found at least in small quantities in oil development fields. The total onsite emissions from this category make up about 10 percent of total emissions for most pollutants, though flaring could make up a larger percentage of emissions of sulfur dioxide and related compounds.

► The second shaded **section** includes **emissions** that would be expected with **low volumes of natural gas development**. Because developable natural gas is not expected in any appreciable volume, this category represents no more than two percent of the normalized 1.0 lb/hr emissions in this screening analysis.

► The lowest unhighlighted **table section represents onsite fugitive emissions** not vented through a stationary stack. This category includes fugitive dust emissions from vehicular exhaust and road dust, wind erosion from disturbed ground surfaces, and emissions including valve and tank leakage from handling resources and supplies. This category represents the major component for particulate emissions, but includes lower percentages of emissions from the other criteria pollutants studied (NOx and SO_2).

► The **bold red Total Emissions** in the highlighted bottom section under each pollutant's column show that cumulative screening model emissions for each pollutant were 1.0 pound per hour.

4.2 Evaluating Applicability of Model Results Screening

To evaluate applicability of the results from the screening modeling analyses, model source data sets were prepared for the specific well field development scenarios described as reasonable by local USFS personnel. The development scenario proposed by the Fishlake NF and modeled for this analysis is understood to be based upon the one existing energy field development there.

For the specific development scenario modeling analyses, model sources were identified and their emissions estimated based upon expected operating scenarios. They were allocated across the development field consistent with descriptions of each scenario provided by the NF. Each of the well field development scenarios were assumed to cover three to three and a half square miles, include specified numbers of wells footprints, and be operated consistent with scenario information provided by the NF. Each scenario included the volume of vehicular traffic expected to be needed to support those efforts.

4.3 References

References utilized in preparing the emission inventory included Utah State Government's "Analysis of Emissions from Oil and Gas Wells in Utah," the Oil & Gas Emission Inventory Workbook for the Uinta Basin Study, similar data from the Four Corners Oil & Gas Development Study, information from existing oil field development on the Dixie and Fishlake NF, and regional and national O&G field emission analyses and emission factors.

The Uinta Basin Study was especially helpful in supplying county-wide cumulative inventories of air emissions from recent development of O&G field development in Uinta and Duchesne Counties, Utah. That data, similar information from a Four Corners area study, and information about existing O&G field developments on the Dixie and Fishlake NFs provided the main basis for allocating the particulate matter less than 10 microns in diameter (PM_{10}), NOx, and SO_2 emissions among source types and categories in the model. This information was also used in the screening model runs to allocate the normalized 1 lb/hr of emissions proportionally among a variety of emissions sources, each with representative stack parameters and model emissions scenarios. This also helped in the quality assurance reviews of emissions inventories for the specific development scenario modeling analyses. It ensured that the model emissions were allocated among likely sources consistent with emission inventories from existing regional and local O&G developments.

Vehicle traffic volume estimates were prepared consistent with the "Highway Freight Traffic Associated with Development of Oil and Gas Wells" document prepared in 2006 by Daniel Kuhn of the Utah Department of Transportation.

4.4 Fishlake National Forest Development Scenario Modeling (Scenario 2)

The Fishlake NF development scenario model consisted of one, 10 to 15-well field on the Fishlake NF using directional drilling technology. The scenario described two or three production pads with each pad hosting up to five wells each, using directional drilling technology and an offset distance of one-half mile. The modeled scenario included 12 wells on three pads. Total actual ground disturbance including the discovery well, central production facilities pad, production pads, water disposal well, new access roads, reconstruction of existing roads, pipelines and power lines, and a truck loading facility is estimated at 122-acres. The area within the perimeter of the field including pads, pad access roads, and interior pipelines and power lines, and undisturbed areas between could vary, but is estimated at approximately 3.0 square miles using a well spacing of 160 acres (or ½ mile distance between down-hole well termini (directional drilling).

Table 4.5-1 on the following page documents the model emissions sources used to simulate emissions from this well field development scenario. As with the Dixie NF development scenario modeling analysis, on the ground considerations were added by distributing the model emission sources over three square miles. The sources were distributed in a manner consistent with the anticipated spread of the well field scenario at a conceivable location in the Fishlake NF, with variations in elevations across the development field and across the receptor network based upon actual topography in the modeled location. Figures in the next section of this document will provide a visual representation of their layout.

Table 4.5-1 Fishlake National Forest Directional Drilling Oil Field Development Scenario Model Sources and Source Parameters

Source ID	Source Description	Easting (X)	Northing (Y)	Base Elev	Stack Height	Temp	Exit Velocity	Stk Diam	NOx	SO_2
POINT SOURCES		(m)	(m)	(ft)	(ft)	(°F)	(fps)	(ft)	(lb/hr)	(lb/hr)
DRE	Drill Rig Engine	381195	4277425	2503	15	950	75	1.00	8.47	0.01
PFLAR	Production Flare	381145	4277415	2495	100	1000	55	1.50	3.55	0.00
COMPR	Compressor Engine	381245	4277415	2511	25	760	95	1.00	2.20	0.00
HT1	Heater Treater	380325	4276795	2464	20	180	15	0.67	0.05	0.00
HT2	Heater Treater	382265	4277435	2584	20	180	15	0.67	0.05	0.00
HT3	Heater Treater	380813	4278408	2487	20	180	15	0.67	0.05	0.00
HT4	Heater Treater	381195	4277465	2502	20	180	15	0.67	0.05	0.00
HT5	Heater Treater	380245	4276815	2465	20	180	15	0.67	0.05	0.00
HT6	Heater Treater	380345	4276815	2464	20	180	15	0.67	0.05	0.00
HT7	Heater Treater	380345	4276715	2464	20	180	15	0.67	0.05	0.00
HT8	Heater Treater	380245	4276715	2465	20	180	15	0.67	0.05	0.00
HT9	Heater Treater	382245	4277515	2592	20	180	15	0.67	0.05	0.00
HT10	Heater Treater	382345	4277515	2581	20	180	15	0.67	0.05	0.00
HT11	Heater Treater	382345	4277415	2572	20	180	15	0.67	0.05	0.00
HT12	Heater Treater	382245	4277415	2583	20	180	15	0.67	0.05	0.00
DHY1	Dehydrator	380793	4278488	2480	30	200	8	1.00	0.05	0.00
DHY2	Dehydrator	380893	4278488	2470	30	200	8	1.00	0.05	0.00
WP1	Well Pump	380893	4278388	2492	10	775	45	0.67	0.66	0.21
WP2	Well Pump	380793	4278388	2493	10	775	45	0.67	0.66	0.21
WP3	Well Pump	381195	4277425	2503	10	775	45	0.67	0.66	0.21
WP4	Well Pump	381145	4277415	2495	10	775	45	0.67	0.66	0.21
WP5	Well Pump	381245	4277415	2511	10	775	45	0.67	0.66	0.21
WP6	Well Pump	380325	4276795	2464	10	775	45	0.67	0.66	0.21
WP7	Well Pump	382265	4277435	2584	10	775	45	0.67	0.66	0.21
WP8	Well Pump	380813	4278408	2487	10	775	45	0.67	0.66	0.21
WP9	Well Pump	381195	4277465	2502	10	775	45	0.67	0.66	0.21
WP10	Well Pump	380245	4276815	2465	10	775	45	0.67	0.66	0.21
WP11	Well Pump	380345	4276815	2464	10	775	45	0.67	0.66	0.21
WP12	Well Pump	380345	4276715	2464	10	775	45	0.67	0.66	0.21

Source ID	Source Description	Easting (X)	Northing (Y)	Base Elevation	Release Height	Horiz Dim	Vert Dim	NOx	SO_2
VOLUME SOURCES		(m)	(m)	(ft)	(ft)	(ft)	(ft)	(lb/hr)	(lb/hr)
ORD1	outer road	381195	4276306	2484	2.0	100	6.0	0.075	
ORD2	outer road	380641	4276454	2477	2.0	75	6.0	0.075	
ORD3	outer road	380235	4276860	2465	2.0	75	6.0	0.075	
ORD4	outer road	380086	4277415	2471	2.0	100	6.0	0.075	
ORD5	outer road	380235	4277969	2498	2.0	75	6.0	0.075	
ORD6	outer road	380641	4278375	2524	2.0	75	6.0	0.075	
ORD7	outer road	381195	4278524	2490	2.0	100	6.0	0.075	
ORD8	outer road	381750	4278375	2542	2.0	75	6.0	0.075	
ORD9	outer road	382156	4277969	2586	2.0	75	6.0	0.075	
ORD10	outer road	382304	4277415	2576	2.0	100	6.0	0.075	
ORD11	outer road	382156	4276860	2564	2.0	75	6.0	0.075	
ORD12	outer road	381750	4276454	2494	2.0	75	6.0	0.075	
IRD1	inner road	380883	4276752	2478	2.0	75	6.0	0.075	
IRD2	inner road	380533	4277102	2480	2.0	75	6.0	0.075	
IRD3	inner road	380533	4277727	2504	2.0	75	6.0	0.075	
IRD4	inner road	380883	4278077	2497	2.0	75	6.0	0.075	
IRD5	inner road	381508	4278077	2545	2.0	75	6.0	0.075	
IRD6	inner road	381858	4277727	2562	2.0	75	6.0	0.075	
IRD7	inner road	381858	4277102	2525	2.0	75	6.0	0.075	
IRD8	inner road	381508	4276752	2527	2.0	75	6.0	0.075	

Source ID	Source Description	Easting (X)	Northing (Y)	Base Elev	Rel Ht	Radius of Circle	Vert Dim	NOx	SO_2
		(m)	(m)	(ft)	(ft)	(ft)	(ft)	(lb/hr)	(lb/hr)
WELPAD1	Disturbed area - well pad	380295	4276765	2464	0	282.7	2.0		
WELPAD2	Disturbed area - well pad	382295	4277465	2584	0	282.7	2.0		
WELPAD3	Disturbed area - well pad	380843	4278438	2485	0	282.7	2.0		
CENTPROC	50 acres dist center proc	381195	4277415	2503	0	832.6	2.0		

4.5 Fugitive Emissions in the Development Scenario Modeling

The development scenario model runs include area and/or volume sources to assess the impacts of criteria pollutant emissions from vehicular traffic. The onsite emissions were evenly distributed around the facility in the model, with concentrations relatively even across the area. This is considered conservative in this analysis, where the nearest receptors are 0.25 kilometers (0.155 miles) away, closer to the center of activity than some of the wells. The percentages of overall traffic emissions that occur within the project boundary, as opposed to outside that boundary, were estimated high. Road and disturbed area emissions occurring outside the identified project area are included in the emissions inventory, but their impacts were not modeled.

5.0 MODEL FACILITY AND SOURCE LAYOUT

The emissions scenarios for the screening table runs included eight model emission sources: seven point sources, and a fugitive area source. These runs were scaled to be representative of actual emissions from anticipated O&G development.

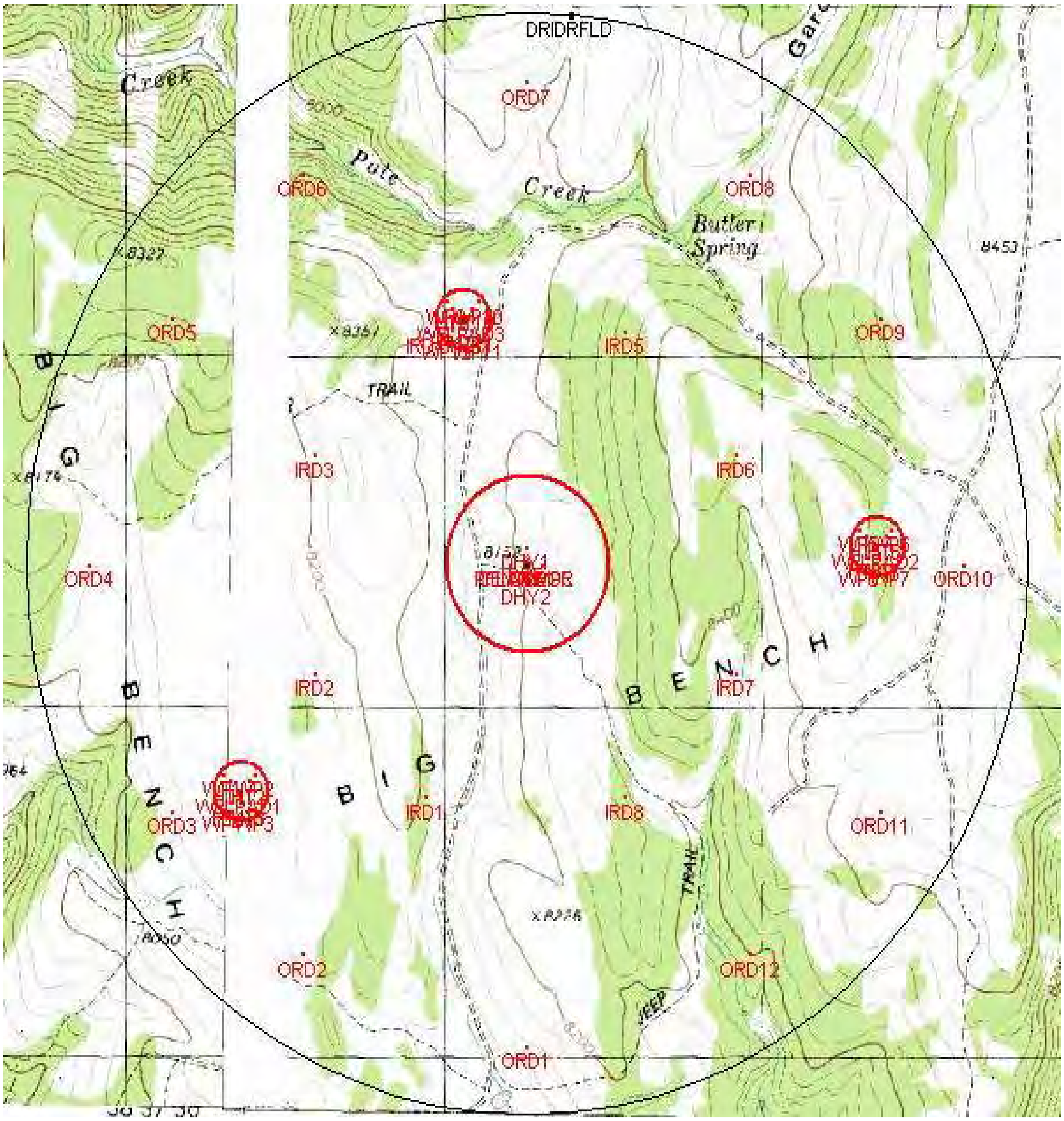
The screening tables prepared from the screening runs were checked for accuracy. The results were compared to the development scenario runs with model emissions laid out using on the ground locations in the Fishlake NF. Those model scenarios were based upon development scenarios determined by the USFS. The methodology for setting up and laying out these specific development scenario model runs is described below. These runs also assisted in defining model source data for the screening table runs.

Building downwash was not considered because the nearest receptors were well beyond all building or structure cavities. While actual locations may vary within the NF, the site selected was chosen at random, with a relatively flat area to locate the well field being the only criteria.

5.1 Fishlake National Forest Well Field Layout

Based on USFS development expectations, the 10 to 15 well Fishlake NF directional drilling oil field development model scenario featured 12 well pads over a small area, with potentially concentrated activity in the vicinity of each well. Figure 5.2-1 shows the representative AERMOD model layout for the hypothetical 12-well directional drilling oil field that was used as one of the specific development scenarios. The black circle represents a 3-square mile area boundary for the entire field. The underlying topographic map shows the hypothetical location modeled at Big Bench on the Joseph Peak United States Geological Survey (USGS) topographic map, approximately eight miles WSW of Joseph, Utah in the Fillmore District.

Figure 5.2-1 AERMOD Model: FNF 12-Well Directional, Drilling Field Scenario Facility Layout



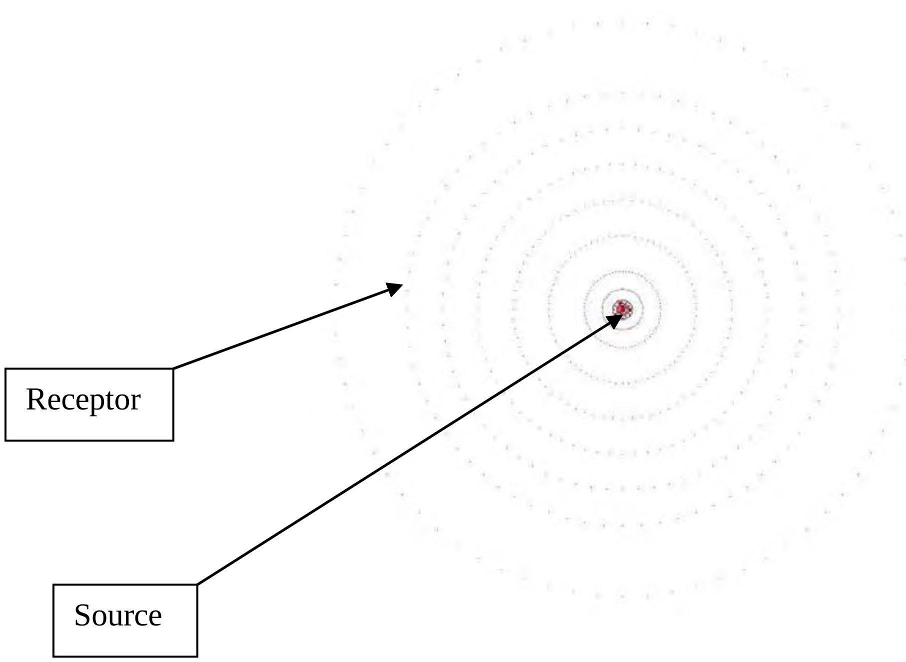
5.2 Exploratory Well Development Scenario (Scenario 1) Layout

The exploration development scenario model includes all emissions within an area consisting of a 5.9 acre pad with 9 to 10.7 acres of road and other surface disturbances around or atop the pad. Given that the nearest receptor was 250-meters away, the screening scenario with all sources collocated was assumed to be representative of an isolated exploratory oil well.

6.0 MODEL DOMAIN, MAPPING, AND RECEPTOR NETWORK

The model receptor network extends to 50 kilometers (km) from the area of activity. The receptor network for the analyses includes rings of receptors around the activity area at distances of 0.25, 0.5, 1, 2.5, 5, 10, 15, 20, 25, 30, 40 and 50. km (Figure 6.0-1). Receptors were placed at 5 degree intervals around the receptor rings within 50. The figure below shows the model receptor network. The model domain was set conservatively beyond the furthest extent of the receptor network.

Figure 6.0-1 Model Receptor Network



AERMOD was used for pollutant concentrations within 50 km (approximately 31 miles) of the activity area, consistent with UDAQ air quality modeling guidance.

6.1 Receptor Network

The receptor network for the screening modeling included seven source/receptor elevation differences. Separate model runs for each elevation difference scenario were performed with receptors at 2,500, 1,000, 500, and 100 feet above the source elevation, at the same elevation as the source, and at 1,000 and 2,500 feet below the source. These elevation difference scenarios include the five described in the modeling protocol, plus two more with receptors 500 feet and 100 feet above the model sources. Those added receptor elevations were based upon UDAQ comment that this elevation can often have highest impacts due to close proximity to the mean plume height.

In the case of the specific development scenario model runs, receptors were set at actual elevations corresponding to the distance rings described for the screening runs. The elevations of those receptors were calculated from USGS National Elevation Dataset (NED) data for receptors at each receptor ring distance (see Figure 6.0-1).

The ambient air boundary (point beyond which the public has access) for the specific development scenario model runs in the June 2008 version of this modeling report was the edge of the activity area (the 3-square mile area for the Fishlake NF directional drilling scenario). Based on agency comments, the analysis conducted in this current version of this modeling report refined the receptor network to begin at the fence surrounding the central processing area, assuming that the public could have access to areas beyond there, including around the well pads.

7.0 METEOROLOGICAL DATA

The normalized model analyses used to prepare the screening tables utilized AERMOD-based screening meteorological data files generated with the USEPA MAKEMET program. The inputs utilized in the MAKEMET program are summarized in Table 7.0-1 below.

Table 7.0-1 Proposed Physical Parameters for the Project Area

Parameter	Value
Minimum Wind Speed	0.5 m/s
Anem. Height	10 m
Number of Wind Directions	36
Starting Wind Direction	0 Degrees
Clockwise Increment	10 Degrees
Max and Min Temperature	273 and 390 K
Albedo	0.22
Bowen Ratio	0.65
Surface Roughness Length	0.504

For the Fishlake 12-well directional drilling scenario analyses, AERMOD model-ready meteorological data files for Milford, UT were provided by UDAQ. The data file, for years 2005-2009, consists of KMLF ASOS Station surface characteristics data merged with 1-minute ASOS (1/1/05-3/4/05 no 1-minute ASOS used; 3/05-12/09 1-minute ASOS used) and Desert Rock, NV upper air data.

8.0 LAND USE CLASSIFICATION AND AREA PHYSICAL CHARACTERISTICS

Rural dispersion coefficients are assumed to be appropriate for all locations where project development is anticipated. AERMOD defaults, including regulatory default options, were used. The USEPA AERSURFACE program was used to develop representative input variable for use in MAKEMET for the screening analysis. These values are summarized in Table 8.0-1 below.

Table 8.0-1 Proposed Physical Parameters for the Project Area

Parameter	Value
UTM Easting	381200.0 m
UTM Northing	4277400.0 m
Study Area	5.0 km
Temporal Resolution	Annual
Snow Cover	Yes
Reassign Months	No
Airport	No
Surface Moisture	Average

9.0 MODELING RESULTS

9.1 Screening Modeling

The results of the screening modeling analyses were translated into a set of screening tables as described in the DEIS modeling protocol. The pollutant concentration screening runs were prepared using a MAKEMET screening meteorological data file. The resulting screening tables conservatively estimate the maximum impact per pound per hour of emissions of 1-hr NOx and 1-hr SO_2 at a variety of distances from the proposed activity and elevations differences between the activity area and receptor.

Model results from the Fishlake verification scenario runs were used to perform quality assurance checks on the screening table initially prepared from screening modeling results. As a result of those quality assurance checks, specific recommendations were made for applying the screening table entries for near field short term NO_2 concentrations (the reasoning behind those refinements is discussed in Section 9.1 of this report).

The intention in preparing these criteria pollutant impact screening table is to conservatively estimate the potential impact and confirm, through the specific development scenario model analyses, that the screening process would not underestimate the actual impacts. With that verification, the screening table results can be used to make an initial check on compliance with applicable impact limits. If screening impact estimates from a development action show compliance with applicable impact limits for all receptors, as long as that development action was planned consistent with the assumptions included in the screening analysis, it would not be expected to show any air quality impact concerns with a site and development specific air quality impact analysis. If screening impact estimates from a development action do not show compliance with applicable impact limits for all receptors, that development action cannot be justified by the screening analysis. That development action might require stronger emission control or mitigation conditions, or might be justified by a site and development specific air quality impact analysis (which would remove some of the conservatism inherent in the screening analysis).

Screening tables are presented in Appendix A for each parameter modeled: 1-hr NOx and 1-hr SO_2. The details of the specific development scenario model runs, analyses of results, and screening table usage refinements made as a result of those specific development scenario model runs are described below.

Each Appendix A table shows maximum predicted impacts at each receptor ring distance for each source / receptor elevation difference scenario. The impacts included in the tables are normalized, based upon one pound per hour emissions. The normalized impacts can be used to estimate the potential impact of various O&G development scenarios considered in the Fishlake NF. Using the pound per hour emissions rate from any proposed project, the screening impact can be estimated by multiplying the screening table impact in Appendix A (in µg/m^3 per pound per hour emission) by the projected emission rate (in pounds per hour) for the project under consideration. The documentation clarifies that this is a screening tool for planning, leasing, and exploration estimates and conveys what level of development will require subsequent NEPA and/or air permitting action.

9.2 Development Scenario Verification Model Runs

As noted earlier, after the screening model runs, one potential development scenario described by the Fishlake NF was modeled to assess concentrations of 1-hr NOx and 1-hr SO_2. The activity was set at an arbitrarily chosen, conceivably developable location on the Fishlake NF. The location was chosen based upon the O&G production potential, where such information was available; otherwise they were selected by air quality scientists as topographically representative sites where development could occur.

Receptors were placed in 12 rings around each of these development scenarios, at intervals consistent with the screening modeling receptors. Receptor elevations in the specific development scenario modeling used actual elevations from USGS NED data. The primary goal was to estimate modeled impacts from the identified potential development scenario laid out in an area where it could conceivably occur. Another goal was to check if modeled impacts, at receptors set at actual locations in rings surrounding that development, were consistent with those predicted at those locations by the screening tables developed. As noted under the Model Receptor discussion, receptors were set assuming the outer edge of the developed area would be the ambient air boundary (the nearest location to which the public has access), which began at the fence of the central processing area.

Figure 5.2-1 above show the layout of the model for the multi-well scenario, and shows the actual location used for the specific development scenario modeling run analysis. Table 4.5-1 above shows the model source parameters used to simulate emissions from each scenario.

As noted under the meteorological data description, verifications for the Fishlake NF 12-well drilling scenario were performed using five years of meteorological data from Milford, UT.
For the above comparison, the maximum 8th highest maximum daily 1-hr value for each year averaged for all years for 1-hr NOx and the maximum 4th highest maximum daily 1-hr value for each year averaged for all years for 1-hr SO_2 were compared to the screening table result (see Appendix A).

The specific development scenario modeling run was considered as a realistic test of potential maximum impacts from the scenario modeled, even if the local wind patterns were not consistent with one of the meteorological data sets, since the results represent the conservative model predicted impacts from a variety of different wind flow patterns.

The goal of the verification process was to ensure that the screening tables produced conservative estimates of potential impacts (that they did not under predict impacts, which could result in problems if they were used for planning purposes), and that they were reasonable enough in estimating possible impacts to be potentially valuable planning tools.

"Model predicted maximum impacts" for each development scenario were prepared through the specific development scenario model runs described. For each meteorological data set modeled, the design value impact for each pollutant and each regulatory averaging period was calculated at each receptor distance up to 50 kilometers. The actual elevations of the receptors where the maximum model predicted impact occurred were documented and the source / receptor elevation difference calculated. Those maximum predicted impacts at each receptor ring were compared to the impact value estimated from the screening tables for the source / receptor elevation difference. Mean source elevations were used for the development scenario, which included real world considerations of elevation variation across the well field. This data set provided quality assurance checks for a good percentage of the values on the screening table. Verification receptors lower than the source elevations occurred more than those with higher elevations than the source. This occurred because the locations chosen for the specific development scenario model analyses had comparatively high elevations. However, there were still sufficient results to provide direct checks to almost half of the screening table results for receptors higher than the source elevation.

A representative section of the comparisons of the specific development scenario results with screening table results is included in Appendix B. Those verification analyses showed that the results from the screening table were quite conservative (overestimated values from specific development scenario analyses) for the closer receptors (especially those less than five miles from the development activity) and for long range transport (receptors more than 30 kilometers from the development activity). The exception to this is for 1-hr NOx impacts at receptors 40 km or more from the development activity. At these locations, the screening tables underestimate values from the specific development scenario. In the near field, this conservatism is because the screening runs had all emissions in one location, while actual field development spread the emissions (and hence impacts) over a larger footprint. This effect was minimized by starting the receptor network at the central processing area, and including the well fields in ambient air (accessible to public access). The screening scenario assumed very concentrated emissions that resulted in higher potential maximum impact predictions than those predicted from a well field scenario that spread activity over a few square miles. That concentration of emissions in the model runs supporting the screening table would seem to be appropriate for individual wells, as in an isolated exploratory well. Nonetheless, it is potentially conservative when considering emissions spread over a well field.

9.3 Specific Development Scenario Model Results and Verification against Screening Table Estimates

For 1-hr SO_2 impacts, verification efforts showed conservatism in the screening tables for all distances (receptors between 2.5 and 50 km), with the screening tables over-predicting impacts from 14% to 73% higher than the verification run impacts.

For 1-hr NOx impacts, the verification efforts showed conservatism in the screening tables for receptors between 2.5 km and 30 km of the source. Beyond 30 km, for receptors both near and well below the mean source elevation, the verification runs indicate that the screening tables under-predict NOx concentrations by up to 20%. However, the verification model run predicted impacts at 40 km and 50 km are 50% and 69% below the SIL, respectively, and represent only

2-3% of the 1-hr NOx NAAQs (188 ug/m^3). Therefore, at distances beyond 30 km, although the screening tables under-predict impacts, it is unlikely that actual development scenarios would approach the NAAQs.

9.4 Screening Model Results Interpreted for US Forest Service Identified Potential Development Scenario Impacts

For each of the three potential development scenarios described in Section 2.0, the equipment assumed to be operating to support the scenario development is described here. Also, the screening table data is interpreted consistent with emissions from that equipment at anticipated operational levels to estimate maximum potential impacts. Those impact projections are conservative because they are based upon conservative emission source layout and dispersion conditions.

9.4.1 Scenario 1: Exploratory Drilling

This scenario is assumed to include the following activities that affect air quality:

- Construction of 5.5-acre drilling locations.
- A diesel fuel fired drill rig engine with emissions based upon 13.5 tons NOx per well reported in the Western Regional Air Partnership (WRAP) Oil & Gas Emission Inventory prepared in December 2005 by Environ and the 2005 Wyoming field survey from which that data was developed, with actual emissions adjusted downward to be compliant with recent tiered engine requirements, and SO_2 emissions consistent with AP-42 assuming the 15ppm sulfur content in diesel scheduled to be required during the operational phase.
    - The WRAP study indicated the mean drilling time is approximately 90 days per well, continuously around the clock except for maintenance. Therefore, the longer term average impact predictions effectively assume four wells drilled back to back in relatively close proximity to each other.
- Construction of 1.1 miles of new access roads.
- Support traffic to supply, maintain, and staff the drilling effort.
- A low volume of flaring of natural gas during exploration, equal to 100 Mscf per year.

Table 9.4-1 below documents the predicted 1-hr NO_2 and 1-hr SO_2 concentrations at a variety of distances for three elevation difference scenarios. A more complete set of tables featuring more elevation differences and more receptor rings are included in Appendix A.

Table 9.4-1 Screening Impacts Predicted with the Exploratory Drilling Scenario

Distance from Operating Area to Receptor (km)										
		1 (km)	2.5 (km)	5 (km)	10 (km)	15 (km)	20 (km)	30 (km)	40 (km)	50 (km)
Receptors 2500 feet above source										
NO_2	1 hour	8.58	5.86	4.75	2.96	2.10	1.60	1.04	0.73	0.54
SO_2	1 hour	0.015	0.010	0.008	0.005	0.003	0.003	0.002	0.001	0.001

Distance from Operating Area to Receptor (km)										
		1 (km)	2.5 (km)	5 (km)	10 (km)	15 (km)	20 (km)	30 (km)	40 (km)	50 (km)
Receptors 500 feet above source										
NO_2	1 hour	10.97	7.13	5.45	3.326	2.348	1.782	1.148	0.801	0.602
SO_2	1 hour	0.020	0.011	0.008	0.005	0.003	0.003	0.002	0.001	0.001

Distance from Operating Area to Receptor (km)										
		1 (km)	2.5 (km)	5 (km)	10 (km)	15 (km)	20 (km)	30 (km)	40 (km)	50 (km)
Receptors at same elevation as source										
NO_2	1 hour	54.6	24.6	14.7	7.2	4.4	3.1	2.2	1.6	1.2
SO_2	1 hour	0.11	0.05	0.03	0.01	0.01	0.01	0.00	0.00	0.00

Distance from Operating Area to Receptor (km)										
		1 (km)	2.5 (km)	5 (km)	10 (km)	15 (km)	20 (km)	30 (km)	40 (km)	50 (km)
Receptors 1000 feet below source										
NO_2	1 hour	41.0	18.5	11.0	5.4	3.3	2.3	1.6	1.2	0.9
SO_2	1 hour	0.08	0.04	0.02	0.01	0.01	0.00	0.00	0.00	0.00

Units for NOx and SO_2 concentrations are $\mu g/m^3$

Screening table and model results show air quality impacts concentrated in the near proximity of an isolated exploratory well drilling operation. Air concentrations of 1-hr NOx fall below the EPA defined significant impact levels (SIL) by ten kilometers (6.2 miles); concentrations of 1-hr SO_2 are below the SIL at all distances from the source. Screening tables show that compliance with NAAQS would be assured with the background concentrations expected in potential development areas.

9.4.2 Scenario 2: 12-Well Directional Drilling Development

This scenario is assumed to include the following activities that affect air quality:

- Construction of three 5.5-acre drilling locations.
- One diesel fuel fired drill rig engine with emissions based upon the 13.5 tons NOx per well reported in the WRAP Oil & Gas Emission Inventory prepared by Environ and the 2005 Wyoming field survey from which that data was developed, with actual emissions adjusted downward to be compliant with recent tiered engine requirements, and SO_2 emissions consistent with AP-42 assuming the 15ppm sulfur content in diesel scheduled to be required during the project's operational phase.
    - The WRAP study indicated the mean drilling time is approximately 90 days per well, continuously around the clock except for maintenance. Therefore, the longer term average impact predictions effectively assume four wells drilled back to back in relatively close proximity.
- Construction of five miles of new access roads.

- Support traffic to supply, maintain, and staff the drilling and pumping effort.
- Six 1.0 MMbtu/hr heater / treater separators, two at each well pad.
- Twelve diesel powered 100 hp well pumps to extract oil, one for each well.
- One 0.5 MMbtu/hr dehydrator and one 500 HP compressor processing a low volume of natural gas at partial capacity.

Diesel well pumps are assumed because the development sites are expected to be remote from the electric power grid. Though a slight amount of natural gas production is included, producible natural gas is not routinely expected and is not anticipated in sufficient quantity to power the well pumps.

Table 9.4-2 on the following page documents the predicted 1-hr NO_2 and 1-hr SO_2 concentrations at a variety of distances for three elevation difference scenarios.

Table 9.4-2 Screening Impacts Predicted with the 12-Well Directional Drilling Scenario

Distance from Operating Area to Receptor (km)										
		1 (km)	2.5 (km)	5 (km)	10 (km)	15 (km)	20 (km)	30 (km)	40 (km)	50 (km)
Receptors 2500 feet above source										
NO_2	1 hour	19.98	13.65	11.06	6.89	4.89	3.73	2.42	1.70	1.25
SO_2	1 hour	3.838	2.595	1.971	1.190	0.839	0.638	0.414	0.291	0.213

Distance from Operating Area to Receptor (km)										
		1 (km)	2.5 (km)	5 (km)	10 (km)	15 (km)	20 (km)	30 (km)	40 (km)	50 (km)
Receptors 500 feet above source										
NO_2	1 hour	25.56	16.61	12.69	7.748	5.469	4.151	2.673	1.866	1.403
SO_2	1 hour	5.172	2.677	2.051	1.238	0.872	0.663	0.428	0.300	0.220

Distance from Operating Area to Receptor (km)										
		1 (km)	2.5 (km)	5 (km)	10 (km)	15 (km)	20 (km)	30 (km)	40 (km)	50 (km)
Receptors at same elevation as source										
NO_2	1 hour	127.3	57.4	34.2	16.7	10.3	7.3	5.1	3.8	2.8
SO_2	1 hour	26.92	12.48	7.38	3.50	2.08	1.44	1.11	0.82	0.60

Distance from Operating Area to Receptor (km)										
		1 (km)	2.5 (km)	5 (km)	10 (km)	15 (km)	20 (km)	30 (km)	40 (km)	50 (km)
Receptors 1000 feet below source										
NO_2	1 hour	95.5	43.1	25.7	12.6	7.7	5.3	3.8	2.8	2.1
SO_2	1 hour	20.19	9.36	5.53	2.63	1.56	1.08	0.84	0.61	0.45

Units for NOx and SO_2 concentrations are $\mu g/m^3$

One hour NOx impacts for a receptor at the same elevation as the source, within one kilometer of the source conservatively estimated from the screening table are shown to approach but not exceed the NAAQS with anticipated background concentrations added in the immediate vicinity of development activity. However, 1-hr NOx impacts for all other distance/source-receptor elevation differences and all 1-hr SO_2 impacts are estimated by screening to be well below the NAAQs standards with anticipated background concentrations added in. Air impacts for both pollutants fall below the respective SILs beyond 20 km. Because the impacts are shown to exceed the SIL at receptors closer than 20km to the source, this screening analysis cannot rule out the need to perform a cumulative impact analysis for 1-hr NOx or 1-hr SO_2.

The conservatism in the screening tables is shown by the results of the verifications prepared from modeling runs for potential development operational scenarios. Specific development scenario modeling analyses with realistic layout of equipment in potentially sensible locations and representative meteorological data indicate low probability of exceeding NAAQS, increments and/or thresholds nearby. Specific development scenario modeling results show that actual development scenarios that do not pass the screening tests could be shown to have air quality impacts within acceptable limits with refined air quality modeling. The specific development scenario model analyses give only an indication of the extent to which impacts from refined modeling could be lower than those estimated from the screening tables.

The emission inventory for this analysis was conservative in that it assumed one new well was being drilled while the full field is operating, and also assumed that diesel pumps would be used at each well head. NOx and SO_2 impacts would decrease by approximately 20 percent if either no well drilling occurred simultaneously with the operation of 12-wells, or if enough natural gas was recovered onsite to fuel the well pumps. NOx and SO_2 impacts would be approximately 90 percent lower if electric power lines brought power onsite, and no fuel was needed to operate the well pumps.

9.5 Screening Table Summary

These estimates of potential impacts are based upon emission profiles consistent with the recommendations of the FNF, the USEPA, and the (Utah Department of Environmental Quality (UDEQ), and with the NEPA analysis and associated requirements or mitigation measures defined in the EIS. These predicted distances to regulatory threshold impact limits are only for gauging if a more detailed analysis or a cumulative impact analysis should be considered. The model and screening tables can be used as in the example given in Table 9.4-2 to gauge the need for cumulative impact analysis.

9.5.1 Screen Table Conservatism

In summary, the verification process described above and documented in Appendix B resulted in demonstrating that the results in the screening tables were conservative, with the exception of 1-hr NOx impacts beyond 30 km.

As discussed in Section 9.3 above, beyond 30 km the verification runs indicate that the screening tables under-predict NOx concentrations by up to 20%. However, with verification model predicted impacts of 1-hr NOx approximately 2-3% of the NAAQs at these distances, it is not anticipated that impacts from any actual development scenario would exceed the NAAQs at these distances.

These analyses reveal that screening tables can be used to prepare conservative assessment of impacts of any specific action or alternative consistent with the assumptions included. Specific development scenario analyses confirm that when applied to representative potential development scenarios (consistent with the assumptions documented for the screening analysis), the screening tables generally do not under predict impacts predicted by site and project impact analyses (with the caveat of 1-hr NOx beyond 30 km, as discussed above).

9.5.2 Cumulative Impact Analyses

Assuming the interim SIL represents the future Class 1 SIL, the screening analysis for a single exploration well (Scenario 1), shows the need to perform a cumulative impact analysis for 1-hr NOx for developments within 10 km of a Class 1 area. All Scenario 1 estimated impacts for 1-hr SO_2 are below the SIL, therefore, no cumulative impact analysis would be required. The screening analysis for the “typical 12-well field” scenario (Scenario 2) shows the need to perform a cumulative impact analysis for 1-hr NOx for developments within 20 km of a Class I area and within 5 km of a Class I area for 1-hr SO_2.

APPENDIX A

Dixie and Fishlake National Forests

Screening Tables for Prompt Initial Estimates of

Likely Impacts from Oil and& Gas Development

SO_2		Distance from Operations to Receptor (km)											
		0.25	0.5	1	2.5	5	10	15	20	25	30	40	50
Receptor Elevation (ft) compared to Source Elevation	2500												
	1hr ave (ug/m3)	2.20	1.75	1.55	1.05	0.80	0.48	0.34	0.26	0.20	0.17	0.12	0.09
	1000												
	1hr ave (ug/m3)	4.32	1.84	1.55	1.05	0.80	0.48	0.34	0.26	0.21	0.17	0.12	0.09
	500												
	1hr ave (ug/m3)	6.52	3.40	2.09	1.08	0.83	0.50	0.35	0.27	0.21	0.17	0.12	0.09
	100												
	1hr ave (ug/m3)	41.82	25.03	14.82	7.30	4.09	2.17	1.45	1.06	0.82	0.65	0.43	0.30
	0												
	1hr ave (ug/m3)	22.08	12.31	10.88	5.05	2.98	1.42	0.84	0.58	0.52	0.45	0.33	0.24
	-1000												
	1hr ave (ug/m3)	16.56	9.23	8.16	3.78	2.24	1.06	0.63	0.44	0.39	0.34	0.25	0.18
	-2500												
	1hr ave (ug/m3)	16.56	9.23	8.16	3.78	2.24	1.06	0.63	0.44	0.39	0.34	0.25	0.18

NOx		Distance from Operations to Receptor (km)											
		0.25	0.5	1	2.5	5	10	15	20	25	30	40	50
Receptor Elevation (ft) compared to Source Elevation	2500												
	1hr ave (ug/m3)	1.33	0.99	0.88	0.60	0.49	0.30	0.22	0.16	0.13	0.11	0.08	0.06
	1000												
	1hr ave (ug/m3)	2.30	1.07	0.90	0.63	0.51	0.32	0.23	0.18	0.14	0.12	0.08	0.06
	500												
	1hr ave (ug/m3)	3.69	1.90	1.13	0.73	0.56	0.34	0.24	0.18	0.15	0.12	0.08	0.06
	100												
	1hr ave (ug/m3)	19.96	11.95	7.15	3.54	2.03	1.12	0.76	0.56	0.44	0.35	0.24	0.17
	0												
	1hr ave (ug/m3)	11.63	7.02	5.62	2.54	1.51	0.74	0.46	0.32	0.26	0.22	0.17	0.12
	-1000												
	1hr ave (ug/m3)	8.72	5.27	4.22	1.90	1.13	0.55	0.34	0.24	0.19	0.17	0.12	0.09
	-2500												
	1hr ave (ug/m3)	8.72	5.27	4.22	1.90	1.13	0.55	0.34	0.24	0.19	0.17	0.12	0.09

APPENDIX B

Dixie and Fishlake National Forests

Statistics Comparing Verification Run Results

With Initial Screening Table Results

Fishlake NF 12 Well Drilling Scenario

1-hr SO_2 Verification: Refined Modeling Results vs. Screening Table

	1-hr SO2					
Distance from source	refined model predicted impact	A pred imapct per lb/hr emission	Receptor elevation	source receptor elev diff (rec el - source el)	B scr table results for src/red ht diff	(A-B)/B
km	**ug/m3**	**/lb/hr**	**m**	**ft**	**Scr Tab**	**%diff**
0.25	14.95	6.05	2492.5	-62.23	22.08	-73%
0.5	18.04	7.30	2515.4	12.88	12.31	-41%
1	17.00	6.88	2487.5	-78.63	10.88	-37%
2.5	6.21	2.51	2380.2	-430.58	5.05	-50%
5	4.37	1.77	2473.8	-123.57	2.98	-41%
10	1.98	0.80	2113.8	-1304.37	1.06	-25%
15	1.62	0.66	2472.1	-129.14	0.84	-22%
20	1.16	0.47	2455.8	-182.61	0.58	-19%
25	1.00	0.40	2461.3	-164.57	0.52	-22%
30	0.72	0.29	2295.2	-709.38	0.34	-14%
40	0.51	0.21	2518.5	23.05	0.33	-37%
50	0.40	0.16	2504.1	-24.18	0.24	-32%

Fishlake NF 12 Well Drilling Scenario

1-hr NOx Verification: Refined Modeling Results vs. Screening Table

	1-hr NOx					
Distance from source	refined model predicted impact	A pred imapct per lb/hr emission	Receptor elevation	source receptor elev diff (rec el - source el)	B scr table results for src/red ht diff	(A-B)/B
km	**ug/m3**	**/lb/hr**	**m**	**ft**	**Scr Tab**	**%diff**
0.25	172.46	7.62	2541	96.85	19.95	-62%
0.5	132.55	5.85	2540.7	95.86	11.95	-51%
1	81.12	3.58	2540.3	94.55	7.15	-50%
2.5	33.10	1.46	2533.9	73.56	3.54	-59%
5	19.07	0.84	2546.4	114.56	2.03	-58%
10	10.85	0.48	2500.2	-36.98	0.74	-35%
15	8.47	0.37	2472.1	-129.14	0.46	-18%
20	6.64	0.29	2477.4	-111.76	0.32	-9%
25	5.40	0.24	2385.4	-413.52	0.26	-7%
30	4.45	0.20	2653.7	466.50	0.22	-12%
40	3.99	0.18	2518.5	23.05	0.17	6%
50	2.50	0.11	2213	-978.99	0.09	20%

Exhibit 3

EPA, “Emissions—Unit Level Data Report, Cholla” (Dec. 18, 2013).

Chaco Culture

National Historical Park
New Mexico

Explore This Park

- Park Home
- Plan Your Visit
- Photos & Multimedia
- History & Culture
- Nature & Science
- For Teachers
- For Kids
- News
- Management
- Support Your Park

Park Tools

There are park alerts in effect. SHOW ALERTS »

International Dark Sky Park

View Park Map

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Chaco great house at night.

NPS Photo

International Dark Sky Park

Commemorative Poster

Courtesy of Dr. Tyler Nordgren

Chaco has long been considered by many night sky enthusiasts to be one of the best places in America to stargaze. Today, amidst this ancient landscape, visitors can experience the same dark sky that the Chacoans observed a thousand years ago. The protection of dark night skies is a priority at Chaco not only for the enjoyment of star-gazing visitors, but for the natural environment as well. Nocturnal wildlife relies on darkness for survival, and the natural rhythms of humans and plants depend on an unaltered night sky. By designating over 99% of the park as a "natural darkness zone", in which no permanent outdoor lighting exists, Chaco is ensuring the preservation of these nocturnal ecosystems.

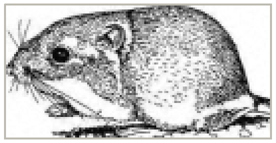
The park's natural nighttime darkness, commitment to reducing light pollution, and ongoing public outreach have led to its certification as an International Dark Sky Park by the International Dark-Sky Association (IDA). Chaco is the fourth unit in the National Park System to earn this distinction. By receiving this designation at the Gold-tier level, Chaco rates as one of the best places in the country to experience and enjoy natural darkness.

With the help of the NPS Natural Sounds and Night Skies Division, the park produced an inventory of existing night sky conditions which will be used as the basis for a continuing monitoring program. In an effort to preserve Chaco's natural darkness and reduce light pollution from park facilities, the park has developed outdoor lighting guidelines that meet the IDA's International Dark Sky Park standards. The park has also developed new dark sky interpretive programming and, in partnership with The Albuquerque Astronomical Society, has enhanced its public outreach to local communities.

Learn more about Chaco's Night Sky Initiative and interpretive programs.

Review Chaco's IDA International Dark Sky Park application.

Did You Know?



Many of the animal mounds you see at Chaco were made by Ord's kangaroo rats. They often dig in the soft midden (trash) areas in sites because they are elevated, easy to dig in, and don't flood. In their colonies there are often more burrow openings than there are rats! (Drawing courtesy: ICWDM.org)

Last Updated: 11/30/2013