AIR QUALITY IMPACT ASSESSMENT PROTOCOL
JONAH INFILL DRILLING PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT
IMPACT ANALYSIS SUPPLEMENT

PREFERRED ALTERNATIVE MITIGATION RUNS
AND
EARLY PROJECT DEVELOPMENT STAGE MODELING

Prepared for:

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1.0 INTRODUCTION

TRC Environmental Corporation (TRC) has prepared this Air Quality Impact Assessment Protocol (Protocol) to identify the methodologies to be used to:

- quantify project-specific and cumulative air quality impacts from additional configurations of the proposed Jonah Infill Drilling Project (JIDP) Preferred Alternative which were not analyzed as part of the Draft Environmental Impact Statement (DEIS), and
- quantify project-specific and cumulative impacts from potential emissions which reflect early-project-development stage conditions existing in the region surrounding the Jonah Infill Drilling Project area (JIDPA).

The air quality modeling analyses defined herein have been requested by the Bureau of Land Management (BLM) to supplement the air quality analyses that were performed and presented for a range of project alternatives in the DEIS.

The additional analyses were deemed necessary by the BLM to:

- evaluate alternative potential mitigation strategies for the Preferred Alternative in an effort to identify possible project development requirements to reduce adverse air quality impacts, and
- identify maximum early-project-development stage regional emissions (i.e., drilling) which could reveal that regional impacts are more severe at this stage due to impacts from the development of other regional projects, which at present have not been adequately evaluated.

This Protocol presents the methodologies for these analyses prior to study initiation to ensure that the approach, input data, and computation methods are acceptable to the BLM and Wyoming Department of Environmental Quality-Air Quality Division (WDEQ-AQD), and that other interested parties have the opportunity to review the Protocol and provide input before the study is initiated.

The methodologies for these additional modeling analyses generally follow the approaches described in the October 2003, Jonah Infill Drilling Project *Air Quality Impact Assessment Protocol* and the November 2004, *Draft Air Quality Technical Support Document for the Jonah Infill Drilling Project Environmental Impact Statement*, with any changes described herein. The new analyses include an assessment of pollutant concentrations in the JIDPA as well as the use of the CALMET and CALPUFF models to assess far-field and mid-field pollutant impacts within the cumulative study area, shown in Figure 1, attached. Far-field pollutant impacts will be assessed at the Prevention of Significant Deterioration (PSD) Class I areas (Bridger, Fitzpatrick, Teton, and Washakie Wilderness Areas and Grand Teton and Yellowstone National Parks), and at the sensitive Class II Popo Agie Wilderness Area and Wind River Roadless Area. Far-field analyses will include impact assessments of concentration, visibility, acid deposition, and lake acidity (at sensitive lakes within the Wilderness Areas). Mid-field visibility impact analyses will be performed at the Wyoming regional community locations of Big Piney, Big Sandy, Boulder, Bronx, Cora, Daniel, Farson, LaBarge, Merna, and Pinedale.

The remainder of this Protocol describes the methodologies for analysis of the Preferred Alternative additional configurations (Section 2.0) and the methodologies for analysis of early-project-development stage conditions in the JIDPA region (Section 3.0).

2.0 PREFERRED ALTERNATIVE MODELING ANALYSES

Additional configurations of the Preferred Alternative will be modeled to provide a representation of the range of impacts possible under this alternative (low and high emissions scenarios), and a representation of impacts which could occur using various mitigation methods in the JIDPA. Modeling analyses for these additional configurations will generally follow the methodologies described in the October 2003 Jonah Infill Drilling project *Air Quality Impact Assessment Protocol*, and will be directly comparable to the analyses conducted for the DEIS. The CALMET (Version 5.53) and CALPUFF (Version 5.711) models used in the DEIS analyses will again be used to estimate both project and cumulative pollutant impacts at far-field PSD Class I and sensitive Class II areas, at mid-field Wyoming regional community locations, and within the JIDPA.

Only project emissions will differ from those emissions modeled for the DEIS. Non-project cumulative emissions will be modeled as they were included in the DEIS and as described in detail in the *Draft Air Quality Technical Support Document for the Jonah Infill Drilling Project Environmental Impact Statement.* These include sources newly permitted by the state agencies through June 30, 2003, reasonably foreseeable development (RFD), and reasonably foreseeable future actions (RFFA). Project and cumulative emissions of PM_{10}, $PM_{2.5}$, NO_X, and SO_2 emissions will be modeled. Revised VOC emissions and resulting revised ozone impacts will be included in the FEIS.

Non-project cumulative emissions will differ from those included in the early project development stage modeling described in Section 3.0 of this Protocol. Early project development stage modeling is proposed to include additional estimates of future compression requirements beyond those projected by regional operators and included in the DEIS analysis. The Preferred Alternative modeling analyses described in this section will include only the originally projected compression estimates to maintain consistency and comparability with the DEIS analysis.

The Preferred Alternative for the JIDP consists of the development of 3,100 new natural gas wells on approximately 8,316 acres of new surface disturbance in the JIDPA, and assumes approximately 50% directionally drilled wells and 50% straight hole wells. Modeling results presented in the DEIS for Alternative F with a well development rate (WDR) of 250 wells per year are assumed to represent the maximum impacts from the Preferred Alternative at peak year emissions. Peak year emissions were assumed to occur in year 2017, and included emissions from 2,850 wells in production and 250 wells under construction, consistent with the field configuration anticipated for year 2017 (the field at nearly full production and the last year of construction in the field). The modeling also assumed a 50/50 split between straight and directional wells (consistent with the Preferred Alternative) and a 50/50 split between EPA Tier 1 and Tier 2 emissions levels for drilling rig engines. The modeling included 80 percent flareless completions (20% of completions flared) and JIDPA compression emissions at maximum levels projected at the time of the DEIS. This analysis remains the "most likely" emissions/impact assessment for the Preferred Alternative based upon current knowledge and assuming voluntary commitments made by developers.

Sections 2.1 through 2.3 describe the model scenarios analyzed to provide a range of impacts possible under the Preferred Alternative. Each of these scenarios is based upon anticipated field characteristics in year 2017, the presumed year of peak emissions.

2.1 LOW EMISSIONS CONFIGURATION

The Preferred Alternative will be modeled using the methods and inputs described in Section 2.0, with the exception of drilling rig engine emissions. This analysis will include all drilling rig engine emissions at Tier 2 emission levels. Development rates of 250, 150, and 75 wells per year will be analyzed (i.e., 20, 12, and 6 drill rigs operating continuously). Modeling will be performed for both project-specific and cumulative emissions scenarios.

2.2 HIGH EMISSIONS (BASE CASE) CONFIGURATION

The Preferred Alternative will be modeled using the methods and inputs described in Section 2.0, with the exception of drilling rig engine emissions. This analysis will include 80% of drilling rig engine emissions at Tier 0 emission levels (AP-42 levels), and 20% of engine emissions at Tier 1 emission levels. Development rates of 250, 150, and 75 wells per year will be analyzed. Modeling will be performed for both project-specific and cumulative emissions scenarios.

2.3 MITIGATION ANALYSES

Modeling will be performed to determine project-specific impacts based on emission reduction percentages from the high emissions (base case) configuration at a 250 WDR. Specifically, project emissions for this modeling configuration will be reduced by 20, 40, 60 and 80 percent, and these four emissions scenarios will be modeled. These analyses are sensitivity modeling runs that can be used to identify minimum impacts levels from project-specific source emissions. Modeling will be performed for both project-specific and cumulative emissions scenarios.

2.4 MODEL RESULTS

CALPUFF output will be post-processed to derive: 1) concentrations for comparison to ambient standards, significance thresholds, and Class I and II Increments; 2) deposition rates for comparison to sulfur (S) and nitrogen (N) deposition thresholds and to calculate acid neutralizing capacity (ANC) for sensitive lakes; and 3) light extinction for comparison to visibility impact thresholds in Class I and sensitive Class II areas and at regional communities. The modeling results will be presented in a supplemental report, summarized in the JIDP Final EIS (FEIS), and presented in detail in the Final JIDP Air Quality Technical Support Document. These results will be directly comparable to all other alternatives analyzed and presented in the DEIS.

Modeled concentrations combined with appropriate ambient background pollutant concentrations will be calculated at each far-field PSD Class I and sensitive Class II area and within the JIDPA, and will be compared to Wyoming and National Ambient Air Quality Standards (WAAQS and NAAQS). Both JIDP-specific and cumulative source modeling results will be presented.

Modeled concentrations predicted from the JIDP alone in Federal PSD Class I areas will be compared to Class I significance levels (Class I SILs) and Class I Increments, and cumulative modeling results predicted within Federal PSD Class I areas will be compared to Class I Increments. Project and cumulative impacts predicted at far-field sensitive areas designated as PSD Class II areas will be compared to Class II Increments. The PSD demonstrations serve information purposes only and will not constitute a regulatory PSD Increment consumption analysis, which may be completed as necessary by WDEQ-AQD. The approach to this PSD screening analysis is consistent with the original October 2003 Jonah Infill Drilling Project *Air Quality Impact Assessment Protocol.*

Visibility impacts (measured as change in light extinction) will be calculated using two methods, FLAG and IMPROVE, which differ by the background data used to derive the percent change in visibility. CALPOST visibility processing method MVISBK=6 will be used in combination with the two sets of background visibility data and monthly relative humidity factors from the *Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Rule.* These visibility processing methods are consistent with the October 2003 Protocol and the analyses presented in the DEIS. No updates to the 2002 baseline IMPROVE data set will be made. Changes in light extinction will be estimated from both JIDP emissions and cumulative source emissions at far-field PSD Class I and sensitive Class II areas, and at mid-field Class II Wyoming regional community locations. The 0.5 deciview change threshold value (for project source impacts) and the 1.0 deciview change threshold value (for cumulative source impacts) will be compared to far-field results modeled at PSD Class I and sensitive Class II areas. A summary of number of days greater than each of these threshold values will be provided in the text and, consistent with the DEIS, a summary of far-field cumulative impacts above both the 0.5 and 1.0 deciview change threshold values will be included in the appendices. Modeled results at

mid-field Class II regional locations from both project source and cumulative source impacts will be compared to the 1.0 deciview change threshold.

The total S deposition and N deposition at far-field PSD Class I and sensitive Class II areas from project emissions will be calculated and presented in kilograms/hectare/year (kg/ha/yr). These values will be compared to the 0.005 kg/ha/yr deposition analysis threshold (DAT) defined by the National Park Service (NPS) for total N and total S. Estimated total deposition fluxes of S and N from cumulative source impacts at the sensitive areas will be compared with levels of concern values of 5 and 3 kg/ha/yr for total S and N deposition fluxes, respectively. It is understood that the U.S. Department of Agriculture, Forest Service (USFS) no longer considers these levels of concern to be protective; however, in the absence of alternative Federal Land Manager-approved values, comparisons with these values will be made.

Predicted annual deposition fluxes of S and N at sensitive lake receptors from both JIDP and cumulative source emissions will be used to estimate the change in ANC. The predicted changes in ANC will be compared with the USFS's Level of Acceptable Change (LAC) thresholds of 10% for lakes with ANC values greater than 25 microequivalents per liter (µeq/l) and 1 µeq/l for lakes with background ANC values of 25 µeq/l and less.

3.0 EARLY PROJECT DEVELOPMENT STAGE MODELING

At the request of the BLM, an analysis of early-project-development stage air quality conditions in the vicinity of the JIDPA will be performed. What has been modeled and presented in the DEIS for the JIDP considers the "most likely case" maximum emissions scenario for the project, as described in greater detail in Section 2.0. However, when quantifying maximum cumulative impacts regionally, it is possible that peak regional impacts could occur prior to JIDP maximum emissions as a result of the development of other natural gas projects in the region. The BLM requested this analysis because it was considered probable that regional impacts would be greatest during the early stages of JIDP development due to accelerated development paces in nearby project areas. Unlike the Preferred Alternative modeling analyses (see Section 2.0), the modeling of the early project development stage will not be directly comparable to the results presented in the DEIS for reasons explained below.

The goal of this analysis is to quantify a maximum PM_{10}, $PM_{2.5}$, NO_X, and SO_2 emissions scenario that could potentially occur within the next few years in the air basin located southwest of the Bridger Wilderness Area, as a result of 1) increased well drilling and flaring activities among several active natural gas field developments, and 2) expanded compression requirements, beyond what was analyzed for the DEIS. To accomplish this goal, a study baseline year has been selected, for which emissions will be quantified and subtracted from a selected year which is representative of current conditions. This accounting will allow ambient background concentrations to be added to modeled impacts without "double-counting" existing background conditions. The emissions information available for well drilling and flaring activities and expanded compressions requirements up through a cut-off date of May 26, 2005 will be used in the analysis.

A study baseline year of 2002 is proposed for use based on the availability of background visibility data through 2002. Year 2006 is proposed as a representative year to analyze for a maximum emissions scenario. The 2006 inventory would include drilling and completion flaring activities occurring within the JIDPA, Pinedale Anticline Project (PAP), South Piney Project (SPP), Riley Ridge Project (RRP), and Jack Morrow Hills Project (JMHP) areas. The 2006

inventory would also include expanded compression estimates and a more recent emissions inventory of permitted sources for the area.

The modeling analysis will be performed generally following the methodologies described in the October 2003 Jonah Infill Drilling Project *Air Quality Impact Assessment Protocol*. Modeled emissions will include expanded compression emissions, reasonably foreseeable development (RFD) and reasonably foreseeable future actions (RFFA) that were determined for the DEIS, with the exception of the JIDP, PAP, SPP, RRP and JMHP emissions that were modeled for the DEIS. For these projects, emissions will be determined as the difference between maximum development emission rates calculated for 2006 minus the emissions determined to be included in background in baseline study year 2002. This approach results in an analysis of incremental emissions changes on both a project-specific and cumulative basis. Emissions differences determined for the JIDP, PAP, SPP, RRP, and JMHP will be modeled as point sources, spread within each project area. Emissions from expanded compression will be modeled as point sources located based on best available information. Details on the revised emissions inventories for this analysis are provided in Section 3.1 of this Protocol.

The CALMET and CALPUFF model versions that were used for the DEIS analysis will be used to estimate cumulative pollutant impacts at far-field PSD Class I and sensitive Class II areas, and at mid-field Wyoming regional community locations. However, the CALMET wind fields used for this analysis will differ from the wind fields used for the DEIS and Preferred Alternative modeling. The CALMET wind fields used for the current conditions modeling will be developed without the use of the "kinematic effects" CALMET switch setting option, which was used for all previous DEIS analyses. The change in wind field development will be made to correct a potential CALMET model anomaly, which could produce unrealistically high wind speeds in the wind field layers above the surface layer. Recent CALMET model peer review studies and model developer suggestions are the basis for this change. This change was not made for the Preferred Alternative modeling analyses to maintain consistency and comparability with the DEIS analyses.

3.1 EMISSIONS INVENTORIES

3.1.1 Permitted Source Emissions Inventory

As part of the JIDP DEIS, an inventory of permitted source emissions was developed using data obtained from the WDEQ-AQD, Colorado Department of Public Health and Environment/Air Pollution Control Division (CDPHE/APCD), Utah Department of Environmental Quality-Air Quality Division (UDEQ-AQD), and Idaho Division of Environment Quality (IDEQ). This source inventory included sources that had received permits through June 30, 2003. This inventory will be updated to include additional source emissions permitted through March 31, 2004. These additional source emissions will be obtained from the source inventory that was developed for the Atlantic Rim Natural Gas Project and the Seminoe Road Gas Development Project. The extent of the inventory domain for these projects is shown in Figure 1, attached.

3.1.2 Year 2006 Drilling and Flaring Emissions

Emissions for drilling activities and completion flaring have been developed for the JIDP, PAP, SPP, RRP, and JMHP based on a review of proposed well development rates and drilling activities for each project, from information available from the Wyoming Oil and Gas Conservation Commission (WOGCC) for drill rig "spud" activity, and from information provided by the BLM, Pinedale Field Office. Emissions will be determined for monthly drilling activities in order to capture seasonal variations in drilling. Table 1 provides a summary of the drilling rig and flare information that will be used for year 2006 modeling for all projects.

A WDR of 250 will be used for the JIDP (20 drill rigs [10 at 2,100 hp and 10 at 2,600 hp], and 3 completion flares operating continuously per month). An additional 3 drill rigs (all at 2,600 hp) and 1 completion flare will also be added to account for other operators expanded Jonah Field operations. For the JIDP it will be assumed that 50% of the wells will be directionally drilled and 50% of the wells will be straight hole, 80% of the wells will have flareless completions, and

there will be an 80%/20% combination of drilling engines with Tier 0 and Tier 1 emissions levels, respectively (Tier 0 emissions will be determined using EPA AP-42 emission factors).

For the PAP, the 2004 monthly well development rates obtained from the WOGCC, along with additional information provided by the BLM, Pinedale Field Office, will be used for 2006. Emissions are based on 6 year-round drilling rigs from Questar's year-round drilling project, 6 5,000 hp rigs based off of Questar's biggest rig to account for other operator's year-round drilling projects, and the remainder of the rigs based off of a representative 3,216 hp rig operating in the area. Emissions from Questar's 6 year-round drilling rigs assumes Tier 0 emissions for 3 rigs, Tier 1 emissions for 2 rigs, and a combination of Tier 0/Tier 1 emissions on 1 rig. These estimates come from emissions data provided by WDEQ/Questar. Emissions from the six 5,000 hp year-round drill rigs and the additional 3,216 hp drill rigs assume an 80%/20% Tier 0/Tier 1 emissions ratio. The analysis for the PAP also assumes 80% flareless completions.

The SPP project year 2006 drilling activity will be assumed to occur only during the summer months (May-Oct) with 3 drill rigs and 1 flare operating continuously for these months. The RRP will include 2 to 6 drill rigs and 1 flare operating throughout the year with an increase in activity in the summer months. The JMHP project will include a single operating rig and flare operating continuously throughout the year. Three 5,000 hp "wildcat" drilling rigs and 1 completion flare were added to the inventory to account for exploratory drilling in the BLM Pinedale Field Office area. It was assumed that this activity would only take place during the summer months (Jul-Aug). For the SPP, RRP, JMHP, and the "wildcat" rigs it will be assumed that 100% of the wells will be straight hole, 100% of the wells will be flared, and 100% of drilling engines will be Tier 0.

Table 1: Summary of Year 2006 Drilling Rigs Counts and Flaring Operations

Field	Months	Operating Drilling Rigs	Operating Flares
JIDP	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20	3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3
JIDP – Expanded Jonah Field Operators	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
PAP[1]	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	25, 25, 25, 25, 25, 30, 35, 35, 35, 30, 25, 25	4, 4, 4, 4, 4, 5, 5, 5, 5, 5, 4, 4
SPP	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	0, 0, 0, 0, 3, 3, 3, 3, 3, 3, 0, 0	0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 0, 0
RRP	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	2, 2, 2, 2, 3, 3, 6, 6, 6, 3, 2, 2	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
JMHP	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
Pinedale Field Office – Wildcat Rigs	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	0, 0, 0, 0, 0, 0, 3, 3, 0, 0, 0, 0	0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0

[1] Drill rig estimates for PAP include 6 drilling rigs for the Questar year-round drilling program and 2 each for Anschutz, Ultra, and Shell.

3.1.3 Year 2002 Drilling and Flaring Emissions

Baseline study year emissions for drilling activities and completion flaring have been developed for the JIDP, PAP, SPP, RRP, and JMHP based on a review of monthly actual well development rates and drilling activities that occurred in the region during 2002. Year 2002 emissions are

quantified to determine the level of emissions that existed in background ambient air quality. Information from the WOGCC was used to determine 2002 development rates and drill rig counts. It will be assumed that during year 2002 all drilling engines would be at Tier 0 emissions levels. For all project areas, 100% straight hole drilling will be assumed. Completion flaring emissions will be determined from a review of actual well development rates and will assume 100% of the developed wells required flaring. A summary of the preliminary drilling rig and flare information that will be used for the year 2002 modeling is provided in Table 2.

Table 2: Summary of Year 2002 Drilling Rigs Counts and Flaring Operations

Field	Months	Operating Drilling Rigs	Operating Flares
JIDP	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	6, 6, 6, 8, 5, 7, 4, 5, 8, 5, 4, 5	3, 3, 3, 4, 2, 3, 2, 2, 4, 2, 2, 2
PAP	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	4, 3, 3, 1, 7, 3, 8, 5, 3, 3, 0, 1	2, 1, 1, 1, 3, 1, 4, 2, 1, 1, 0, 1
SPP	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	0, 0, 0, 0, 0, 0, 0, 0, 2, 0, 2, 1	0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 1
RRP	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	0, 0, 0, 0, 1, 2, 2, 4, 2, 2, 1, 1	0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1
JMHP	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1

3.1.4 Expanded Compression

The BLM, field operators, and other gas compression companies operating nearby were contacted to determine an estimate of expanded field compression requirements for the area. The expanded compression is in addition to the compression estimates that were obtained, from

field operators, state permits, and RFD, and modeled for the DEIS. A summary of the expanded compression estimates that have been obtained, and the field compression estimates included in the DEIS analyses are provided in Table 3. Emissions for expanded field compression were calculated based on best available data provided by BLM, operators, and information obtained from the WDEQ-AQD.

Table 3: Summary of Expanded Field Compression Estimates

Field	Permitted/RFD Compression Included in DEIS Analyses	Expanded Compression Included in DEIS Analyses	Expanded Compression Estimates Beyond that included in the DEIS
JIDP	13,269 hp (Falcon) 0 hp (Luman) 9,405 hp (Bird) 5,285 hp (Jonah)	7,336 hp (Falcon) 11,604 hp (Luman) 11,004 hp (Bird) 3,900 hp (Jonah)	2,888 hp (Falcon) 11,248 hp (Luman) 30,928 hp (Bird) 3,000 hp (Jonah)
PAP	12,094 hp (Paradise) 25,110 hp (Gobblers Knob, Mesa 1, Mesa 2)	7,336 hp (Paradise) 10,000 hp (Gobblers Knob)	9,624 hp (Paradise) 1,160 hp (Gobblers Knob)
SPP	48,500 hp	0 hp	0 hp
RRP	0 hp	0 hp	0 hp
JMHP	3,480 hp	0 hp	2,940 hp

3.2 MODEL RESULTS

CALPUFF output will be post-processed to derive: 1) concentrations for comparison to ambient standards, significance thresholds, and Class I and II Increments; 2) deposition rates for comparison to S and N deposition thresholds and to calculate ANC change for sensitive lakes; and 3) light extinction for comparison to visibility impact thresholds in Class I and sensitive Class II areas. The modeling results will be presented in a supplemental report for the DEIS, summarized in the JIDP FEIS (Chapter 3.0), and presented in detail in the Final JIDP Air Quality Technical Support Document. It is important to note that the results of this modeling analyses will not be directly comparable to the results presented in the DEIS or those presented for the Preferred Alternative (see Section 2.0) due to differences (emissions increases) in the cumulative emissions (non-project) inventories and the expanded compression estimates included in this analysis.

Modeled concentrations combined with appropriate ambient background pollutant concentrations will be calculated for each far-field PSD Class I and sensitive Class II area and will be compared to WAAQS and NAAQS.

Modeled concentrations predicted in Federal PSD Class I areas from project-specific sources alone will be compared to Class I SILs and Class I Increments, and cumulative impacts will be compared to Class I Increments. Impacts predicted at far-field sensitive areas designated as PSD Class II areas will be compared to Class II Increments. This demonstration will be for information purposes only and will not constitute a regulatory PSD Increment consumption analysis, which may be completed as necessary by WDEQ-AQD. The approach to this PSD screening analysis is consistent with the original October 2003 Jonah Infill Drilling Project *Air Quality Impact Assessment Protocol.*

Visibility impacts will be calculated using two methods, FLAG and IMPROVE, and using MVISBK=2 and MVISBK=6 visibility change estimate methods available in CALPOST. The MVISBK=6 method, which was used in all DEIS analyses, uses monthly relative humidity factors. The MVISBK=2 method uses hourly relative humidity data from the CALMET wind fields. Changes in light extinction will be estimated at far-field PSD Class I and sensitive Class II areas, and at mid-field Class II Wyoming regional community locations.

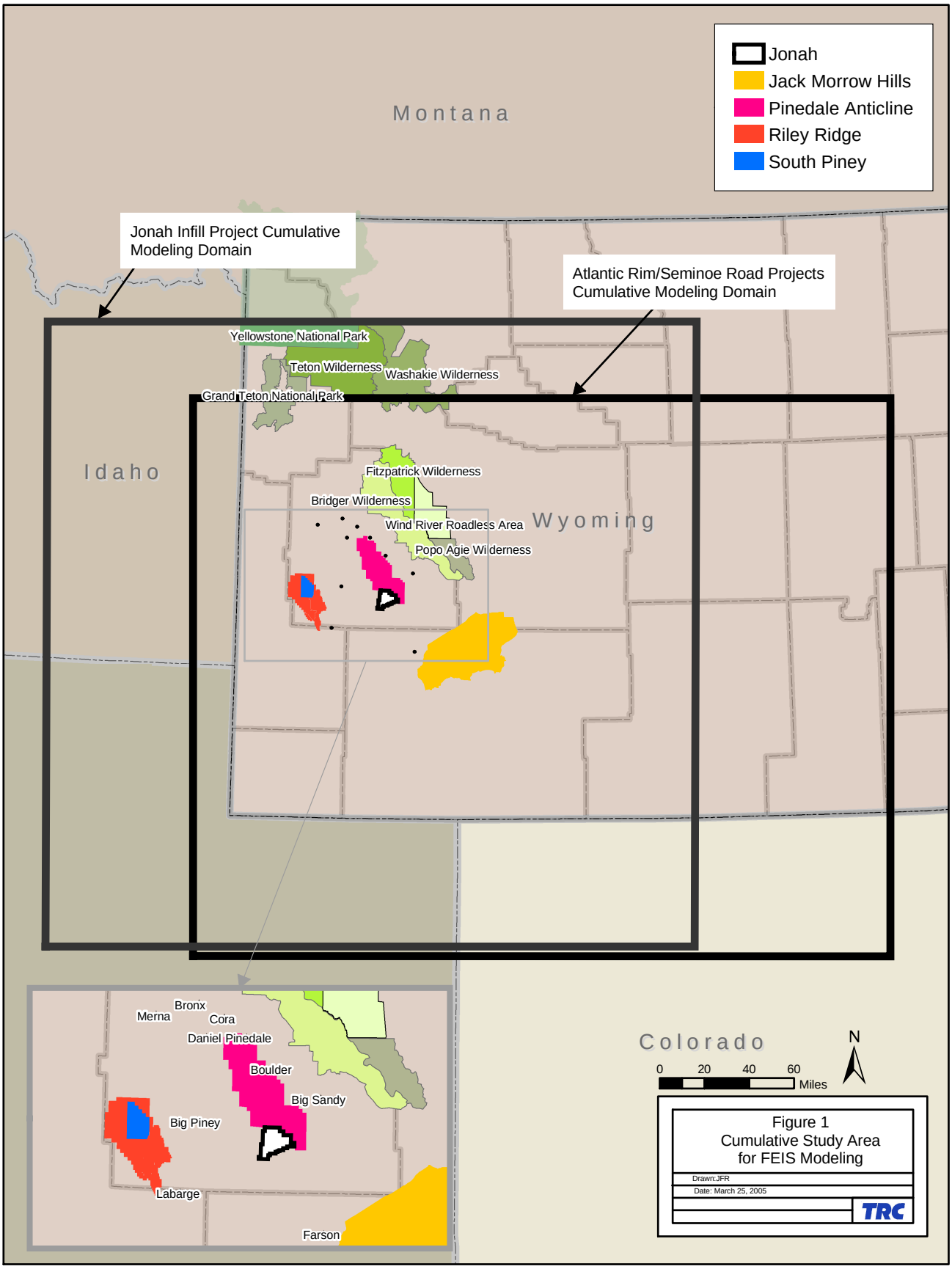
The 0.5 deciview change threshold value (for project source impacts) and the 1.0 deciview change threshold value (for cumulative source impacts) will be compared to far-field results modeled at PSD Class I and sensitive Class II areas. A summary of number of days greater than each of these threshold values will be provided in the text and, consistent with the DEIS, a summary of far-field cumulative impacts above both the 0.5 and 1.0 deciview change threshold values will be included in the appendices. Modeled results at mid-field Class II regional locations will be compared to a 1.0 deciview change thresholds for both project source and cumulative source impacts.

The total S deposition and N deposition at far-field PSD Class I and sensitive Class II areas from project emissions will be calculated and presented in kilograms/hectare/year (kg/ha/yr). These values will be compared to the 0.005 kg/ha/yr DAT defined by NPS for total N and total S. The total S deposition and N deposition impacts at far-field PSD Class I and sensitive Class II areas will be compared with levels of concern values of 5 and 3 kg/ha/yr for total S and N deposition fluxes, respectively. It is understood that the USFS no longer considers these levels of concern to be protective; however, in the absence of alternative Federal Land Manager-approved values, comparisons with these values will be made.

Predicted annual deposition fluxes of S and N at sensitive lake receptors will be used to estimate the change in ANC. The predicted changes in ANC will be compared with the USFS's Level of Acceptable Change (LAC) thresholds of either 10% for lakes with ANC values greater than 25 µeq/l, or 1 µeq/l for lakes with background ANC values of 25 µeq/l and less.

ATTACHMENT

Figure 1


Jonah
Jack Morrow Hills
Pinedale Anticline
Riley Ridge
South Piney
Montana
Jonah Infill Project Cumulative Modeling Domain
Atlantic Rim/Seminoe Road Projects Cumulative Modeling Domain
Yellowstone National Park
Teton Wilderness
Washakie Wilderness
Grand Teton National Park
Idaho
Fitzpatrick Wilderness
Bridger Wilderness
Wind River Roadless Area
Popo Agie Wilderness
Wyoming
Bronx
Merna
Cora
Daniel Pinedale
Boulder
Big Sandy
Big Piney
Labarge
Farson
Colorado
N
0 20 40 60
Miles
Figure 1
Cumulative Study Area
for FEIS Modeling
Drawn:JFR
Date: March 25, 2005
TRC