



STATE OF COLORADO

Fwd: Modeling meeting outcome

1 message

Rink - CDPHE, Bradley

Tue, Mar 16, 2021 at 7:21 AM

To: Rosendo Majano

Bradley Rink  
Technical Services Program, Air Pollution Control Division

fyi - we've been told to not model short term standards

blr

----- Forwarded message -----

From: Malone - CDPHE, Emmett

Date: Tue, Mar 16, 2021 at 5:18 AM

Subject: Fwd: Modeling meeting outcome

To: Bradley Rink -

Hi,

We can talk about this at 7  
Emmett Malone  
Supervisor  
Modeling and Emissions Inventory Unit  
[Technical Services Program](#)  
Air Pollution Control Division  
Colorado Department of Public Health and Environment  
APCD-TS-B1  
[4300 Cherry Creek Drive South](#)

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From: Pierce - CDPHE, Gordon

Date: Mon, Mar 15, 2021 at 4:30 PM

Subject: Modeling meeting outcome

To: Emmett Malone

Emmett,

Per the meeting we had today 3/15/21 with Garry and Robyn, Garry specifically stated that, effective immediately, the short-term thresholds in the Modeling Guideline will not be used and that modeling only be performed using the following thresholds:

- 40 tpy for NO2 and SO2
- 82 lbs/day for PM10
- 5 tpy for PM2.5
- 23 lbs/hr for CO
- 25 lbs/3-mo for Pb

He will allow exceptions based on agreement between the modelers and permit engineers, and his specific approval.

Garry also requested that the Modeling Guideline also be removed from the website, pending further discussions and revisions. I will ask Ivan to pull it. Attached is a copy of the current version that is on the website.

Thanks,  
Gordon

Gordon Pierce  
Program Manager  
Technical Services Program



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 Modeling Guideline\_downloaded 20210315.pdf  
5097K

STATE OF  
COLORADO**Fwd: Modeling meeting outcome**

1 message

**Reynolds - CDPHE, DeVondria**

To: Rosendo Majano - CDPHE

Tue, Mar 16, 2021 at 11:16 AM

----- Forwarded message -----

From: **Malone - CDPHE, Emmett**

Date: Tue, Mar 16, 2021 at 1:12 PM

Subject: Fwd: Modeling meeting outcome

To: Bradley Rink - CDPHE, DeVondria Reynolds - CDPHE

Gordon response

Emmett Malone

Supervisor

Modeling and Emissions Inventory Unit

[Technical Services Program](#)

Air Pollution Control Division

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From: **Pierce - CDPHE, Gordon**

Date: Tue, Mar 16, 2021 at 10:06 AM

Subject: Re: Modeling meeting outcome

To: Malone - CDPHE, Emmett

No, we are not to address the short-term standards..."the short-term thresholds in the Modeling Guideline will not be used."

(Based on Brad's email, is he planning something?)

Gordon

On Tue, Mar 16, 2021 at 8:04 AM Malone - CDPHE, Emmett wrote:

Hi,

Had a discussion with Brad and DeVondria this morning and it went much like I thought it would, badly. I feel like I have stepped back in time and Doris and Rosendo are arguing about how this is wrong.

One question that came up and if you or Garry could respond I would appreciate it. What I took from the meeting was that we are not to address the short term standards. The way you worded your email is slightly different, are we to address the short term standards?

2 years, 7 months, and 15 days.

Emmett Malone

Supervisor

Modeling and Emissions Inventory Unit

[Technical Services Program](#)

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Thanks,  
Gordon

--

Gordon Pierce  
Program Manager  
Technical Services Program



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Gordon Pierce  
Program Manager  
Technical Services Program



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--

DeVondria Reynolds, MS  
Air Quality Modeler  
Modeling and Emissions Inventory Unit  
Technical Services Program



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COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT  
Stationary Sources Program / Air Pollution Control Division

**INTER-OFFICE COMMUNICATION**

**PS Memo 10-01**

TO: Stationary Sources Staff, Local Agencies, Regulated Community

FROM: Kirsten King and Roland C. Hea

DATE: September 20, 2010

RE: Permit Modeling Requirements for the 1-Hour NO<sub>2</sub> and SO<sub>2</sub> NAAQS

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The Division is establishing this guidance for use by minor stationary sources of nitrogen dioxide (NO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>) in evaluating whether modeling is necessary for permitting purposes to determine whether a permit applicant's emissions will comply with the new 1-hour NO<sub>2</sub> and/or the new 1-hour SO<sub>2</sub> National Ambient Air Quality Standard (NAAQS). The United States Environmental Protection Agency (EPA) published implementation guidance on June 28, 2010 and August 23, 2010 regarding demonstrating compliance with the new standards for Prevention of Significant Deterioration (PSD) sources.<sup>1</sup> The Division finds it useful to publish this supplemental state guidance to ensure that minor sources are addressed in a manner consistent with the EPA guidance for PSD sources.

Under federal rules, an ambient air quality impact analysis is required for each pollutant that a PSD source has the potential to emit in significant amounts. Such analysis includes modeling. The metric used by EPA to measure significant amounts is the significant emissions rate (SER). Federal rules currently define the SER for NO<sub>x</sub> and SO<sub>2</sub> as 40 tons per year (tpy). (40 CFR 52.21(b)(23)(i); 40 CFR 51.166(b)(23)(i)). EPA recently evaluated and decided to apply on an interim basis the 40 tpy SER to major source permitting compliance demonstrations for the hourly NO<sub>2</sub> and SO<sub>2</sub> standards. EPA concludes and states that an ambient air quality impact analysis is not necessary for PSD sources with projected NO<sub>2</sub> or SO<sub>2</sub> emissions rates below the SER. (Wood Memoranda at p.11 and p.4)

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<sup>1</sup> See June 28, 2010, Anna Marie Wood, Acting Director, Air Quality Policy Division, Office of Air Quality Planning and Standards Memorandum "General Guidance for Implementing the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO<sub>2</sub> Significant Impact Level" and August 23, 2010 Memorandum "General Guidance for Implementing the 1-hour SO<sub>2</sub> National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour SO<sub>2</sub> Significant Impact Level" ("Wood Memoranda").

The Division has evaluated EPA's rationale for establishing NO<sub>2</sub> and SO<sub>2</sub> SERs for modeling the 1-hour NO<sub>2</sub> and SO<sub>2</sub> standards. The Wood Memoranda guidance set forth EPA's reasoning that its SER for SO<sub>2</sub> (a pollutant with shorter-term 3-hour and 24-hour averaging times) is 40 tpy, and, for this pollutant, ambient air quality impact analyses have not been necessary at levels below the SER. EPA has concluded that this reasoning applies to the one-hour NO<sub>2</sub> and SO<sub>2</sub> standards on an interim basis. EPA states it intends to conduct an evaluation of screening tools available to permitting agencies. In the interim, it recommends the continued use of the existing SER for NO<sub>x</sub> and SO<sub>2</sub> emissions with respect to the 1-hour NO<sub>2</sub> and SO<sub>2</sub> standards, and thus ambient air quality impact analyses are not necessary for either NO<sub>2</sub> or SO<sub>2</sub> emissions below the 40 tpy SER.

EPA's Wood Memoranda guidance address PSD sources. The Division believes that the same principles apply to minor sources, in part, to ensure consistency of treatment in permitting and to ensure that it is not imposing different requirements on minor sources than those to which PSD sources are subject. The Division is aware of no factual basis to impose more stringent requirements on minor sources than EPA would impose on the largest air pollution sources. Therefore, the Division will apply EPA's SERs for NO<sub>x</sub> and SO<sub>2</sub> to the 1-hour NO<sub>2</sub> and 1-hour SO<sub>2</sub> standards for all stationary source permitting activities, including determining when ambient air quality impact analyses are necessary for permitting, pending the consideration of any further guidance issued by EPA on this subject.

**Majano, Rosendo**

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**From:** Majano, Rosendo  
**Sent:** Thursday, December 08, 2011 3:02 PM  
**To:** Money, Carissa D.  
**Subject:** RE: Enterprise CTF - SO2 emissions  
**Attachments:** ENTERPRISE CTF - NE TERRAIN ELEVATION PROFILE.jpg

Thanks Carissa for this information. I just reviewed the memo you are referring to in your email, and I have a couple of questions/comments:

- 1- The memo seems to apply only to 1-hr NO<sub>2</sub> and 1-hr SO<sub>2</sub>, but the SO<sub>2</sub> NAAQS/CAAQS also include the 24-hr/3-hr averaging periods.
- 2- Where does this memo leave the short-term modeling thresholds indicated in the CO Modeling Guideline? Should I assume that the memo supersedes the Modeling Guideline in this matter?

Anyhow, regardless of these questions and comments, there is a strong technical reason why, despite the guidance provided by the memo, I recommend that the SO<sub>2</sub> modeling be required in this particular case: There are complex terrain situations all around the CTF facility, which means that the elevation of the surrounding terrain is higher than the elevation of the highest stack at CTF. The consequence of this is that the plume of gases will impact the higher terrain causing higher concentrations than what you would normally see with simple terrain situations. How much higher these concentrations will be will depend on the distance at which the elevated terrain is located since this will in turn determine how much the plume of gases will have traveled and how much dispersion of the pollutants will have occurred. You can better visualize this situation by looking at the attached file. This is showing the terrain elevation profile in the north-east direction from the CTF site, and as you can see, the elevation of the surrounding terrain starts being higher than the highest stack at approximately 5 km and from there you can expect higher concentrations. This is only one direction, and the CTF facility is surrounded by higher terrain in almost every direction. The yellow dots represent the receptors where the concentrations are being modeled and a big portion of them will be located in complex terrain.

For the specific case of the CTF facility, you have to consider also the fact that the 1-hr NO<sub>2</sub> modeling is already showing violations of the corresponding NAAQS. As I explained to you yesterday, these violations are not necessarily being caused by CTF, but that is something that is still pending to be determined. And although the SO<sub>2</sub> emissions are much lower, the dispersion conditions and terrain characteristics are the same, so if there are high concentrations for 1-hr NO<sub>2</sub>, the possibility of getting high 1-hr SO<sub>2</sub> concentrations is real and shouldn't be ignored.

So, I'm not saying that the short term SO<sub>2</sub> NAAQS will be exceeded, but the fact that the SO<sub>2</sub> emissions are below 40 tpy is not by itself sufficient technical evidence to prove the contrary, at least not in the particular case of the CTF facility. In this case I think that the Division should ask the applicant to submit modeling to demonstrate compliance with the SO<sub>2</sub> NAAQS.

Let me know your thoughts about this.

Thanks,

Rosendo.

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**From:** Money, Carissa D.  
**Sent:** Thursday, December 08, 2011 12:02 PM  
**To:** Majano, Rosendo  
**Subject:** RE: Enterprise CTF - SO2 emissions

Rosendo,

I did not request modeling of SO<sub>2</sub> since per PS Memo 10-01 modeling is only required if SO<sub>2</sub> emissions exceed 40 tpy. Please let me know if you have additional questions about this determination. (Here is the link to PS memo in case you have not seen it before)

<http://www.cdphe.state.co.us/ap/down/PS10-01.pdf>

Thank you!

Carissa

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**From:** Majano, Rosendo

**Sent:** Thursday, December 08, 2011 11:34 AM

**To:** Money, Carissa D.

**Subject:** Enterprise CTF - SO<sub>2</sub> emissions

Carissa,

While looking at the APENs I noticed that the facility has about 22 tpy of SO<sub>2</sub> emissions (approximately 5 lb/hr). This would exceed the short term modeling threshold of 0.46 lb/hr and they would need to submit modeling to verify compliance with the short-term SO<sub>2</sub> NAAQS, specially with the 1-hr standard.

Do you know if this issue has been previously discussed with the applicant?

Thanks,

Rosendo.

**Majano, Rosendo**

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**From:** Money, Carissa D.  
**Sent:** Tuesday, December 13, 2011 9:35 AM  
**To:** Majano, Rosendo  
**Subject:** RE: Enterprise - CTF and Meeker

Rosendo,

I have not yet heard back about the flares so I will follow up with Enterprise today.

Also, I talked with my supervisor yesterday about the SO2 issue (my guidance so no modeling required and your guidance says that SO2 should be modeled) . We then followed up with Kirsten and I think she has already talked with Gordon this morning about the issue. Ultimately I am leaving it up to management to decide but please let me know if you have any questions/concerns for me.

I also agree with getting back to Enterprise quickly about the modeling issues since it is quite a bit of work for them so thank you for moving everything along!

Thanks,  
Carissa

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**From:** Majano, Rosendo  
**Sent:** Monday, December 12, 2011 5:53 PM  
**To:** Sebesta, Jacob C.; Money, Carissa D.  
**Subject:** Enterprise - CTF and Meeker

Hi Carissa and Jacob,

I just wanted to check if you had a chance to discuss the flare emissions for both facilities with the applicant. I don't mean to rush you, I just want to know where is the situation at for the purpose of planning my workload.

For CTF, I'm done reviewing the modeling analysis and I'm ready to send Enterprise an email with all the modeling issues they need to address, so once I get confirmation if the flare's emissions are OK or will change, then I'll send the email.

For Meeker, it looks like the consulting company is already working on the new modeling, so my concern here is that if the flare's emissions change, they will have to re-do whatever work they have completed, and it will be worse if the re-submit the modeling and then we have to tell them the repeat it. So I was thinking that it might be a good idea to contact the consulting company and applicant and tell them to hold the re-submittal until this issue is solved. Jacob, please let me know if you are OK with doing that.

Also, since both facilities are about 12 kilometers apart, they have to include each other in their respective off-site emissions inventory. Therefore, I will ask them to do that taking into account all the corrections that are currently being made. This means that CTF will have to model Meeker as an off-site source with all the recent corrections, and Meeker will have to do the same with CTF. This request shouldn't be a problem for them considering that we are talking about the same applicant and same consulting company. The only problem is that I need to notify them of the corrections for both plants, and I haven't done that yet for CTF. So for that reason it also makes sense to tell them to hold the re-submittal for Meeker.

Thanks,

Rosendo.-



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**Re: Bowie Mine**

1 message

**Jung, Doris** [REDACTED]

Tue, Nov 27, 2012 at 6:46 AM

To: Rosendo Majano [REDACTED]

Cc: Chuck [REDACTED]

Rosendo,

I completely disagree with permitting on how they are handling Bowie with regards to PM2.5 and, on a more basic level, how they are handling impact analyses and NAAQS compliance demonstrations.

I had conveyed to permitting in March of this year that Bowie's modeling should include PM2.5. See attached PDF.

At this point, permitting has already told the consultant to ignore PM2.5 (per Chuck Pray) and it's not the first time they have done so. The modeling/impact analysis review report can discuss how PM2.5 has not been addressed and include any data/results/concerns relating to PM2.5 attainment.

Doris

On Mon, Nov 26, 2012 at 3:24 PM, Rosendo Majano [REDACTED] wrote:

Doris,

I was reviewing the comments that Jon Torizzo made to the consulting company related to the modeling submitted prior to 2009, and there were all sort of issues ranging from incorrect emission rates to incorrect source characterization and definition of ambient air. I don't think this would fall under the explanation described in the memo of "applications that exceeded the normal permit processing timeframes."

This one did not exceed the normal time frame. The applicant just failed to demonstrate compliance with the NAAQS through no fault of the Division. In my opinion it is completely wrong to exempt them from PM2.5 modeling based on that 2008 application.

How many years can they keep resubmitting the modeling analysis and still consider it the same application?

Are you completely ruling out the possibility of requesting the applicant to submit PM2.5 modeling?

Rosendo

On Mon, Nov 26, 2012 at 12:58 PM, Jung, Doris [REDACTED] wrote:

Rosendo,

After CC&V lobbied up the management chain in 2010 to relieve themselves of submitting a PM2.5 impact analysis for their current permit, the previous Division director (Paul Tourangeau) decided that applications in-house prior to 2009 would not need to submit PM2.5 modeling (as reflected in the memo, although his name does not appear anywhere).

The application originally submitted by Bowie prior to 2009 had not been completed due to delays on the

EPAOIG Appendix 10

applicant/consultant side. Thus, such uncooperative behavior is rewarded by not assessing attainment with PM2.5 standards.

I agree that EPA's surrogate policy does not apply but, according to permitting, they are relying on the attached memo. The memo does not reference the surrogate policy. By the date of the memo, case law had ruled/clarified the limited use of the surrogate policy (a demonstration needs to be made). At this time, there is no technical reason for not assessing PM2.5.

As with the 1-hr NO2 and SO2 standards, the modeling/impact analysis review report can discuss how PM2.5 has not been addressed and include any data/results/concerns relating to PM2.5 attainment.

I believe Bowie is the last of the pre-2009 applications.

Doris

----- Forwarded message -----

From: **Rosendo Majano** [REDACTED]  
Date: Wed, Nov 21, 2012 at 3:03 PM  
Subject: Bowie Mine  
To: Doris Jung [REDACTED]  
Cc: Chuck Machovec [REDACTED]

Doris,

I started reviewing the Bowie Mine application - received at the SSP on 02/29/2012 - and noticed that the applicant is claiming to be exempt from conducting PM2.5 modeling (please see the attached file). I talked to Chuck Pray about this and he confirmed it. According to him, this is exactly the same application that had been submitted several years ago, with no changes, and therefore the PM10 surrogate policy would still apply.

However, from what I have seen, it is not that the application has been sitting on someone's desk waiting for review, it looks like the modeling was rejected and resubmitted several times. I don't know the details but I don't think this could be considered as the same application submitted prior to 2009.

Given that you have more knowledge of what happened with the previous submittals, you might be in a better position to determine if the PM10 surrogate policy would still apply. I don't think it does and I would request PM2.5 modeling to be submitted.

Let me know your thoughts about this.

Thanks,

Rosendo.



**RE\_ Bowie Mining.pdf**  
67K



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**Re: Bowie Mine**

1 message

**Pray - CDPHE, Charles**

Tue, Feb 19, 2013 at 12:56 PM

To: Rosendo Majano

Cc: "Jung, Doris", Chuck Machovec - CDPHE

Rosendo:

Yes, the decision to allow Bowie, and three other sources, to not be required to model the PM2.5 was made by upper management. I haven't been told it has been rescinded. I think they get a pass until this permit action is completed.

The APEN the Division received in January was not for this purpose. It was to expand the existing GOB pile to allow the mine to continue to operate, again until this permit process is complete for the newly located GOB pile and associated haul. The expansion of GOB pile #2 has been allowed under "enforcement discretion" to keep the mine open, but at only half the volume requested to comply with the DRMS permitting.

BLM's lease arrangements do allow a lessee to prevent access under certain circumstances, while not requiring fencing to allow for animal migration. How a company enforces this is probably up to them, but I'm certain that the mine would be trying to prevent access to any operations which could potentially create a lawsuit situation. It's easier in open pit mining, you fence everything you can and let terrain take care of the rest. The deer, elk and antelope ( and occasionally black bear) always seemed to find a way in and out.

I didn't receive a copy of the diagram mentioned in Aaron's e-mail, so I can't review that.

Chuck

On Tue, Feb 19, 2013 at 12:33 PM, Rosendo Majano wrote:

Chuck,

FYI, please see the email below. Specifically, see the last paragraph. It is saying that they will submit a revised modeling analysis to account for changes in several sources. An APEN related to these changes was apparently submitted in January, 2013 and if I understand correctly, you will also receive revised emissions calculations.

Under these circumstances I can't do absolutely anything with the modeling review until I receive the new files, so I will put this application on hold in the meantime.

Also, in this new resubmittal, will the SSP continue to exempt this facility from demonstrating compliance with the PM2.5 NAAQS?

The email below is describing violations of the 24-hr PM10 NAAQS, so there is reason for concern about the PM2.5 NAAQS.

Let me know what you decide.

Thanks,

Rosendo

----- Forwarded message -----

From: **Aaron Martinkus** [REDACTED]  
Date: Fri, Feb 15, 2013 at 12:37 PM  
Subject: Re: Bowie Resources  
To: Rosendo Majano [REDACTED]

Rosendo,

I have conducted a modeling analysis of the Bowie operations without excluding any receptors. The model results show some predicted exceedances of the 24-hour and annual PM-10 NAAQS, but they only occur in areas that are physically controlled by Bowie. I have attached a diagram showing the receptor locations where the model predicted an exceedance. As you can see, these receptors are located near the facility wash plant, and at the top of the mine. There is one predicted exceedance at the Terror Creek Site, but that area is surrounded by fencing, and not publically accessible. This analysis includes the assumed 24-hour and annual background concentrations of 29 ug/m<sup>3</sup> and 16 ug/m<sup>3</sup>, respectively.

I have also attached a diagram with the locations of the gates that keep the public from accessing the roads north of the mine. Installation of fencing around the entire mine property would not be possible; the lease agreement between Bowie and the Bureau of Land Management would not allow for this type of activity. Consideration must be made when there are competing interests amongst regulatory agencies; installation of fencing would cause land disturbances that are not permitted, and there are also considerations regarding wildlife migration and habitat protection.

While Bowie does not have a complete physical barrier around the entire mine, public access to the areas where an exceedance is predicted to occur is controlled due to these gates, the topography, and because the general public will not be able to reach these active mine areas without the permission of Bowie. With permission to be on-site, any visitors (e.g. contractors) are no longer considered by EPA to be the general public. MSHA regulations also require that people coming onsite must register with the mine upon arrival, they must be accompanied by mine personnel, and that they do not allow general public access to the mine. However, this requirement does not insist on fencing or physical barriers; it is understood that the actions of mine personnel is sufficient to preclude public access to active mining areas. Bowie personnel have been trained to approach any unfamiliar persons onsite, and to escort them off-site as necessary. Again, EPA does not define preclude as making public access absolutely impossible; rather that the likelihood of such access is small.

In addition, APCD has approved this approach for other permitting/modeling actions for other coal mines in the North Fork Valley, such as Oxbow Mining, LLC and Mountain Coal Company, LLC. APCD has previously understood the unique aspects of the siting of these mines requires different rationale to be applied in the permitting process, and has used discretion and judgement when reviewing and approving permit applications for these sources. This is not the first time this approach has been proposed, nor the first time it has been approved by the Division for permitting. Bowie is just asking for a fair and consistent application of regulatory interpretations.

Please note, the dispersion modeling has been updated to account for an APEN submitted in January to expand Gob Pile #2; additional "area-poly sources" have been added (NEWGOB2 and NEWGOB2DOZ), a volume source for the dropping of gob onto the pile (GOBPILENEW2), and an on-site haul road route has been modified (CYN001-062) to account for where this expansion of the stockpile will occur. In addition, the size of the area-poly source Gob Pile #3 (NEWGOB) was expanded to more accurately reflect the size of the proposed pile, and as such the haul road (GRN001-029) associated with this stockpile was lengthened. I will send you the revised input files in a separate email, and will forward the associated emission inventory to Chuck Pray.

Thanks for your help.

EPAOIG Appendix 13

Regards,

Aaron

—  
  
Chuck Pray, P.E.-P.L.S.

Permit Engineer, Air Pollution Control Division  
Colorado Department of Public Health and Environment  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530  
[REDACTED]

[www.colorado.gov/cdphe](http://www.colorado.gov/cdphe)

**My office hours are 7:30 AM to 4:00 PM.**

Please be aware that any information submitted to the Air Division regarding emissions of pollutants is potentially subject to the Colorado Open Records Act.



State  
of  
Colorado

## LEAN meeting

1 message

Machovec - CDPHE, Chuck [REDACTED]

Wed, Dec 5, 2012 at 10:19 AM

To: Doris Jung [REDACTED], Rosendo Majano - CDPHE [REDACTED]

Garry wants to schedule a status update LEAN meeting on Dec 17, 18, or 19th.

I don't get the impression he is expecting that we are "done," rather, he wants to just make sure the process continues moving to implementation.

He seemed fine with the progress so far.

He also discussed metrics. For example, a year from now he/we need to be able to show how LEAN has or hasn't helped. I told him that we'll need to be careful with metrics because other variables are at work such as decreased workloads (i.e., although I didn't quite say this... I suggested that a finding of an association between better "turnaround time" of modeling reviews and LEAN implementation does not necessarily establish a "causal" relationship because of the other variables at play).

He also mentioned that at some point he wants to have a meeting to reach an understanding on "policy" versus "technical" aspects of modeling. I told him that as long as there is unwritten policy whereby management asks staff verbally to not follow language in the rule, there will be issues. Any requests from management for staff to not follow the requirements of the rule should be in writing. He agrees that there should be more discussion.

On a side discussion, he mentioned that he isn't convinced that the modeling completeness language should be included in the letter sent by the engineer (i.e., he seemed to be suggesting that the modeling completeness letter and permit engineer completeness letter are separate things... but that said, he said that he is open to discussion). My two cents... which I didn't share with Garry... is that if we are issuing a completeness letter on modeling alone, then it would need a disclaimer that another letter may or may not be sent by the engineer... and that a "complete" modeling analysis does not indicate a complete application, etc.

Chuck Machovec  
Scientist/Supervisor  
Modeling, Meteorology, and Emission Inventory Unit  
[Technical Services Program](#), Air Pollution Control Division  
Colorado Department of Public Health and Environment  
APCD-TS-B1  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530



Colorado Department  
of Public Health  
and Environment

STATE OF  
COLORADO**Re: Brief Survey - Minor Source Modeling**

1 message

**Jung - CDPHE, Doris**

To: Rosendo Majano - CDPHE

Cc: "gordon.pierce@state.co.us"

Mon, Jul 6, 2015 at 10:43 AM

Rosendo,

The issues you have brought to Roland's attention in the email below are among the many we (Chuck, Jon, and I) had informed permitting about in the August 18, 2010 meeting that was organized to discuss PM2.5 modeling.

Attendees included Chuck, Jon, me, Gordon, Roland Hea, Jim King (operating permit supervisor at the time), Chip Hancock, Mark McMillan, and Chris Laplante.

In addition to discussing PM2.5 in this meeting, we (modelers) were told to raise the modeling thresholds because compliance with NAAQS could not be demonstrated or they would just issue permits without considering NAAQS compliance.

We (modelers) argued that their approach would be inconsistent with regulatory requirements and raising thresholds when NAAQS are more stringent was not technically justified but ultimately we were ignored. Consequently, since the modelers wouldn't cooperate, permitting came out with the 40 tpy threshold for 1-hr NO2 and SO2 NAAQS on September 20, 2010.

The circumstances and the permitting personnel involved have not changed since the 2010 meeting/decision. While I agree concerns for NAAQS attainment remain, there is nothing that indicates to me that permitting is willing to change their practice.

At this time, dialogue on this subject with permitting is beating a dead horse. Our resources are better spent elsewhere.

Doris

----- Forwarded message -----

From: **Rosendo Majano**

Date: Mon, Jul 6, 2015 at 9:13 AM

Subject: Fwd: Brief Survey - Minor Source Modeling

To: Doris Jung - CDPHE

FYI. I should have CC'd you. I apologize for not doing it.

----- Forwarded message -----

From: **Hea - CDPHE, Roland**

Date: Mon, Jul 6, 2015 at 8:53 AM

Subject: Re: Brief Survey - Minor Source Modeling

To: Rosendo Majano

Cc: Gordon Pierce - CDPHE

Rosendo,

Thanks for your additional thoughts. I do believe that we will need to continue these discussions over time to find the right balance between workloads, resources, outcomes, etc. From a permitting perspective, we need to find solutions that balance environmental and public health protection, available staff resources, our permit timeliness requirements, applicants' capacities and abilities to provide detailed technical information (especially small businesses), etc. I look forward to continuing the discussion and have given Mark McMillan a heads-up as well.

Roland

On Tue, Jun 30, 2015 at 1:10 PM, Rosendo Majano wrote:

Thanks Roland for your response.

My opinion is that the broader internal discussion is long overdue. The workable set of thresholds/criteria that you talk about establishing, already exist in the CO Modeling Guideline. Table 1 of his document establishes long-term and short-term thresholds (0.46 lb/hr for NO2 and SO2) and also a list of criteria (footnotes of Table 1) for when modeling could be warranted even when the emissions rates are below the short and/or long-term thresholds.

Those thresholds and criteria to determine when modeling is required were developed by the APCD modeling experts and I never understood why the SSP has chosen to ignore them all these years.

I can't take credit for any content of the CO Modeling Guideline since it was developed before I started working here at the APCD, but I can perfectly see and understand the logic in the content of Table 1 and its footnotes, considering the clear requirement in AQCC Regulation 3 to verify compliance with the NAAQS as condition to issue permits, and the unique situation of Colorado with most of its emission sources located in complex terrain (i.e. surrounding terrain elevations above the height of the stack).

Under these circumstances it is perfectly feasible to have sources with small annual emission rates cause very high impacts on air quality, specially on the short-term NAAQS, because of the unique meteorological conditions created by complex terrain. I think that looking at the annual emissions alone to determine when modeling is warranted is a big mistake, as it is ignoring the expert advice of those who have a better understanding of the dispersion modeling process, and the corresponding regulations and guidance issued by the EPA.

By doing this, the Division might be issuing permits to facilities that are causing or contributing to modeled violations of the NAAQS, which I think is something we should all be concerned about.

I agree with you that this discussion is way beyond the scope of the NACAA survey, and I never intended to suggest otherwise, but the questions in the survey reminded me of this unresolved issue at the APCD: the requirement in AQCC Regulation 3 to verify compliance with the NAAQS before issuing a permit, and the question of what kind of demonstration of compliance with the NAAQS has been performed for all those applications with emissions below the annual thresholds (e.g. 40 tpy for NO2 and SO2) that were never required to submit modeling, but that have emissions above the short-term thresholds or that meet other criteria that would warrant a modeling analysis.

I have made this same question to several people at the APCD before, including Will, and just like in your case now, the question has always been left unanswered. And I'm not referring to those hundreds of applications with VOC-only emissions or ownership change applications, I'm referring to applications like Williams Willow Creek or Williams

Crawford Trail, and many other that despite the clear potential to cause modeled violations of the 1-hr NO<sub>2</sub> or SO<sub>2</sub> NAAQS, were never required to submit a quantitative demonstration of compliance with those NAAQS.

Anyway, I can see that under the current circumstances my questions are mostly rhetorical, and I admit that all this discussion is way above my pay grade. But as technical staff constantly dealing with this issue, I thought the NACAA survey was a good opportunity to, once again, bring this problem to the attention of decision makers like you, who have steered the Division all these years and are ultimately responsible for defining how things work at the APCD.

I appreciate your taking the time to reply to my email and address my concerns.

Rosendo

---

**Rosendo Majano**

Air Quality Scientist

Modeling, Meteorology and Emission Inventory Unit

Air Pollution Control Division

Colorado Department of Public Health and Environment

On Mon, Jun 29, 2015 at 4:57 PM, Hea - CDPHE, Roland [REDACTED] wrote:

Rosendo,

Thanks for your thoughts. You raise some very good questions that warrant a broader internal discussion.

For purposes of responding to the New Mexico NACAA survey request, I tried to keep my responses as brief as possible. On Questions 1 and 2, they were simply asking for a yes/no response. The only reason I included some additional discussion was to convey that in Colorado we require modeling analysis for some of our minor source permit applications based on a set of thresholds/criteria that we have established over time.

The 40 tpy NO<sub>x</sub> and SO<sub>2</sub> threshold I cited was simply an example of one of the criteria we use. The New Mexico questions appear to be geared to how other agencies are addressing modeling (or not modeling) for the 1-hour NO<sub>2</sub> and SO<sub>2</sub> standards. I responded N/A for Question 3 because for some applications we do model to demonstrate compliance with the 1-hour standards. We typically receive several thousand minor source permit applications per year and the vast majority do not trigger our modeling thresholds/criteria based either on their level of requested emissions or because of the pollutant involved, e.g., we get lots of oil and gas E&P site applications that only have reportable VOC emissions.

For me, the questions regarding which of these applications we do require quantitative modeling analysis for and how we establish a workable set of thresholds/criteria were way beyond the scope of the response back to New Mexico. We should be discussing these questions internally between SSP, TSP, P&P, etc. if we feel there are issues with our approach.

Roland

On Mon, Jun 29, 2015 at 9:53 AM, Rosendo Majano [REDACTED] wrote:

Roland,

This email was forwarded to me and I wanted to ask you a couple of things given that your response doesn't seem to completely address the requirements in AQCC Regulation 3.

- 1- The requirement in Reg 3 is not to do modeling, but to verify compliance with the NAAQS (AQCC Regulation 3, Part B, III.D.1.c and d).
- 2- My understanding is that dispersion modeling is the only mechanism approved by the EPA to quantify impacts on air quality. Per AQCC Regulation 3, Part B, III.B.5 the Division needs to prepare a preliminary analysis that will indicate what impact, if any, the new source will have. Such preliminary analysis will allow the Division to determine, among other requirements, whether the new source will comply with the NAAQS.
- 3- So according to your response to questions 1 and 2 below the SSP does not require modeling for sources with proposed permitted emissions below the 40 tpy threshold for NO<sub>2</sub> and SO<sub>2</sub>. So in those cases, how does the SSP verify compliance with the 1-hr NO<sub>2</sub> and 1-hr SO<sub>2</sub> NAAQS? That's question 3 below that was left unanswered.

According to your email that's the case for the vast majority of minor source applications, so I'm curious to know for those applications with NO<sub>2</sub> and/or SO<sub>2</sub> emissions below the 40 tpy threshold, if the impacts on ambient air are not quantified through dispersion modeling, what kind of demonstration of compliance with the NAAQS has been performed that has allowed the SSP to issue these permits all these years?

I will appreciate your response.

Rosendo

---

**Rosendo Majano**

Air Quality Scientist

Modeling, Meteorology and Emission Inventory Unit

Air Pollution Control Division

Colorado Department of Public Health and Environment

----- Forwarded message -----

From: Hea - CDPHE, Roland [REDACTED]

Date: Fri, Jun 26, 2015 at 4:46 PM

Subject: Fwd: Brief Survey - Minor Source Modeling

To: William Allison - CDPHE [REDACTED], Chris Colclasure - CDPHE [REDACTED], Gordon Pierce - CDPHE

[REDACTED], Christopher Laplante -

CDPHE [REDACTED], Stefanie Rucker - CDPHE [REDACTED], Mark McMillan - CDPHE [REDACTED]

All,

FYI - Here is a response I sent to Rita Bates with the State of New Mexico as a result of a request from NACAA. It was straightforward, so I just went ahead and replied.

Thanks and have a nice weekend,  
Roland

----- Forwarded message -----

From: Hea - CDPHE, Roland [REDACTED]  
Date: Fri, Jun 26, 2015 at 4:29 PM  
Subject: Re: Brief Survey - Minor Source Modeling  
To: [REDACTED], Karen Mongoven [REDACTED]

Rita,

Here are Colorado's responses to your questions:

**Does your state require facility modeling analysis for minor source permitting?**

Yes, for some of our minor source permit applications. We have developed a set of thresholds and criteria for when modeling is required for minor source applications. For example, new sources whose proposed permitted emissions are equal to or greater than 40 tons per year of NOx or SO2, or existing sources who are proposing to increase their permit limits by 40 tons per year or more of NOx or SO2 are required to model for that pollutant. As a matter of practice, the vast majority of our minor source applications do not require modeling analysis because they don't trigger the modeling thresholds or criteria.

**If you require modeling analysis for minor sources do you require modeling demonstration of compliance with 1-hr NO2 and 1-hr SO2 NAAQS?**

Yes, if they trigger our modeling thresholds or criteria for NOx or SO2.

**If you do not require a modeling analysis, do you show compliance with the NO2 and SO2 1-hour standards in another way? If yes, how?**

Not applicable based on our responses to Questions 1 and 2.

Please let me know if you have any questions or would like to discuss in greater detail.

Best regards,  
Roland

On Fri, Jun 26, 2015 at 10 00 AM, Karen Mongoven [REDACTED] wrote:

TO: NACAA NEW SOURCE REVIEW COMMITTEE  
NACAA EMISSIONS AND MODELING COMMITTEE

Rita Bates (New Mexico) asked me to circulate the following brief survey questions to committee members and would appreciate it if you could take a few moments to respond. This email is formatted so that responses will be addressed to both Rita and me. Thank you in advance for your assistance.

**Does your state require facility modeling analysis for minor source permitting?**

Yes or No

**If you require modeling analysis for minor sources do you require modeling demonstration of compliance with 1-hr NO2 and 1-hr SO2 NAAQS?**

Yes or No

**If you do not require a modeling analysis, do you show compliance with the NO2 and SO2 1-hour standards in another way? If yes, how?**

Rita Bates  
Planning Section Chief  
Air Quality Bureau – New Mexico Environment Department  
525 Camino de los Marquez, Suite I  
Santa Fe, New Mexico 87505

[REDACTED]  
[REDACTED]  
[REDACTED]

\*\*\*

Karen K. Mongoven

Senior Staff Associate

National Association of Clean Air Agencies

444 North Capitol Street, NW, Suite 307

Washington, DC 20001

[Redacted]

[Redacted]

[Redacted]

--

Roland C. Hea, P.E.  
Permitting Section Supervisor

[Redacted]

[Redacted]

--

Roland C. Hea, P.E.  
Permitting Section Supervisor

[Redacted]

[Redacted]

--

Roland C. Hea, P.E.  
Permitting Section Supervisor

[Redacted]

[Redacted]

--

Roland C. Hea, P.E.  
Permitting Section Supervisor

[Redacted]

[Redacted]





STATE OF COLORADO



**Excel Denver Steam Plant**

1 message

**R K Hancock III** [redacted] Tue, Sep 6, 2016 at 11:00 AM  
To: Rosendo Majano - CDPHE [redacted]  
Cc: Emmett Malone - CDPHE [redacted], Gordon Pierce - CDPHE [redacted], Roland Hea - CDPHE [redacted], Mark McMillan - CDPHE [redacted]

Rosendo,

In your e-mail to Xcel you made some excellent arguments why impact modeling to the 1 hour NOx standard would be a good idea for the proposed new boiler at the existing steam plant. However, PS memo 10-01 makes it very clear that we cannot require Xcel to do modeling to the 1 hour NOx standard since emissions of NOx will be less than 40 tons per year.

I will let Gary Magno know that we will not be requiring modeling to the 1 hour NOx standard for the new boiler so long as emissions are limited to less than 40 tons per year.

Chip

R K "Chip" Hancock III, P.E.  
Construction Permit Unit Supervisor  
Stationary Sources Program  
Air Pollution Control Division



**NOTE:** As of January 1, 2014, the Colorado Air Pollution Control Division no longer accepts blank or incomplete APENs. Additional fees may apply if an APEN is submitted without the necessary information. An application with missing information may result in longer processing times. Please note that all APEN submissions should be completed using forms currently supplied by the Division (See Reg. 3, Part A, Section II.A). Current APEN forms can be found at: <https://www.colorado.gov/cdphe/APENforms>.



STATE OF COLORADO

Fwd: MMM Monaghan - air modeling status

1 message

Rink - CDPHE, Bradley [redacted] Wed, Mar 11, 2020 at 1:51 PM
To: Rosendo Majano [redacted], Emmett Malone [redacted], "Reynolds - CDPHE, DeVondria" [redacted]

fyi

Bradley Rink
Technical Services Program, Air Pollution Control Division
emailsig.png



----- Forwarded message -----

From: Brickey - CDPHE, Jonathan [redacted]
Date: Wed, Mar 11, 2020 at 1:45 PM
Subject: Re: MMM Monaghan - air modeling status
To: Anna Unruh [redacted]
Cc: Hanna Warlick [redacted], Erin Kunkel [redacted], Bradley Rink - CDPHE [redacted]

Anna,

After consul ing with some higher-ups, I agree that modeling for the 24-hour PM2.5 standard will not be required in this case.

Unfortunately, we don't have a specific written policy I can point to that says "you can always ignore the daily PM2.5 modeling hreshold", but we do it on more of a case-by-case basis. In the case of Monaghan, it's nearly a half mile from the nearest residential area (and predominant wind patterns in the area are in the opposite direction), the topography of the area is very flat, and I haven't heard any community objections, so I don't have an issue with overlooking this particular PM2.5 modeling.

Thanks,

Jonathan Brickey, PE
Permit Engineer
Construction Permits Unit



COLORADO
Air Pollution Control Division
Department of Public Health & Environment

P 303.691.4093 | F 303.782.0278

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On Wed, Mar 11, 2020 at 12:09 PM Anna Unruh [redacted] wrote:

Hi Jonathan,

I've received guidance from multiple non-oil & gas permit engineers in the last year or so that the agency only looks at the 5 tpy threshold for PM2.5, unless there are special circumstances (e.g., high expectation of comments from nearby residents). The first time I heard it, I was surprised, so I've brought it up with other permit engineers (basically anytime I've had the chance) and was told the same thing. Based on this guidance, we did not submit daily PM2.5 modeling.

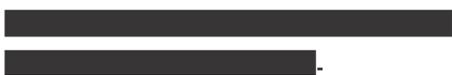
Thanks,

Anna

Anna Unruh
Senior Consultant

Trinity Consultants

1391 N Speer Blvd Suite 350 | Denver, CO 80204



From: Brickey - CDPHE, Jona han [redacted]
Sent: Wednesday, March 11, 2020 10:06 AM
To: Anna Unruh [redacted]
Subject: MMM Monaghan - air modeling status

Anna,

I was going over the Monaghan modeling with Bradley, and I wanted to give you a quick update.

All the emission factors/calculations look good. Bradley was going to make some slight changes to how the emission types were binned, but he said any changes to the final outcome will be minimal, nothing to worry about.

However, your analysis doesn't seem to address the 24-hour PM2.5 standard. Table 7-1 notes that the annual PM2.5 emissions are below the modeling threshold, but makes no mention of the short term PM2.5 NAAQS (35 ug/m3). Considering the facility-wide daily PM10 emissions in Table D-1 show 321.63 ppd of emissions, it's unlikely that facility-wide daily PM2.5 emissions will be below the modeling threshold of 11 ppd, but I don't see any daily total calculated. What was your reasoning for leaving out daily PM2.5 from the modeling?

Thanks,

Jonathan Brickey, PE  
Permit Engineer  
Construction Permits Unit



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Fwd: Modeling meeting outcome

1 message

Reynolds - CDPHE, DeVondria

Tue, Mar 16, 2021 at 1:39 PM

To: Matt Burgett - CDPHE, Rosendo Majano - CDPHE

fyi
DeVondria Reynolds, MS
Air Quality Modeler
Modeling and Emissions Inventory Unit
Technical Services Program



[Redacted]

Learn more about COVID-19 https://www.colorado.gov/pacific/cdphe/apcd-covid-19 .

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From: Reynolds - CDPHE, DeVondria
Date: Tue, Mar 16, 2021 at 3:38 PM
Subject: Re: Modeling meeting outcome
To: Kaufman - CDPHE, Garrison
Cc: Gordon Pierce - CDPHE, Emmett Malone, Bradley Rink - CDPHE

Hello Gary,

Based on the above communication that took place during the uncompromising meeting Emmett encountered yesterday with Gordon, Robyn and yourself, It is unclear how Regulation 3, Part B, Sections III.B.5.d and III.D.1.c will be satisfied.

As stated in the Clean Air Act and per my job description it is my duty to determine compliance or noncompliance with the National Ambient Air Quality Standards, the Colorado Ambient Air Quality Standards, PSD Increments, and Air Quality Related Values, for major and minor sources of air pollution. It is my understanding that you are instructing me to turn a blind eye to the work that we are supposed to do in order to protect and improve the health of Colorado's citizens and the quality of its environment.

I refuse to sign my name on any fur her modeling reports under your mandate without a written documented memo (or likewise) that has your signature of approval that is dictating this direct violation of law and regulations. Considering the lawsuits that have been presented to our division I do not want litigation brought upon myself seeing that it is your direction that has led us down this path (you are more than welcome to sign off on all modeling reports going forward, not something I would recommend seeing that you did not do the work but that choice is yours).

I do want to make you aware that if this email remains unresponsive by you I will forward his correspondence and your lack of reply to the Environmental Program Manager, a general assembly, EPA and environmental groups if need be.

I would like for it to also be noted that I do not appreciate being bullied and forced into a situation that is in direct violation of federal regulations. As much as you and your higher official peers assume modeling is a meaningless unit, resources should not be taken away nor should our job responsibilities be reduced. Your push should be to only add resources to this unit not take away.

DeVondria Reynolds, MS
Air Quality Modeler
Modeling and Emissions Inventory Unit
Technical Services Program



[Redacted]
4300 Cherry Creek Drive South, Denver, CO 80246-1530
[Redacted]

Learn more about COVID-19 https://www.colorado.gov/pacific/cdphe/apcd-covid-19 .

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On Tue, Mar 16, 2021 at 2:43 PM Rink - CDPHE, Bradley [Redacted] wrote:

yep
Bradley Rink
Technical Services Program, Air Pollution Control Division
[Redacted] CO 80246

----- Forwarded message -----

From: Malone - CDPHE, Emmett [Redacted]

Date: Tue, Mar 16, 2021 at 11:12 AM  
Subject: Fwd: Modeling mee ing outcome  
To: Bradley Rink - CDPHE [REDACTED], DeVondria Reynolds - CDPHE [REDACTED]

Gordon response

Emmett Malone  
Supervisor  
Modeling and Emissions Inventory Unit  
[Technical Services Program](#)  
Air Pollution Control Division  
Colorado Department of Public Health and Environment  
APCD-TS-B1  
[4300 Cherry Creek Drive South](#)  
Denver, CO 80246-1530  
[REDACTED] [REDACTED]

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----- Forwarded message -----

From: **Pierce - CDPHE, Gordon** [REDACTED]  
Date: Tue, Mar 16, 2021 at 10:06 AM  
Subject: Re: Modeling meeting outcome  
To: Malone - CDPHE, Emmett [REDACTED]

No, we are not to address the short-term standards..."the short-term thresholds in the Modeling Guideline will not be used."

(Based on Brad's email, is he planning something?)

Gordon

On Tue, Mar 16, 2021 at 8:04 AM Malone - CDPHE, Emmett [REDACTED] wrote:

Hi,

Had a discussion with Brad and DeVondria this morning and it went much like I thought it would, badly. I feel like I have stepped back in time and Doris and Rosendo are arguing about how this is wrong.

One question that came up and if you or Garry could respond I would appreciate it. What I took from the mee ing was hat we are not to address the short term standards. The way you worded your email is slightly different, are we to address the short term standards?

2 years, 7 months, and 15 days.

Emmett Malone  
Supervisor  
Modeling and Emissions Inventory Unit  
[Technical Services Program](#)  
Air Pollution Control Division  
Colorado Department of Public Heal h and Environment  
APCD-TS-B1  
[4300 Cherry Creek Drive South](#)  
Denver, CO 80246-1530  
[REDACTED] [REDACTED]

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On Mon, Mar 15, 2021 at 4:30 PM Pierce - CDPHE, Gordon [REDACTED] wrote:  
Emmett,

Per the meeting we had today 3/15/21 with Garry and Robyn, Garry specifically stated that, effec ive immediately, the short-term thresholds in the Modeling Guideline will not be used and that modeling only be performed using the following thresholds:

- 40 tpy for NO2 and SO2
- 82 lbs/day for PM10
- 5 tpy for PM2.5
- 23 lbs/hr for CO
- 25 lbs/3-mo for Pb

He will allow exceptions based on agreement between the modelers and permit engineers, and his specific approval.

Garry also requested that the Modeling Guideline also be removed from the website, pending further discussions and revisions. I will ask Ivan to pull it. Attached is a copy of the current version that is on the website.

Thanks,  
Gordon

--

Gordon Pierce  
Program Manager

Technical Services Program



4300 Cherry Creek Drive South, Denver, CO 80246-1530



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--

Gordon Pierce  
Program Manager  
Technical Services Program



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STATE OF COLORADO

Re: Modeling meeting outcome

1 message

Rink - CDPHE, Bradley [redacted] Tue, Mar 16, 2021 at 1:31 PM
To: Gordon Pierce - CDPHE [redacted], Emmett Malone [redacted], "Reynolds - CDPHE, DeVondria" [redacted]
Cc: "Simpson - CDPHE, Joi" [redacted], "Garrison W. Kaufman" [redacted], "Burgett - CDPHE, Matt" [redacted], Rosendo Majano [redacted]

FYI - these actions undertaken by APCD management, et al., are in violation of the law defined by the Clean Air Act, and rules defined by APCD and the AQCC. I object to these directions by my management as they are in violation of Federal Law and State Rule; I am requesting whistleblower status.

regards

blr

Bradley Rink
Technical Services Program, Air Pollution Control Division
4300 Cherry Creek Dr. South, Denver, CO 80246

On Tue, Mar 16, 2021 at 12:42 PM Rink - CDPHE, Bradley [redacted] wrote:

yep

Bradley Rink
Technical Services Program, Air Pollution Control Division

----- Forwarded message -----

From: Malone - CDPHE, Emmett [redacted]
Date: Tue, Mar 16, 2021 at 11:12 AM
Subject: Fwd: Modeling meeting outcome
To: Bradley Rink - CDPHE [redacted], DeVondria Reynolds - CDPHE [redacted]

Gordon response

Emmett Malone
Supervisor
Modeling and Emissions Inventory Unit
Technical Services Program
Air Pollution Control Division
Colorado Department of Public Health and Environment
APCD-TS-B1
4300 Cherry Creek Drive South
Denver, CO 80246-1530

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----- Forwarded message -----

From: Pierce - CDPHE, Gordon [redacted]
Date: Tue, Mar 16, 2021 at 10:06 AM
Subject: Re: Modeling meeting outcome
To: Malone - CDPHE, Emmett [redacted]

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Gordon

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2 years, 7 months, and 15 days.

Emmett Malone
Supervisor
Modeling and Emissions Inventory Unit

Technical Services Program  
Air Pollution Control Division  
Colorado Department of Public Health and Environment  
APCD-TS-B1  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530

[Redacted]

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He will allow exceptions based on agreement between the modelers and permit engineers, and his specific approval.

Garry also requested that the Modeling Guideline also be removed from the website, pending further discussions and revisions. I will ask Ivan to pull it. Attached is a copy of the current version that is on the website.

Thanks,  
Gordon

--

Gordon Pierce  
Program Manager  
Technical Services Program



4300 Cherry Creek Drive South, Denver, CO 80246-1530

[Redacted]

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--

Gordon Pierce  
Program Manager  
Technical Services Program



4300 Cherry Creek Drive South, Denver, CO 80246-1530

[Redacted]

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STATE OF COLORADO

**Re: Asphalt Specialties - Central Plant**

1 message

Thu, Oct 10, 2019 at 4:53 PM

**Moseley - CDPHE, Aaron** [REDACTED]

To: Rosendo Majano [REDACTED]

Cc: "Reynolds - CDPHE, DeVondria" [REDACTED], Emmett Malone [REDACTED], Chip Hancock - CDPHE [REDACTED]

Rosendo,

Per Chip's guidance, for this facility, SSP is only asking for a demonstration of compliance with the carbon monoxide 1-hr and 8-hr NAAQS.

Thanks, stay warm!

Aaron Moseley  
Permit Engineer

Stationary Sources Program



**COLORADO**  
Air Pollution Control Division  
Department of Public Health & Environment

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On Thu, Oct 10, 2019 at 2:12 PM Rosendo Majano [REDACTED] wrote:

Hi Aaron,

We have started the review of the subject application and found that the facility submitted a NAAQS compliance demonstration only for carbon monoxide despite having emissions rates of PM10, PM2.5, SO2 and NOx, that exceed the corresponding short-term modeling thresholds.

Could you please confirm for which pollutants-averaging periods did the Stationary Sources Program request a NAAQS compliance demonstration?

Thanks!

Rosendo

---

**Rosendo Majano**



Fwd: MMM Monaghan - air modeling status

1 message

Rosendo Majano [redacted] Thu, Mar 12, 2020 at 8:28 AM
To: "Brickey, Jonathan" [redacted]
Cc: Emmett Malone [redacted]
Bcc: Bradley Rink - CDPHE [redacted], "Reynolds - CDPHE, DeVondria" [redacted]

Jonathan,

Your email below was forwarded to me. I know that you are following instructions from your supervisors when not requesting a 24-hr PM2.5 NAAQS compliance demonstration, but I would fail to do my job if I don't inform you that the Martin Marietta Monaghan facility submitted a screening modeling analysis for CO, PM10, and PM2.5 last year (see the attached modeling review report) and that such analysis resulted in a modeled violation of the 24-hr PM2.5 NAAQS.

Because the previous results are from a screening analysis, the next recommended step should be to request a refined modeling analysis to verify NAAQS compliance per CO Regulation 3, Part B §III.B.5.d and §III.D.1.c. That's what I would suggest.

Once again, I understand the constraints of your situation, but my role in this permit application is to verify NAAQS compliance, so I feel compelled to inform you of the pre-existing PM2.5 NAAQS compliance issue at this facility.

Thanks,

---
Rosendo Majano
Permit Modeling Work Lead
Modeling and Emissions Inventory Unit



[redacted]

----- Forwarded message -----

From: Rink - CDPHE, Bradley [redacted]
Date: Wed, Mar 11, 2020 at 1:51 PM
Subject: Fwd: MMM Monaghan - air modeling status
To: Rosendo Majano [redacted], Emmett Malone [redacted], Reynolds - CDPHE, DeVondria [redacted]

fyi
Bradley Rink
Technical Services Program, Air Pollution Control Division
[redacted]

----- Forwarded message -----

From: Brickey - CDPHE, Jonathan [redacted]
Date: Wed, Mar 11, 2020 at 1:45 PM
Subject: Re: MMM Monaghan - air modeling status
To: Anna Unruh [redacted]
Cc: Hanna Warlick [redacted], Erin Kunkel [redacted], Bradley Rink - CDPHE [redacted]

Anna,
After consulting with some higher-ups, I agree that modeling for the 24-hour PM2.5 standard will not be required in this case.
Unfortunately, we don't have a specific written policy I can point to that says "you can always ignore the daily PM2.5 modeling threshold", but we do it on more of a case-by-case basis. In the case of Monaghan, it's nearly a half mile from the nearest residential area (and predominant wind patterns in the area are in the opposite direction), the topography of the area is very flat, and I haven't heard any community objections, so I don't have an issue with overlooking this particular PM2.5 modeling.

Thanks,
Jonathan Brickey, PE
Permit Engineer
Construction Permits Unit



[redacted]

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On Wed, Mar 11, 2020 at 12:09 PM Anna Unruh [REDACTED] wrote:

Hi Jonathan,

I've received guidance from multiple non-oil & gas permit engineers in the last year or so that the agency only looks at the 5 tpy threshold for PM2.5, unless there are special circumstances (e.g., high expectation of comments from nearby residents). The first time I heard it, I was surprised, so I've brought it up with other permit engineers (basically anytime I've had the chance) and was told the same thing. Based on this guidance, we did not submit daily PM2.5 modeling.

Thanks,

Anna

**Anna Unruh**  
Senior Consultant

**Trinity Consultants**

1391 N Speer Blvd Suite 350 | Denver, CO 80204

[REDACTED]  
[REDACTED]

**From:** Brickey - CDPHE, Jonathan [REDACTED]  
**Sent:** Wednesday, March 11, 2020 10:06 AM  
**To:** Anna Unruh [REDACTED]  
**Subject:** MMM Monaghan - air modeling status

Anna,

I was going over the Monaghan modeling with Bradley, and I wanted to give you a quick update.

All the emission factors/calculations look good. Bradley was going to make some slight changes to how the emission types were binned, but he said any changes to the final outcome will be minimal, nothing to worry about.

However, your analysis doesn't seem to address the 24-hour PM2.5 standard. Table 7-1 notes that the annual PM2.5 emissions are below the modeling threshold, but makes no mention of the short term PM2.5 NAAQS (35 ug/m3). Considering the facility-wide daily PM10 emissions in Table D-1 show 321.63 ppd of emissions, it's unlikely that facility-wide daily PM2.5 emissions will be below the modeling threshold of 11 ppd, but I don't see any daily total calculated. What was your reasoning for leaving out daily PM2.5 from the modeling?

Thanks,

Jonathan Brickey, PE  
Permit Engineer  
Construction Permits Unit



[REDACTED]  
jonathan.brickey@state.co.us | [www.colorado.gov/cdphe/apcd](http://www.colorado.gov/cdphe/apcd)

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**Martin Marietta Monaghan Facility - Modeling Review Report 03082019.pdf**  
807K

STATE OF  
COLORADO**Re: MMM Monaghan - air modeling status**

1 message

**Rosendo Majano**

Thu, Mar 12, 2020 at 7:47 AM

To: "Rink - CDPHE, Bradley"

Cc: "Reynolds - CDPHE, DeVondria", Emmett Malone

Regarding the email head below:

From CO Regulation 3, Part B §III.D.1.c

**"... the Division shall grant the permit if it finds that: The proposed source or activity will not cause an exceedance of any National Ambient Air Quality Standards;"**

From CDPHE's 03/06/2020 press release distributed among all employees:

**"Our rules and regulations exist for a reason: they protect Coloradans' health and the environment that we all cherish, so compliance is not an option; it's an imperative," said Garry Kaufman, director of the Colorado Air Pollution Control Division.**

The modeling analysis submitted by the Monaghan facility for this same permit application already resulted in a 24-hr PM2.5 NAAQS modeled violation.

**Rosendo Majano**

----- Forwarded message -----

From: **Brickey - CDPHE, Jonathan**

Date: Wed, Mar 11, 2020 at 1:45 PM

Subject: Re: MMM Monaghan - air modeling status

To: Anna Unruh

Cc: Hanna Warlick, Erin Kunkel, Bradley Rink - CDPHE

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Thanks,

Jonathan Brickey, PE  
Permit Engineer  
Construction Permits Unit**COLORADO**  
**Air Pollution Control Division**  
Department of Public Health & Environment**Are you curious about ground-level ozone in Colorado? Visit our [ozone webpage](#) to learn more.**

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Thanks,

Anna

**Anna Unruh**  
Senior Consultant**Trinity Consultants**

1391 N Speer Blvd Suite 350 | Denver, CO 80204

[REDACTED]  
[REDACTED]  
[REDACTED]  
**From:** Brickey - CDPHE, Jonathan [REDACTED]  
**Sent:** Wednesday, March 11, 2020 10:06 AM  
**To:** Anna Unruh [REDACTED]  
**Subject:** MMM Monaghan - air modeling status

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All the emission factors/calculations look good. Bradley was going to make some slight changes to how the emission types were binned, but he said any changes to the final outcome will be minimal, nothing to worry about.

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Thanks,

Jonathan Brickey, PE  
Permit Engineer  
Construction Permits Unit



[REDACTED]  
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**Oxford Asphalt Plant**

Rosendo Majano [REDACTED]  
To: Aaron Moseley - CDPHE [REDACTED]  
Cc: Emmett Malone [REDACTED], "Reynolds - CDPHE, DeVondria" [REDACTED]

Wed, Feb 19, 2020 at 8:23 AM

Hi Aaron,

I was discussing with DeVondria yesterday the Oxford Asphalt Plant modeling analysis, and there are some issues that we need to bring to your attention.

**1- Particulate matter modeling.**

The modeling report that was submitted earlier this month has the following language:

*In an email dated May 2, 2019, Mr. Moseley of the CDPHE indicated that, based on his calculations, CO and particulate matter (PM) must be modeled. He also indicated in this email communication that he would perform the SCREEN3 modeling for the particulate sources, and that Aggregate Industries would only be responsible for the CO modeling.*

SCREEN3 is an outdated program that is no longer an EPA regulatory model for permitting purposes. If I'm not mistaken it was replaced by AERSCREEN in early 2011, so I would not recommend to use SCREEN3 results to support a permitting action. Moreover, both SCREEN3 and AERSCREEN are one-source models, meaning that you can only model once source at a time, so there is no way to represent at the same time all the sources of fugitive dust, which typically are responsible for a much larger fraction of the total particulate matter emissions. Hence our long standing recommendation to use AERMOD when modeling this type of facilities.

Currently the consultants have not provided the necessary information that would allow us to model the fugitive dust sources, so our recommendation is to request the applicant to submit the particulate matter modeling in AERMOD for us to review. However, this is your decision. Please let us know how you would like to proceed.

**2- Stack parameters of the drum mixer.**

The exhaust velocity of the drum mixer used in the modeling analysis is of 440.9 m/s, which seems quite high. Has the consultant sent you specification sheets for this unit or do you know from experience if this range of exhaust velocity is normal for a drum mixer?

**3- Pb emissions.**

This facility is reporting Pb emissions of 5.2 lb/day and indicating that the requested operating limit is 5000 hours per year. At this emission rate the facility will exceed EPA's 0.5 tpy Pb emissions threshold for monitoring, so we would need to notify the Division's particulate monitoring group. This daily emission rate also exceeds by far the modeling threshold in our CO Modeling Guideline, so we would also recommend that Pb modeling be submitted as well. Alternatively, we could do that modeling analysis in house, but in any case, we would ask you for confirmation if that daily emission rate is correct and if this facility will have the 5000 hrs/year restriction in the permit. Also, could you please confirm if there will be any restriction in the daily hours of operation?

**4- APENs and PA.**

Could you please provide us with a copy of the APENs and the preliminary analysis for this facility?

Thanks in advance for your help!

---  
Rosendo Majano [REDACTED]



---

**Oxford Asphalt Plant**

Rosendo Majano [REDACTED]

Thu, Feb 27, 2020 at 11:35 AM

To: "Reynolds - CDPHE, Devonoria [REDACTED]"

Hi DeVondria,

I talked to Aaron about the issues with the Oxford Asphalt Plant, and he said he would get back to us with the information: APENs, PA, confirmation of the Pb emissions, and high velocity of the exhaust from the drum mixer.

The one issue for which he gave me a definitive answer is the modeling of the PM emissions with SCREEN3. I explained that this is no longer a regulatory model and he told me that he was instructed to do use that model, so that's what he is going to do.

I would recommend to include a statement indicating that SCREEN3 is no longer a regulatory model and that those results can't be used for a NAAQS compliance determination. I would also recommend to include an explanation about that being a single-source model and that fugitive PM emissions can't be included in the analysis.

Finally, I recommend that you place this application on hold until you get all the necessary information from Aaron.

We can discuss this in more detail but I just wanted to let you know about these answers.

Thanks,

---

**Rosendo Majano**  
[REDACTED]



CC&V Modeling Results

1 message

Rosendo Majano  
To: Emmett Malone

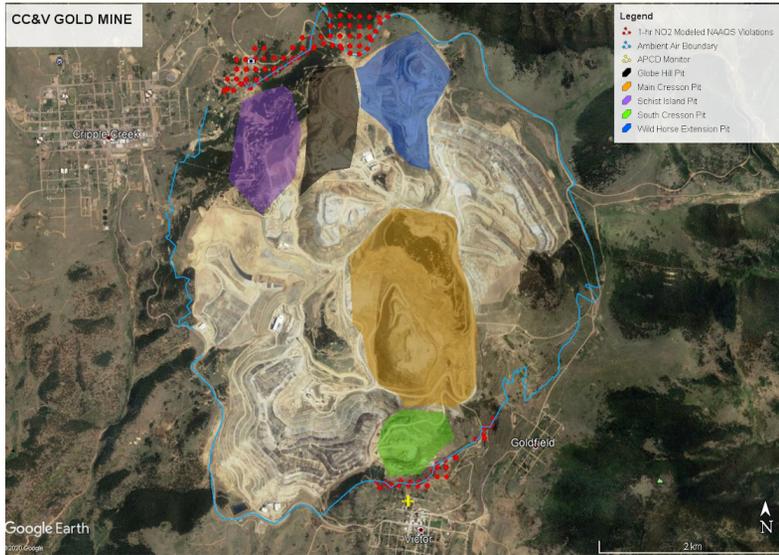
Thu, Mar 12, 2020 at 2:33 PM

Emmett,

You requested the maximum modeled concentrations on both the southern and north portion of the CC&V Mine property boundary shown in the figure below and listed as 1-hr NO2 Modeled NAAQS violations.

As you know, officially there aren't any modeled violations at the CC&V Mine. That's because of the 01/14/19 and 01/28/19 emails from Gordon Pierce requesting to remove the concentration exceeding the NAAQS from the report and to replace them with a value that was lower and that was based on incorrect data. Therefore officially the highest modeled concentration is of 187.7 ug/m3 (99.77 ppb). The NAAQS is of 100 ppb.

Reality however, is very different. The actual highest modeled design concentration in the southern area of the mine is of 229.34 ug/m3 (121 ppb). In the northern area of the mine this concentration is of 225.78 ug/m3 (120 ppb). This is the information you are now requesting.



Those results above beg the question, if the Division is now acknowledging the modeled NAAQS violations, why would the permit be issued?

Wouldn't that create the exact same situation as the ColoWyo Mine permit that was challenged in court for being issued with a NAAQS modeled violation?

---  
Rosendo Majano  
Permit Modeling Work Lead  
Modeling and Emissions Inventory Unit



[Redacted] 1530

**H1H and McCormick**

4 messages

**Malone - CDPHE, Emmett**To: Rosendo Majano - CDPHE [REDACTED], Bradley Rink - CDPHE [REDACTED], DeVondria Reynolds - CDPHE [REDACTED]  
Cc: "Gordon.Pierce@state.co.us" [REDACTED]

Tue, Sep 15, 2020 at 1:26 PM

Hi,

Today's meeting with management is over. It was decided to use option 3 for the H1H question. The variation of this option chosen is, when there is not representative meteorological data the two most representative meteorological data sets available for the site will be provided to the applicant/consultant. Both data sets will be modeled. The data set with the highest impacts will be used for the design concentration. The design concentration will be the form of the standard.

I will let the industry workgroup know what was decided Sep 30. If there are no major concerns raised by industry we will implement the new policy Oct 1.

On the McCormick Asphalt Plant there was no conclusive answer on how to handle this type of situation other than we will continue to talk about it in the quarterly meetings I have with management. In McCormicks case since the owner was open to raising the stacks I was asked to ask him to do so. But before doing so it was thought that we should do some quick model runs to get an idea how high the stacks would need to be raised to make sure we are not asking something that is not practical. I have asked DeVondria to do some runs to get an idea of how high the stacks need to be.

I called Steve McCormick and let him know what was going on and he was OK with the approach.

Let me know if you have any questions.

Emmett Malone  
Supervisor  
Modeling and Emissions Inventory Unit  
[Technical Services Program](#)  
Air Pollution Control Division  
Colorado Department of Public Health and Environment  
APCD-TS-B1  
[4300 Cherry Creek Drive South](#)  
Denver, CO 80246-1530

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**Rosendo Majano**To: "Malone - CDPHE, Emmett" [REDACTED]  
Cc: Bradley Rink - CDPHE [REDACTED], DeVondria Reynolds - CDPHE [REDACTED], "Gordon.Pierce@state.co.us" [REDACTED]

Tue, Sep 15, 2020 at 3:15 PM

I was taking a look at all the information and it seems to me that the issues with the McCormick plant are not only with its design, but also with its location. There is an ethanol plant located about a kilometer away that is causing modeled violations of the 24-hr PM2.5 NAAQS and that might also be causing high 1-hr NO2 impacts. If that's the case raising the stacks at McCormick might not solve the problem.

My recollection is that no nearby sources were included in the 1-hr NO2, and if that's the case the impacts from McCormick don't have to be that high to contribute to modeled violations of these standards.

There is also the problem that the modeling for PM did not include any fugitive emissions. McCormick submitted modeling for Carbon Monoxide only, which means that they only modeled point sources, so they did not provide any information that would allow us to model fugitives (e.g. haul road traffic, materials handling, etc.).

What has been modeled so far is the PM emissions from the stacks, and the 24-hr PM2.5 impacts from those emissions alone were fairly high, although still below the corresponding NAAQS. That's why the draft table of results includes the following conclusion: *Although a complete analysis could not be completed for PM fugitive emissions it is possible that the facility will contribute to a model violation of the PM2.5 NAAQS standard if additional fugitive emissions are added to the modeling including background.*

In my opinion, raising the stacks might be a solution only for the 1-hr and 3-hr SO2 NAAQS modeled violations (unless the ethanol plant is burning coal or other fuel with high sulfur content), but for 1-hr NO2 and 24-hr PM2.5 I think that full cumulative analyses would be needed for to determine if the McCormick plant would contribute to modeled violations.

The test runs with different stack heights will give us only partial answers and will leave us with the uncertainty of what the cumulative impacts will be, so it might be better if we request from the applicant to submit full modeling analyses for all the troubled pollutants and averaging periods. That way we will have certainty of where this facility stands in terms of NAAQS compliance.

---

**Rosendo Majano**

[Quoted text hidden]

**Reynolds - CDPHE, DeVondria**To: Rosendo Majano [REDACTED]  
Cc: "Malone - CDPHE, Emmett" [REDACTED], Bradley Rink - CDPHE [REDACTED]

Tue, Sep 15, 2020 at 5:16 PM

All,

Please see the attached document with my findings.

Please let me know if you have any questions or comments.

**Rosendo,**

I requested nearby source inventory from David and both the previous modeling results and these include nearby sources for all pollutants, you will see that if the 'HMA' stack is raised to 20m then cumulative modeling is no longer required for CO (the only pollutant they were instructed to model, but all other pollutants that they were not instructed to model will require cumulative modeling 'ironic I know...')

I do agree that a complete analysis should be done especially for PM emissions but I do not think we should be doing it for them, at all. The applicant should resubmit their own modeling for testing out raising stacks, additional PM emissions, etc.

Thanks.

DeVondria Reynolds, MS  
Air Quality Modeler  
Modeling and Emissions Inventory Unit  
[Technical Services Program](#)



**COLORADO**  
Air Pollution Control Division  
Department of Public Health & Environment

4300 Cherry Creek Drive South, Denver, CO 80246-1530

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[Quoted text hidden]

 **McCormick Asphalt NAAQS Analysis Summary-raised stack.docx**  
23K

Reynolds - CDPHE, DeVondria [redacted]  
To: Rosendo Majano [redacted] >  
Cc: "Malone - CDPHE, Emmett [redacted]", Bradley Rink - CDPHE [redacted], "Gordon.Pierce@state.co.us" [redacted]



DeVondria Reynolds, MS  
Air Quality Modeler  
Modeling and Emissions Inventory Unit  
Technical Services Program



[redacted]

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[Quoted text hidden]



**McCormick Asphalt Plant**

Malone - CDPHE, Emmett [redacted] Wed, Aug 26, 2020 at 2:57 PM  
To: Matt Burgett - CDPHE [redacted]  
Cc: DeVondria Reynolds - CDPHE [redacted] Bradley Rink - CDPHE [redacted] Rosendo Majano - CDPHE [redacted]

Hi Matt,  
I wanted to give you a heads up. McCormick Asphalt Plant was told to only model CO. When the permit modelers reviewed the application they became concerned about other pollutants because of the nearby sources, low stack heights, and the dirty fuel the plant plans on using.

As I understand it the plant causes or contributes to exceedances of the NAAQS for:  
PM2.5 24hr  
SO2 8hr  
SO2 1hr  
NO2 1hr  
They are using representative meteorological data so these exceedances are using the form of the standard not the H1H. I have attached tables DeVondria has created showing the results. PM was not modeled with fugitive emissions therefore a refined analysis may have even higher impacts. The tables shows that the exceedances are significantly over the NAAQS.

My question becomes do we (Air Division) want to have the source address these impacts or have DeVondria to write her report saying the source was only required to model CO but the source contributes to or causes modeled exceedances of the NAAQS for  
PM2.5 24hr  
SO2 8hr  
SO2 1hr  
NO2 1hr

Attached are some tables showing the modeling results.

Let me know what you think.  
Emmett Malone  
Supervisor  
Modeling and Emissions Inventory Unit  
[Technical Services Program](#)  
Air Pollution Control Division  
Colorado Department of Public Health and Environment  
APCD-TS-B1  
[4300 Cherry Creek Drive South](#)  
[Denver, CO 80246-1530](#)  
[redacted]

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---

McCormick Asphalt NAAQS Analysis Summary-2.docx  
4810K



CC&V

Pierce - CDPHE, Gordon  
 To: Rosendo Majano  
 Cc: Emmett Malone

Mon, Jan 14, 2019 at 2:24 PM

Rosendo,

Please see below for my requested edits in red. The primary one involves the 1-hour NO<sub>2</sub>. While I agree that the use of OLMGROUP ALL is incorrect (per the June Modeler's Workshop), that was an error on our part as we told CC&V to model it that way (as you mention in the writeup). As we have done for other applicants when there is an error on our part, we do not request it be fixed unless there is a need to re-model. Thus, the report summary table should reflect the values without that error being corrected. I do believe that this error should be discussed in the writeup following the summary table, as you have done. If you could please send a revised version for review, I would appreciate it.

Thanks,  
 Gordon

The Division's Modeling and Emissions Inventory Unit (MEIU) received on April 23, 2018 a dispersion modeling analysis submitted by Cripple Creek & Victor Gold Mining Company (CC&V) as part of the application to modify the Construction Permit No.98TE0545 and implement the Mine Life Extension #2 Cresson Project in Teller County, CO.

Review of that modeling analysis was finalized on June 2018 and a final report was written on 06/26/2018 concluding that the proposed project at the Cripple Creek & Victor facility will cause modeled violations of the 1-hr NO<sub>2</sub> NAAQS. In addition, it was concluded that there were several critical errors in the modeling analysis that **should** require correction before it could be determined whether the proposed project will or will not cause and/or contribute to modeled violations of the rest of applicable NAAQS.

After fulfilling administrative requirements of gathering all the communications records for the project, entering all the application information into the Modeling Unit's database, generating a review checklist report, and creating a billing report, the final modeling review report was provided to the permit engineer, Jonathan Brickey, on 07/09/2018.

On 08/13/2018 the Modeling Unit MEIU manager, Emmett Malone, forwarded two emails from the Air Pollution Control Division (APCD) director, Garry Kaufman, in which he provided arguments to reject the main findings and conclusions of the CC&V final modeling review report in what pertains to the engine loads and NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios for the non-road diesel engines, and also provided instructions to review the modeling analysis with the originally submitted emission rates and to accept the originally submitted NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios for the non-road diesel engines. All the aforementioned emails are included in Appendix 1 of this document.

In compliance with the APCD director's instructions, CC&V's 04/23/18 modeling submittal has been reviewed for a second time leaving intact the original emission rates and in-stack ratios of the non-road diesel engines. In addition, an analysis of the APCD director's arguments to approve CC&V's data has also been conducted to determine if they are supported by sound scientific principles and applicable regulations and guidance. Such analysis is included in a subsequent section of this document. The results of this new review are provided below.

There are NAAQS and CAAQS currently in effect for the following pollutants and averaging periods: CO (1-hr and 8-hr), Pb (3-month rolling average), NO<sub>2</sub>(1-hr and annual), PM10 (24-hr), PM2.5 (24-hr and annual), SO<sub>2</sub> (1-hr and 3-hr), and ozone (8-hr). For this permit application, quantitative impact analyses are warranted to demonstrate compliance with the NAAQS/CAAQS for the following pollutants and averaging periods: NO<sub>2</sub> (1-hr and Annual), PM2.5 (24-hr and Annual), PM10; CO (1-hr and 8-hr); and SO<sub>2</sub> (1-hr and 3-hr).

The applicant submitted modeling analyses for all required pollutants and averaging periods, and the results of the modeling analyses are summarized below:

Pollutant	Averaging Period	Maximum Modeled Concentration (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Total Impact (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )
PM2.5	24-hr	19.72	12.7	32.42	35
PM2.5	Annual	5.36	6.0	11.36	12
PM10	24-hr	124.03	24.0	148.03	150
SO <sub>2</sub>	1-hr	34.5	86.4	120.9	196.5
SO <sub>2</sub>	3-hr	19.6	62.8	82.4	700
NO <sub>2</sub>	1-hr	<del>229.34</del> (use values with OLMGROUP ALL) with background	Seasonal-hourly profile	<del>229.34</del> (use values with OLMGROUP ALL)	188.34
NO <sub>2</sub>	Annual	37.4	28.22	65.62	100
CO	1-hr	8,509.3	4580	13,089.3	40,000
CO	8-hr	628.3	2290	2918.3	10,000

The meteorological data used was adequately representative of the dispersion conditions at the mine and therefore the design concentrations of the results listed above match the original form of the corresponding NAAQS.

For 24-hr PM2.5 the modeled design concentrations is the highest eighth high 24-hr concentration averaged across the 3 years of meteorological data.

For annual PM2.5 the modeled design concentration is the maximum annual concentration averaged across the 3 years of meteorological data.

For 24-hr PM10 the modeled design concentration is the highest fourth high 24-hr concentration of the 3-year period of meteorological data.

For 1-hr SO<sub>2</sub> the modeled design concentration is the highest fourth high maximum daily 1-hr concentration averaged across the 3 years of meteorological data.

For 3-hr SO<sub>2</sub> the modeled design concentration is the highest second high 3-hr concentration of the 3-year period of meteorological data.

For 1-hr NO<sub>2</sub> the modeled design concentration is the highest eighth high maximum daily 1-hr concentration averaged across the 3 years of meteorological data.

For annual NO<sub>2</sub> the modeled design concentration is the highest annual concentration of the 3-year period of meteorological data.

For 1-hr CO the modeled design concentration is the highest second high 1-hr concentration of the 3-year period of meteorological data.

For 8-hr CO the modeled design concentration is the highest second high 8-hr concentration of the 3-year period of meteorological data.

It is noted that the meteorological data was reprocessed with AERMET v18081, and AERMOD v18081 was used to conduct all the final runs. This version of AERMET includes a correction in the Bulk Richardson algorithm when using on-site meteorological data, a situation that applies directly to the CC&V case. CC&V submitted this modeling analysis using meteorological data processed with the previous version, V16216r, which was correctly the latest version available at the time of submittal.

~~After review of the information submitted by the applicant with revisions by the MEIU, it is concluded that the CC&V gold mine will cause modeled violations of the 1-hr NO<sub>2</sub> NAAQS.~~ After review of the information submitted by the applicant, and requested by the Division Director, with revisions by the MEIU, it is concluded that the CC&V gold mine will/will not cause modeled violations of the 1-hr NO<sub>2</sub> NAAQS/any pollutants.

The 1-hr NO<sub>2</sub> analysis that CC&V submitted was performed with the Ozone Limiting Method and the "OLMGROUP ALL" option by grouping the representation of multiple operating scenarios into single AERMOD runs through the use of source groups.

The applicant has indicated that blasts do not occur in more than one pit at the same time, consequently, CC&V was instructed by the MEIU to model this activity as taking place in each pit at a time. MEIU further indicated that this could be accomplished with separate model runs per scenario or by using source groups in AERMOD <sup>[1]</sup>.

However, during the June, 2018 EPA Regional/State/Local Modelers Workshop, James Thurman from EPA's OAQPS office did a presentation on the use of source groups in AERMOD and explicitly indicated that source groups should not be used when modeling NO<sub>2</sub> with the Ozone Limiting Method using the OLMGROUP ALL option because the model would underestimate impacts.

After this presentation, AERMOD's documentation was reviewed and it was verified that in fact, the Ozone Limiting Method when using the OLMGROUP ALL option will distribute the available ambient ozone equally among all of the emission sources declared in the AERMOD input file, without any regard for which sources are included or not included in the different source groups. The consequence of this situation is that the background ozone concentration provided in the input file would in practice be diluted, thus resulting in less conversion of NO<sub>x</sub> to NO<sub>2</sub> and therefore in lower modeled NO<sub>2</sub> concentrations.

~~Consequently, if this error was corrected by the MEIU by separating the different operating scenarios and reviewing them by conducting a separate, individual AERMOD run per each individual scenario. This allowed~~, then the available ozone ~~to~~ would be distributed only among those sources that are active on each operating scenario. Applying this correction, modeled 1-hour NO<sub>2</sub> concentrations would be in excess of 225 µg/m<sup>3</sup>, well above the NAAQS.

In addition to this problem, the design concentration for the 1-hr NO<sub>2</sub> NAAQS involves doing a receptor-specific average across the different years of meteorological data used. This average is generally done as post-processing after the AERMOD runs, but CC&V did not provide any evidence of doing such average, so it was performed by the MEIU on all the final 1-hr NO<sub>2</sub> runs during the review process.

~~The modeled results for 1-hr NO<sub>2</sub> are above the corresponding standard, but it is noted that they are expected to be even higher if the issues discussed below were to be corrected.~~

Although the engine loads used by CC&V have been approved by the APCD director, they were calculated using statistical techniques that are inadequate and that have skewed the results. If these calculations were corrected, it is expected that the emission rates will increase and so would the resulting modeled concentrations. More details on this topic are provided in a subsequent section of this document.

Also, the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios used for some of the non-road diesel engines are of 0.2 and 0.01; values that are not technically supported for the type of engines in question. While these values were approved by the APCD director, the Division's subject matter experts have not been able to find any scientific literature or technical documentation to support them. Values as low as 0.22 have been documented for on-road engines only, and the 0.01 value ~~simply defies logic~~ is highly suspect for any type of mobile source diesel engine, with or without emission control devices.

EPA recommends the use of a NO<sub>2</sub>/NO<sub>x</sub> in-stack ratio value of 0.5 for any case for which a different value cannot be adequately justified.

For the rest of the pollutants and averaging periods the following conclusions have been reached:

- 24-hr and annual PM<sub>2.5</sub>.

While the results are numerically below the corresponding NAAQS, compliance with such standards cannot be determined.

The emission rates used by CC&V are based on emission factors that have not been adjusted with a deterioration factor to account for the increase in emissions resulting from usage as the engine ages, and also with a transient adjustment factor to account for the change in emissions due to transient demands of the engine.

Both adjustment factors are included in the data base of EPA's mobile sources emissions model MOVES, and the resulting emission rates are higher after they are applied. However, CC&V did not use MOVES and instead used what appear to be only zero-hour steady state factors, thus adding another layer of error in the calculation of mobile engine emissions. More details on this topic can be found in Appendix 2 of this document.

Considering that the modeled concentrations for 24-hr and annual PM<sub>2.5</sub> are at 92.6% and 94.6% respectively of their corresponding NAAQS, it is very feasible that once these adjustments are applied, the resulting concentrations could reach or exceed the standards.

- 24-hr PM<sub>10</sub>.

While the results are numerically below the corresponding NAAQS, compliance with such standards cannot be determined.

Similar to the case of PM<sub>2.5</sub>, the emission rates used by CC&V are based on emission factors that have not been adjusted with a deterioration factor to account for the increase in emissions resulting from usage as the engine ages, and also with a transient adjustment factor to account for the change in emissions due to transient demands of the engine.

Both adjustment factors are included in the data base of EPA's mobile sources emissions model MOVES, and the resulting emission rates are higher after they are applied. However, CC&V did not use MOVES and instead used what appear to be only zero-hour steady state factors, thus adding another layer of error in the calculation of mobile engine emissions. More details on this topic can be found in Appendix 2 of this document.

Considering that the modeled concentration is at 98.7% of the NAAQS, it is likely that once these adjustments are applied, the resulting concentration could reach or exceed the standards.

- Annual NO<sub>2</sub>.

While the results are numerically below the corresponding NAAQS, compliance with such standards cannot be determined.

Although the engine loads used by CC&V have been approved by the APCD director, they were calculated using statistical techniques that are inadequate and that have skewed the results. If these calculations were corrected it is expected that the emission rates will increase and so would the resulting modeled concentrations. More details on this topic are provided in a subsequent section of this document.

In addition, the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios used for some of the non-road diesel engines are of 0.2 and 0.01, values that are not technically supported for the type of engines in question. While these values were approved by the APCD director, the Division's subject matter experts have not been able to find any scientific literature or technical documentation to support them. Values as low as 0.22 have been documented for on-road engines only, and the 0.01 value ~~simply defies logic~~ is highly suspect for any type of mobile source diesel engine, with or without emission control devices.

EPA recommends the use of a NO<sub>2</sub>/NO<sub>x</sub> in-stack ratio value of 0.5 for any case for which a different value cannot be adequately justified.

Currently the modeled concentration is at 65.8% of the NAAQS, and it is impossible to predict how much it would increase after applying these corrections.

- 1-hr and 8-hr CO.

While the results are numerically below the corresponding NAAQS, compliance with such standards ~~cannot be determined~~ is likely demonstrated.

Similar to the case of NO<sub>2</sub>, although the engine loads used by CC&V have been approved by the APCD director, they were calculated using statistical techniques that are inadequate and that have skewed the results. If these calculations were corrected it is expected that the emission rates will increase and so would the resulting modeled concentrations. However, considering that the current results are at 29.2% and 32.7% for the 8-hr and 1-hr standards respectively, it is unlikely that the corrections would cause increases in modeled concentrations such that these NAAQS would be reached or exceeded.

- 1-hr and 3-hr SO<sub>2</sub>.

Compliance with these NAAQS has been demonstrated.

While the engine loads were calculated incorrectly as described above for the NO<sub>2</sub> and CO cases, SO<sub>2</sub> emissions are primarily a function of the sulfur content in the fuel, and the influence of the engine load is insignificant. Considering that the current results are at 11.8% and 61.5% of the 3-hr and 1-hr NAAQS respectively, applying the corrections will not raise the emissions enough to cause modeled violations of these standards.

**Non-road engine loads and emissions.**

With regards to the non-road engine loads and emissions, the APCD director's emails (See Appendix 1) require some clarifications.

When discussing non-road engine loads and emissions the director's emails described the estimation of actual worst-case emissions from non-road engines as an extremely complex challenge, referring to CC&V's methodology as a fairly simplified approach and to the corrections applied by the MEIU as a more sophisticated approach.

CC&V's approach consisted in estimating engine loads based on fuel consumption and engine usage data for a period of 3 years. This methodology is in principle scientifically sound, but CC&V failed to use basic statistical techniques in the handling of the raw data thus skewing the resulting calculations of the engine loads.

The MEIU ~~on the other hand~~, did not propose a different methodology for estimating emissions, but only proposed to use the correct statistical techniques to organize and analyze the raw data. So there has never been a simplified approach or a sophisticated approach. The methodology for estimating engine loads and emission rates based on fuel consumption and engine usage is essentially the same, and the only difference has been in the statistical processing of the raw data.

Barring honest mistakes, it is a reasonable expectation that the technical analyses submitted by permit applicants comply with basic scientific and mathematical principles, and that expectation has not been met in CC&V's case when processing the raw data in the calculation of engine loads and emission rates.

**NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios.**

On the APCD director's emails (See Appendix 1) he indicates that CC&V submitted information from the representative for the engine manufacturer stating that in-stack ratio of between 0.15 and 0.20 would be reasonable for four of the engines and that an in-stack ratio of less than 0.01 would be reasonable for the fifth engine. This information ~~consists~~ resides in an email from a Caterpillar dealership, Wagner Equipment ([www.wagnerequipment.com](http://www.wagnerequipment.com)), which included a table in which these NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios were listed for the specific Tier 4 engines owned by CC&V.

In general, the approval process for the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios starts with the permit applicant proposing source-specific values for their emission units, and providing supporting documentation to justify such values. Such supporting documentation is generally a reference to EPA's in-stack ratios database, copy of documentation prepared by federal or State regulatory agencies, reference to or copy of scientific or technical literature citing results of studies conducted on the topic, manufacturer's specification sheets, or stack test reports (tailpipe emission testing in this case).

The first and the last of this list are commonly the most reliable sources of documentation, and they are essentially the same type of data, as EPA has in the last few years undertaken the effort of collecting and validating stack testing results for different types of sources and compiling them in a database. Unfortunately for non-road diesel engines there is no such information available.

Stack tests, in the manner defined by EPA, are not performed on non-road engines or in general on mobile engines. Instead, for mobile sources emissions testing is conducted in a laboratory where the entire vehicle is placed in a dynamometer to apply load to the engine and emissions are collected and analyzed during specific driving cycles. For heavy duty engines, on-road and non-road, the engine alone, removed from the vehicle, is placed on an engine test bench where load is applied directly to the engine axle while operated at specific cycles as emissions are collected and analyzed.

Thus, as opposed to stack testing on stationary engines, emission testing on non-road engines is not something that is done by the owner or operator of the actual permitted emission unit. This type of tests are performed only by the engine manufacturer (published in specification sheets or equipment manuals), by large regulatory agencies like EPA or CARB (California Air Resources Board), or by research institutions on some emission units representative of specific engine types. And while emission factors and

limits have been developed for non-road engines with this type of tests, specific data to derive the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios has not been found from EPA or CARB, either because NO<sub>x</sub> measurements were not conducted during the tests or because the data was not of interest at the time and not published.

The remaining source of data to support specific NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios are the manufacturers or scientific literature. MEIU staff researched the manuals and specification sheets available to the public for the type of engines used by CC&V. The research also included EPA and CARB documentation, and a fair amount of scientific literature discussing this topic; and none of these documents contained any NO<sub>2</sub>/NO<sub>x</sub> in-stack ratio information applicable to CC&V's engines.

However, there were several of these documents discussing NO<sub>x</sub> and NO<sub>2</sub> emissions from mobile diesel engines, and all of them consistently explained that the operating principle of the emissions control devices that make Tier 4 diesel engines much cleaner, would also result in increased NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios.

As explained in the 06/26/2018 final modeling review report, Diesel engines without these control devices (i.e. Tier 3 engines and below) typically have an NO<sub>2</sub>/NO<sub>x</sub> in-stack ratio of about 0.1, but the oxidation catalyst and the regeneration mechanism of the particulate filter will have the side effect of oxidizing a large fraction of the NO<sub>x</sub> emissions into NO<sub>2</sub> therefore increasing substantially the ratio. As it also was explained in that report, there is no mechanism by which that ratio would be reversed to its original value or lower. The reduction catalyst will reduce both NO<sub>2</sub> and NO<sub>x</sub> into elemental nitrogen, and there is nothing in the available literature to suggest that one chemical reaction occurs at a faster rate than the other one to alter the final NO<sub>2</sub>/NO<sub>x</sub> ratio significantly. On the contrary, all the available literature points to an ideal ratio of 0.5 for the final reduction reaction to be optimal and to a final ratio well above the original 0.1 that existed before the exhaust went through the emissions control devices.

Sound scientific principles and judgement support a ratio much higher than the ones proposed by CC&V, and accepting their proposed values as recommended by the APCD director is not scientifically defensible unless testing data is provided to support them. This is particularly true for the 0.01 ratio, which is not defensible even for the older Tier 1 through 3 engines.

[1] 09/19/2014 Modeling Review Report – List of Outstanding Issues – Cripple Creek & Victor Gold Mining Company – Mine Life Extension #2 Cresson Project

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On Thu, Jan 10, 2019 at 10:22 AM Rosendo Majano [REDACTED] wrote:  
Emmett - As you requested, below is the full content that will be included in my CC&V report.

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**Rosendo Majano**  
[REDACTED]

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The Division's Modeling and Emissions Inventory Unit (MEIU) received on April 23, 2018 a dispersion modeling analysis submitted by Cripple Creek & Victor Gold Mining Company (CC&V) as part of the application to modify the Construction Permit No.98TE0545 and implement the Mine Life Extension #2 Cresson Project in Teller County, CO.

Review of that modeling analysis was finalized on June 2018 and a final report was written on 06/26/2018 concluding that the proposed project at the Cripple Creek & Victor facility will cause modeled violations of the 1-hr NO<sub>2</sub> NAAQS. In addition, it was concluded that there were several critical errors in the modeling analysis that require correction before it could be determined whether the proposed project will or will not cause and/or contribute to modeled violations of the rest of applicable NAAQS.

After fulfilling administrative requirements of gathering all the communications records for the project, entering all the application information into the Modeling Unit's database, generating a review checklist report, and creating a billing report, the final modeling review report was provided to the permit engineer, Jonathan Brickley, on 07/09/2018.

On 08/13/2018 the Modeling Unit manager, Emmett Malone, forwarded two emails from the Air Pollution Control Division (APCD) director, Garry Kaufman, in which he provided arguments to reject the main findings and conclusions of the CC&V final modeling review report in what pertains to the engine loads and NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios for the non-road diesel engines, and also provided instructions to review the modeling analysis with the originally submitted emission rates and to accept the originally submitted NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios for the non-road diesel engines. All the aforementioned emails are included in Appendix 1 of this document.

In compliance with the APCD director's instructions, CC&V's 04/23/18 modeling submittal has been reviewed for a second time leaving intact the original emission rates and in-stack ratios of the non-road diesel engines. In addition, an analysis of the APCD director's arguments to approve CC&V's data has also been conducted to determine if they are supported by sound scientific principles and applicable regulations and guidance. Such analysis is included in a subsequent section of this document. The results of this new review are provided below.

There are NAAQS and CAAQS currently in effect for the following pollutants and averaging periods: CO (1-hr and 8-hr), Pb (3-month rolling average), NO<sub>2</sub> (1-hr and annual), PM10 (24-hr), PM2.5 (24-hr and annual), SO<sub>2</sub> (1-hr and 3-hr), and ozone (8-hr). For this permit application, quantitative impact analyses are warranted to demonstrate compliance with the NAAQS/CAAQS for the following pollutants and averaging periods: NO<sub>2</sub> (1-hr and Annual), PM2.5 (24-hr and Annual), PM10; CO (1-hr and 8-hr); and SO<sub>2</sub> (1-hr and 3-hr).

The applicant submitted modeling analyses for all required pollutants and averaging periods, and the results of the modeling analyses are summarized below:

Pollutant	Averaging Period	Maximum Modeled Concentration (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Total Impact (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )
PM2.5	24-hr	19.72	12.7	32.42	35
PM2.5	Annual	5.36	6.0	11.36	12
PM10	24-hr	124.03	24.0	148.03	150
SO <sub>2</sub>	1-hr	34.5	86.4	120.9	196.5
SO <sub>2</sub>	3-hr	19.6	62.8	82.4	700
NO <sub>2</sub>	1-hr	229.34 with background	Seasonal-hourly profile	229.34	188.34
NO <sub>2</sub>	Annual	37.4	28.22	65.62	100
CO	1-hr	8,509.3	4580	13,089.3	40,000

CO	8-hr	628.3	2290	2918.3	10,000
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The meteorological data used was adequately representative of the dispersion conditions at the mine and therefore the design concentrations of the results listed above match the original form of the corresponding NAAQS.

For 24-hr PM<sub>2.5</sub> the modeled design concentrations is the highest eighth high 24-hr concentration averaged across the 3 years of meteorological data.

For annual PM<sub>2.5</sub> the modeled design concentration is the maximum annual concentration averaged across the 3 years of meteorological data.

For 24-hr PM<sub>10</sub> the modeled design concentration is the highest fourth high 24-hr concentration of the 3-year period of meteorological data.

For 1-hr SO<sub>2</sub> the modeled design concentration is the highest fourth high maximum daily 1-hr concentration averaged across the 3 years of meteorological data.

For 3-hr SO<sub>2</sub> the modeled design concentration is the highest second high 3-hr concentration of the 3-year period of meteorological data.

For 1-hr NO<sub>2</sub> the modeled design concentration is the highest eighth high maximum daily 1-hr concentration averaged across the 3 years of meteorological data.

For annual NO<sub>2</sub> the modeled design concentration is the highest annual concentration of the 3-year period of meteorological data.

For 1-hr CO the modeled design concentration is the highest second high 1-hr concentration of the 3-year period of meteorological data.

For 8-hr CO the modeled design concentration is the highest second high 8-hr concentration of the 3-year period of meteorological data.

It is noted that the meteorological data was reprocessed with AERMET v18081, and AERMOD v18081 was used to conduct all the final runs. This version of AERMET includes a correction in the Bulk Richardson algorithm when using on-site meteorological data, a situation that applies directly to the CC&V case. CC&V submitted this modeling analysis using meteorological data processed with the previous version, V16216r, which was correctly the latest version available at the time of submittal.

After review of the information submitted by the applicant with revisions by the MEIU, it is concluded that the CC&V gold mine will cause modeled violations of the 1-hr NO<sub>2</sub> NAAQS.

The 1-hr NO<sub>2</sub> analysis that CC&V submitted was performed with the Ozone Limiting Method and the "OLMGROUP ALL" option by grouping the representation of multiple operating scenarios into single AERMOD runs through the use of source groups.

The applicant has indicated that blasts do not occur in more than one pit at the same time, consequently, CC&V was instructed by the MEIU to model this activity as taking place in each pit at a time. MEIU further indicated that this could be accomplished with separate model runs per scenario or by using source groups in AERMOD<sup>[1]</sup>.

However, during the June, 2018 EPA Regional/State/Local Modelers Workshop, James Thurman from EPA's OAQPS office did a presentation on the use of source groups in AERMOD and explicitly indicated that source groups should not be used when modeling NO<sub>2</sub> with the Ozone Limiting Method using the OLMGROUP ALL option because the model would underestimate impacts.

After this presentation, AERMOD's documentation was reviewed and it was verified that in fact, the Ozone Limiting Method when using the OLMGROUP ALL option will distribute the available ambient ozone equally among all of the emission sources declared in the AERMOD input file, without any regard for which sources are included or not included in the different source groups. The consequence of this situation is that the background ozone concentration provided in the input file would in practice be diluted, thus resulting in less conversion of NO<sub>x</sub> to NO<sub>2</sub> and therefore in lower modeled NO<sub>2</sub> concentrations.

Consequently, this error was corrected by the MEIU by separating the different operating scenarios and reviewing them by conducting a separate, individual AERMOD run per each individual scenario. This allowed the available ozone to be distributed only among those sources that are active on each operating scenario.

In addition to this problem, the design concentration for the 1-hr NO<sub>2</sub> NAAQS involves doing a receptor-specific average across the different years of meteorological data used. This average is generally done as post-processing after the AERMOD runs, but CC&V did not provide any evidence of doing such average, so it was performed on all the final 1-hr NO<sub>2</sub> runs during the review process.

The modeled results for 1-hr NO<sub>2</sub> are above the corresponding standard, but it is noted that they are expected to be even higher if the issues discussed below were to be corrected.

Although the engine loads used by CC&V have been approved by the APCD director, they were calculated using statistical techniques that are inadequate and that have skewed the results. If these calculations were corrected, it is expected that the emission rates will increase and so would the resulting modeled concentrations. More details on this topic are provided in a subsequent section of this document.

Also, the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios used for some of the non-road diesel engines are of 0.2 and 0.01; values that are not technically supported for the type of engines in question. While these values were approved by the APCD director, the Division's subject matter experts have not been able to find any scientific literature or technical documentation to support them. Values as low as 0.22 have been documented for on-road engines only, and the 0.01 value simply defies logic for any type of mobile source diesel engine, with or without emission control devices.

EPA recommends the use of a NO<sub>2</sub>/NO<sub>x</sub> in-stack ratio value of 0.5 for any case for which a different value cannot be adequately justified.

For the rest of the pollutants and averaging periods the following conclusions have been reached:

- 24-hr and annual PM<sub>2.5</sub>.

While the results are numerically below the corresponding NAAQS, compliance with such standards cannot be determined.

The emission rates used by CC&V are based on emission factors that have not been adjusted with a deterioration factor to account for the increase in emissions resulting from usage as the engine ages, and also with a transient adjustment factor to account for the change in emissions due to transient demands of the engine.

Both adjustment factors are included in the data base of EPA's mobile sources emissions model MOVES, and the resulting emission rates are higher after they are applied. However, CC&V did not use MOVES and instead used what appear to be only zero-hour steady state factors, thus adding another layer of error in the calculation of mobile engine emissions. More details on this topic can be found in Appendix 2 of this document.

Considering that the modeled concentrations for 24-hr and annual PM<sub>2.5</sub> are at 92.6% and 94.6% respectively of their corresponding NAAQS, it is very feasible that once these adjustments are applied the resulting concentrations could reach or exceed the standards.

- 24-hr PM<sub>10</sub>.

While the results are numerically below the corresponding NAAQS, compliance with such standards cannot be determined.

Similar to the case of PM<sub>2.5</sub>, the emission rates used by CC&V are based on emission factors that have not been adjusted with a deterioration factor to account for the increase in emissions resulting from usage as the engine ages, and also with a transient adjustment factor to account for the change in emissions due to transient demands of the engine.

Both adjustment factors are included in the data base of EPA's mobile sources emissions model MOVES, and the resulting emission rates are higher after they are applied. However, CC&V did not use MOVES and instead used what appear to be only zero-hour steady state factors, thus adding another layer of error in the calculation of mobile engine emissions. More details on this topic can be found in Appendix 2 of this document.

Considering that the modeled concentration is at 98.7% of the NAAQS, it is likely that once these adjustments are applied the resulting concentration could reach or exceed the standards.

- Annual NO<sub>2</sub>.

While the results are numerically below the corresponding NAAQS, compliance with such standards cannot be determined.

Although the engine loads used by CC&V have been approved by the APCD director, they were calculated using statistical techniques that are inadequate and that have skewed the results. If these calculations were corrected it is expected that the emission rates will increase and so would the resulting modeled concentrations. More details on this topic are provided in a subsequent section of this document.

In addition, the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios used for some of the non-road diesel engines are of 0.2 and 0.01, values that are not technically supported for the type of engines in question. While these values were approved by the APCD director, the Division's subject matter experts have not been able to find any scientific literature or technical documentation to support them. Values as low as 0.22 have been documented for on-road engines only, and the 0.01 value simply defies logic for any type of mobile source diesel engine, with or without emission control devices.

EPA recommends the use of a NO<sub>2</sub>/NO<sub>x</sub> in-stack ratio value of 0.5 for any case for which a different value cannot be adequately justified.

Currently the modeled concentration is at 65.8% of the NAAQS, and it is impossible to predict how much it would increase after applying these corrections.

1-hr and 8-hr CO.

While the results are numerically below the corresponding NAAQS, compliance with such standards cannot be determined.

Similar to the case of NO<sub>2</sub>, although the engine loads used by CC&V have been approved by the APCD director, they were calculated using statistical techniques that are inadequate and that have skewed the results. If these calculations were corrected it is expected that the emission rates will increase and so would the resulting modeled concentrations. However, considering that the current results are at 29.2% and 32.7% for the 8-hr and 1-hr standards respectively, it is unlikely that the corrections would cause increases in modeled concentrations such that these NAAQS would be reached or exceeded.

1-hr and 3-hr SO<sub>2</sub>.

Compliance with these NAAQS has been demonstrated.

While the engine loads were calculated incorrectly as described above for the NO<sub>2</sub> and CO cases, SO<sub>2</sub> emissions are primarily a function of the sulfur content in the fuel, and the influence of the engine load is insignificant. Considering that the current results are at 11.8% and 61.5% of the 3-hr and 1-hr NAAQS respectively, applying the corrections will not raise the emissions enough to cause modeled violations of these standards.

#### **Non-road engine loads and emissions.**

With regards to the non-road engine loads and emissions, the APCD director's emails (See Appendix 1) require some clarifications.

When discussing non-road engine loads and emissions the director's emails described the estimation of actual worst-case emissions from non-road engines as an extremely complex challenge, referring to CC&V's methodology as a fairly simplified approach and to the corrections applied by the MEIU as a more sophisticated approach.

CC&V's approach consisted in estimating engine loads based on fuel consumption and engine usage data for a period of 3 years. This methodology is in principle scientifically sound, but CC&V failed to use basic statistical techniques in the handling of the raw data thus skewing the resulting calculations of the engine loads.

The MEIU on the other hand, did not propose a different methodology for estimating emission, but only proposed to use the correct statistical techniques to organize and analyze the raw data. So there has never been a simplified approach or a sophisticated approach. The methodology for estimating engine loads and emission rates based on fuel consumption and engine usage is essentially the same, and the only difference has been in the statistical processing of the raw data.

Barring honest mistakes, it is a reasonable expectation that the technical analyses submitted by permit applicants comply with basic scientific and mathematical principles, and that expectation has not been met in CC&V's case when processing the raw data in the calculation of engine loads and emission rates.

#### **NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios.**

On the APCD director's emails (See Appendix 1) he indicates that CC&V submitted information from the representative for the engine manufacturer stating that in-stack ratio of between 0.15 and 0.20 would be reasonable for four of the engines and that an in-stack ratio of less than 0.01 would be reasonable for the fifth engine. This information consists in an email from a Caterpillar dealership, Wagner Equipment ([www.wagnerequipment.com](http://www.wagnerequipment.com)), which included a table in which these NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios were listed for the specific Tier 4 engines owned by CC&V.

In general, the approval process for the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios starts with the permit applicant proposing source-specific values for their emission units, and providing supporting documentation to justify such values. Such supporting documentation is generally a reference to EPA's in-stack ratios database, copy of documentation prepared by federal or State regulatory agencies, reference to or copy of scientific or technical literature citing results of studies conducted on the topic, manufacturer's specification sheets, or stack test reports (tailpipe emission testing in this case).

The first and the last of this list are commonly the most reliable sources of documentation, and they are essentially the same type of data, as EPA has in the last few years undertaken the effort of collecting and validating stack testing results for different types of sources and compiling them in a database. Unfortunately for non-road diesel engines there is no such information available.

Stack tests, in the manner defined by EPA, are not performed on non-road engines or in general on mobile engines. Instead, for mobile sources emissions testing is conducted in a laboratory where the entire vehicle is placed in a dynamometer to apply load to the engine and emissions are collected and analyzed during specific driving cycles. For heavy duty engines, on-road and non-road, the engine alone, removed from the vehicle, is placed on an engine test bench where load is applied directly to the engine axle while operated at specific cycles as emissions are collected and analyzed.

Thus, as opposed to stack testing on stationary engines, emission testing on non-road engines is not something that is done by the owner or operator of the actual permitted emission unit. This type of tests are performed only by the engine manufacturer (published in specification sheets or equipment manuals), by large regulatory agencies like EPA or CARB (California Air Resources Board), or by research institutions on some emission units representative of specific engine types. And while emission factors and limits have been developed for non-road engines with this type of tests, specific data to derive the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios has not been found from EPA or CARB, either because NO<sub>x</sub> measurements were not conducted during the tests or because the data was not of interest at the time and not published.

The remaining source of data to support specific NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios are the manufacturers or scientific literature. MEIU staff researched the manuals and specification sheets available to the public for the type of engines used by CC&V. The research also included EPA and CARB documentation, and a fair amount of scientific literature discussing this topic; and none of these documents contained any NO<sub>2</sub>/NO<sub>x</sub> in-stack ratio information applicable to CC&V's engines.

However, there were several of these documents discussing NO<sub>x</sub> and NO<sub>2</sub> emissions from mobile diesel engines, and all of them consistently explained that the operating principle of the emissions control devices that make Tier 4 diesel engines much cleaner, would also result in increased NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios.

As explained in the 06/26/2018 final modeling review report, Diesel engines without these control devices (i.e. Tier 3 engines and below) typically have an NO<sub>2</sub>/NO<sub>x</sub> in-stack ratio of about 0.1, but the oxidation catalyst and the regeneration mechanism of the particulate filter will have the side effect of oxidizing a large fraction of the NO<sub>x</sub> emissions into NO<sub>2</sub> therefore increasing substantially the ratio. As it also was explained in that report, there is no mechanism by which that ratio would be reversed to its original value or lower. The reduction catalyst will reduce both NO<sub>2</sub> and NO<sub>x</sub> into elemental nitrogen, and there is nothing in the available literature to suggest that one chemical reaction occurs at a faster rate than the other one to alter the final NO<sub>2</sub>/NO<sub>x</sub> ratio significantly. On the contrary, all the available literature points to an ideal ratio of 0.5 for the final reduction reaction to be optimal and to a final ratio well above the original 0.1 that existed before the exhaust went through the emissions control devices.

Sound scientific principles and judgement support a ratio much higher than the ones proposed by CC&V, and accepting their proposed values as recommended by the APCD director is not scientifically defensible unless testing data is provided to support them. This is particularly true for the 0.01 ratio, which is not defensible even for the older Tier 1 through 3 engines.

[1] 09/19/2014 Modeling Review Report – List of Outstanding Issues – Cripple Creek & Victor Gold Mining Company – Mine Life Extension #2 Cresson Project

\*\*\*\*\*  
\*\*\*\*\*

Gordon Pierce  
Program Manager  
Technical Services Program



4300 Cherry Creek Drive South, Denver, CO 80246-1530

Are you curious about ground-level ozone in Colorado? Visit our [ozone webpage](#) to learn more.

**Re: CC&V**

1 message

Tue, Jan 29, 2019 at 11:08 AM

**Rosendo Majano**  
 To: "Pierce - CDPHE, Gordon"  
 Cc: Emmett Malone  
 Bcc: Marie Bernardo - CDPHE

Gordon,

Just so it's clear in the record, your statement below about not catching the source group error in the June 2018 review is not accurate. I did catch that error in the June 2018 review. There is an explanation of this issue on Page 5 of the 06/26/18 report. Garry also addressed this issue on his 08/13/18 email to you.

However, per your request, I have reported in the table the results prior to the correction.

---  
**Rosendo Majano**

On Mon, Jan 28, 2019 at 9:34 AM Pierce - CDPHE, Gordon wrote:  
 Rosendo,

Thanks for your response and clarifications. You are correct that my understanding and statement on the OLMGROUP ALL was not accurate and that the way the source groups were combined into a single run is really the issue.

I will stand by my statement that since we did not catch the error in our June 2018 review, it should be allowed to stand in this review. This also follows Garry's request. I do believe there is precedent based on what you listed (and I believe from GCC modeling in the past as well). As such, I would like the results reported without that correction in the table. And, as I requested (and you mention), please make sure that the results with the correction are part of the write-up in the report. As you say, and I agree, it is not correct to conceal or downplay it.

For my request on the CO conclusions, it was based on the last sentence you had written in that paragraph, which I was seeing as contradictory. If the paragraph is amended, as you suggest, that would be fine.

Thanks,  
 Gordon

On Wed, Jan 16, 2019 at 7:24 AM Rosendo Majano <rosendo.majano@state.co.us> wrote:  
 Gordon,

I'm afraid you have not understood the error with the 1-hr NO2 modeling because what you describe in your email is inaccurate and what you have requested in the table of results is already there. So I want to clarify the following:

- 1- The use of OLMGROUP ALL is not incorrect, at all. I did not make any statement to the contrary, nor did EPA on the Modeler's Workshop.
- 2- The 1-hr NO2 results that I provided on the table were already obtained using the OLMGROUP ALL option in AERMOD.

The error in CC&V's NO2 modeling consists in representing different operating scenarios in single AERMOD runs with source groups while at the same time using the Ozone Limiting Method with the OLMGROUP ALL option. That combination of the use of source groups and OLMGROUP ALL is what has the effect of diluting the background ozone concentration thus causing lower NO2 modeled concentrations. But using either source groups or OLMGROUP ALL separately is perfectly acceptable.

So the correction that I applied to CC&V's modeling was to not use source groups to represent different operating scenarios when modeling NO2 with the Ozone Limiting Method and OLMGROUP ALL.

Also, the use of both source groups and OLMGROUP ALL are optional, not mandatory, and I did not tell CC&V that they had to model using either of those options, separate or combined.

Moreover, I did not tell CC&V to do the modeling that way, combining source groups with OLMGROUP ALL. That was CC&V's choice. My mistake was to not catch this error in CC&V's modeling before. But as I explained, I became aware of this issue until it was presented in EPA's Modeler's Workshop.

My instructions to CC&V were related to how to represent blasting activities in the model depending on the pollutant and averaging period being modeled, and specifically to represent blasting as taking place in each pit at a time through different operating scenarios. In that context I indicated that such representation could be accomplished with separate model runs or by using source groups, one or the other.

Those instructions are correct because I was referring to modeling blasting activities in general for all pollutants and averaging periods without any reference whatsoever to NO2, to the Ozone Limiting Method or OLMGROUP ALL. I do admit that I should have included a caveat warning CC&V of the possible conflict with source groups in case that they decided to use the Ozone Limiting Method with OLMGROUP ALL. But once again, I became aware of this issue until it was presented in EPA's Modeler's Workshop.

The full language of my instructions to CC&V are in the attached document, in Item 10 of Appendix A.

So characterizing the situation as an error on our part because we told CC&V to model it that way is inaccurate, as it is also inaccurate to say that I mentioned that in my write up. The error on our part (my error to be specific) was to not catch CC&V's mistake and to not include a caveat in my instructions warning of the conflict in the two options in AERMOD.

On the other hand, I don't recall any application undergoing modeling review in which we found an error on our part that was not required to be fixed, so I think it's inaccurate to say that we have done that with other applicants. I could be wrong though, because I don't remember the details of every application.

I recall two applications with an error on our part: The Gypsum Ranch Pit and the Gypsum Biomass Project, for which the same meteorological data set was processed and given to the applicants by the MEIU containing large amounts of calms in excess of the 10% threshold allowed by EPA for permit modeling. When this error came to light both modeling reviews had been completed, the Biomass permit issued and the Ranch Pit application had been withdrawn because the facility was sold.

The ColoWyo Mine is another case, in which the emissions were calculated with Mobile v6.2 at a time when MOVES was already available as EPA's preferred emissions model for mobile sources. This error was overlooked completely by the MEIU for the South Taylor Pit and when the modeling was submitted for the Collom Pit the applicant was asked to fix this issue and use MOVES. Note that this is the only outstanding issue at the moment so there was no need to remodel other than to fix this problem.

My point is that I don't think there is really a precedent for not fixing an error, specially an error that when corrected would result in modeled concentrations exceeding a NAAQS. However, if you still want me to report the results without correcting the error, that is your prerogative, I just want the facts to be clear. Please let me know in writing if this is what you want to do. In that case I will state in my report that I am presenting those erroneous results following your instructions and I will attach your email to the report, just like I did with Garry's instructions.

I will also explain in the report that the NO2 modeling has been conducted with the correction described above and consequently I will provide the actual results (although not in the table per your request) as opposed to explaining this in a conditional tense, as if it hasn't been done. This is information that I do have and that I relied upon to reach my conclusion on NO2 NAAQS compliance, so I don't think it's correct to conceal it or downplay it.

I would also ask you for similar type of instructions in writing for including your conclusion that 1-hr and 8-hr CO is likely demonstrated. The emission rates for all mobile sources were not calculated correctly, and I simply have no idea how much they would increase after the correction. Rebecca Simpson's analysis focused mostly on NO2 and to a lesser extent on particulate matter, but did not provide information on CO. We do know that those emissions will increase because this pollutant is highly influenced by combustion efficiency which in turn is highly influenced by engine load, but I haven't seen any data quantifying the increase. I suspect, intuitively based on the fact that these are diesel engines and some of them have controls, that the increase might not be enough to reach the NAAQS, but I won't gamble to say or imply that NAAQS compliance has been demonstrated or likely demonstrated. Just look at the CO results for the ColoWyo case with similar type of engines and how close they are to the NAAQS.

So my conclusion as a dispersion modeling expert is that with the information available I cannot determine compliance with the CO NAAQS. If you disagree and have reached a different conclusion and want your conclusion reflected in the report, once again, that is your prerogative, but in that case I would ask you to include that conclusion under your name and not under mine.

I now realize that my write up on that topic might be contradictory by saying that I cannot determine NAAQS compliance and then saying that the corrections are unlikely to lead to a modeled violation of the NAAQS, so I will amend that paragraph and remove the latter statement.

I will await your instructions and if you have any questions please let me know.

---  
**Rosendo Majano**  
 [Redacted]

On Mon, Jan 14, 2019 at 2:25 PM Pierce - CDPHE, Gordon [Redacted] wrote:  
 Rosendo,

Please see below for my requested edits in red. The primary one involves the 1-hour NO2. While I agree that the use of OLMGROUP ALL is incorrect (per the June Modeler's Workshop), that was an error on our part as we told CC&V to model it that way (as you mention in the writeup). As we have done for other applicants when there is an error on our part, we do not request it be fixed unless there is a need to re-model. Thus, the report summary table should reflect the values without that error being corrected. I do believe that this error should be discussed in the writeup following the summary table, as you have done. If you could please send a revised version for review, I would appreciate it.

Thanks,  
 Gordon

The Division's Modeling and Emissions Inventory Unit (MEIU) received on April 23, 2018 a dispersion modeling analysis submitted by Cripple Creek & Victor Gold Mining Company (CC&V) as part of the application to modify the Construction Permit No.98TE0545 and implement the Mine Life Extension #2 Cresson Project in Teller County, CO.

Review of that modeling analysis was finalized on June 2018 and a final report was written on 06/26/2018 concluding that the proposed project at the Cripple Creek & Victor facility will cause modeled violations of the 1-hr NO2 NAAQS. In addition, it was concluded that there were several critical errors in the modeling analysis that should require correction before it could be determined whether the proposed project will or will not cause and/or contribute to modeled violations of the rest of applicable NAAQS.

After fulfilling administrative requirements of gathering all the communications records for the project, entering all the application information into the Modeling Unit's database, generating a review checklist report, and creating a billing report, the final modeling review report was provided to the permit engineer, Jonathan Brickey, on 07/09/2018.

On 08/13/2018 the Modeling Unit/MEIU manager, Emmett Malone, forwarded two emails from the Air Pollution Control Division (APCD) director, Garry Kaufman, in which he provided arguments to reject the main findings and conclusions of the CC&V final modeling review report in what pertains to the engine loads and NO2/NOx in-stack ratios for the non-road diesel engines, and also provided instructions to review the modeling analysis with the originally submitted emission rates and to accept the originally submitted NO2/NOx in-stack ratios for the non-road diesel engines. All the aforementioned emails are included in Appendix 1 of this document.

In compliance with the APCD director's instructions, CC&V's 04/23/18 modeling submittal has been reviewed for a second time leaving intact the original emission rates and in-stack ratios of the non-road diesel engines. In addition, an analysis of the APCD director's arguments to approve CC&V's data has also been conducted to determine if they are supported by sound scientific principles and applicable regulations and guidance. Such analysis is included in a subsequent section of this document. The results of this new review are provided below.

There are NAAQS and CAAQS currently in effect for the following pollutants and averaging periods: CO (1-hr and 8-hr), Pb (3-month rolling average), NO2(1-hr and annual), PM10 (24-hr), PM2.5 (24-hr and annual), SO2 (1-hr and 3-hr), and ozone (8-hr). For this permit application, quantitative impact analyses are warranted to demonstrate compliance with the NAAQS/CAAQS for the following pollutants and averaging periods: NO2 (1-hr and Annual), PM2.5 (24-hr and Annual), PM10; CO (1-hr and 8-hr); and SO2 (1-hr and 3-hr).

The applicant submitted modeling analyses for all required pollutants and averaging periods, and the results of the modeling analyses are summarized below:

Pollutant	Averaging Period	Maximum Modeled Concentration (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Total Impact (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )
PM2.5	24-hr	19.72	12.7	32.42	35
PM2.5	Annual	5.36	6.0	11.36	12
PM10	24-hr	124.03	24.0	148.03	150
SO2	<span style="font-size:10pt;font-				

3/28/2021

State.co.us Executive Branch Mail - Re: CC&V

EPAOIG Appendix 49

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**Machovec, Chuck M.**

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**From:** Hancock, Chip  
**Sent:** Monday, April 18, 2011 3:49 PM  
**To:** Jung, Doris W.  
**Cc:** Fadeyi, Sunday; Machovec, Chuck M.; Hea, Roland C.; King, Kirsten L.  
**Subject:** RE: UCD - permit 96AD234

Per Kirsten and Roland it does.

Chip

---

**From:** Jung, Doris W.  
**Sent:** Monday, April 18, 2011 3:43 PM  
**To:** Hancock, Chip  
**Cc:** Fadeyi, Sunday; Machovec, Chuck M.; Hea, Roland C.; King, Kirsten L.  
**Subject:** RE: UCD - permit 96AD234

PS memo 10-01 is only a guidance document. It does not supersede statutory/regulatory requirements.

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**From:** Hancock, Chip  
**Sent:** Monday, April 18, 2011 3:38 PM  
**To:** Jung, Doris W.  
**Cc:** Fadeyi, Sunday; Machovec, Chuck M.; Hea, Roland C.; King, Kirsten L.  
**Subject:** RE: UCD - permit 96AD234

Doris,

Does not matter - PS memo 10-01 over-rides.

Chip

---

**From:** Jung, Doris W.  
**Sent:** Monday, April 18, 2011 3:22 PM  
**To:** Hancock, Chip  
**Cc:** Fadeyi, Sunday; Machovec, Chuck M.; Hea, Roland C.; King, Kirsten L.  
**Subject:** RE: UCD - permit 96AD234

Chip,

I think you missed it. Impacts of 1-hr NO2 and SO2 exceed the NAAQS.

Doris

---

**From:** Hancock, Chip  
**Sent:** Monday, April 18, 2011 3:16 PM  
**To:** Jung, Doris W.  
**Cc:** Fadeyi, Sunday; Machovec, Chuck M.; Hea, Roland C.; King, Kirsten L.  
**Subject:** RE: UCD - permit 96AD234

Doris,

Per PS memo 10-01, modeling for NO<sub>x</sub> and SO<sub>x</sub> are not required. The increases in PM<sub>2.5</sub> and PM<sub>10</sub> are very small (and the totals are small).

I reviewed the report you attached prior to our making the decision. The previous PM<sub>10</sub> had a huge cushion in the annual impact - ratio up their impact to the new requested level gives a total impact of well less than 110 µg/m<sup>3</sup>. Doing the same for the annual number gives well under the 50 µg/m<sup>3</sup> standard - and this was using the high 1<sup>st</sup> high. Total requested PM<sub>10</sub> (not just the increase) is 7 tons per year. Therefore, PM<sub>10</sub> modeling not necessary.

The increase in PM<sub>2.5</sub> is less than 1.5 tons per year - way below the significance level. Short term increase also below the 11 pounds per day. So, PM<sub>2.5</sub> modeling not necessary.

Chip

---

**From:** Jung, Doris W.  
**Sent:** Monday, April 18, 2011 2:43 PM  
**To:** Hancock, Chip  
**Cc:** Fadeyi, Sunday; Machovec, Chuck M.; Hea, Roland C.; King, Kirsten L.  
**Subject:** RE: UCD - permit 96AD234

Chip,

We evaluated the impacts associated with this facility last year (see attached e-mail). At that time it was determined that demonstrating compliance with the SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> NAAQS is necessary for this modification.

Doris

---

**From:** Hancock, Chip  
**Sent:** Monday, April 18, 2011 2:11 PM  
**To:** Jung, Doris W.  
**Cc:** Fadeyi, Sunday; Machovec, Chuck M.; Hea, Roland C.; King, Kirsten L.  
**Subject:** UCD - permit 96AD234

Doris,

After a recent meeting Roland and I had with the source, we took another look at this one. After further review the Construction Permits Unit has determined that impact modeling is not required for the current application and we will proceed with processing the permit.

This is based on the requested emission levels. The NO<sub>x</sub> increase is well below 40 tons per year. So, per PS memo 10-01 impact modeling for the NO<sub>x</sub> one hour standard is not required. All of the other pollutant increases are well below significance levels. In fact total facility emissions are below significance levels for all of the other pollutants except PM<sub>2.5</sub>. The PM<sub>2.5</sub> level is fairly low and the increase is small (~1 tpy).

I also took a look at the modeling done for the 2009 application. From that it does not appear that the proposed increases will result in exceedences of the NAAQS.

Therefore, please remove this application (96AD234) from your queue of impact modeling submittals to review. If you have spent any time on this application, please send your hourly time summary to Sunday (or me) so it can be added to PTS and included in the invoice.

Thanks,

Chip

State  
of  
Colorado**Fwd: Updated: Sun Valley Steam Plant Permitting Effort Kick off Meeting**

1 message

**Jung - CDPHE, Doris** [REDACTED] Mon, Jan 7, 2013 at 2:57 PM  
To: emmett.malone [REDACTED], Rosendo Majano - CDPHE [REDACTED]

public health first - NOT!

----- Forwarded message -----

From: **R K Hancock III** [REDACTED]  
Date: Mon, Jan 7, 2013 at 2:50 PM  
Subject: Re: Updated: Sun Valley Steam Plant Permitting Effort Kick off Meeting  
To: "Jung - CDPHE, Doris" [REDACTED]  
Cc: Chuck Machovec - CDPHE [REDACTED], Kirsten King - CDPHE [REDACTED]

Doris,

I hear what you are saying. However, per PS memo 10-02 the Division **does not** require impact modeling to the 1 hour standard for sources of SO<sub>2</sub> or NO<sub>x</sub> with a net change in emissions of less than 40 ton per year. Per the last paragraph (emphasis added): "..., the Division **will apply** EPA's SERs for NO<sub>x</sub> and SO<sub>2</sub> to the 1-hour NO<sub>2</sub> and 1-hour SO<sub>2</sub> standards **for all** stationary source permitting activities, including determining when ambient air quality impact analyses are necessary for permitting,...".

As for the reasoning, it is explained better in the memo than I can.

Chip

On Mon, Jan 7, 2013 at 2:20 PM, Jung - CDPHE, Doris [REDACTED] wrote:  
Chip,

It is our understanding that the Sun Valley Steam Center project is a modification at Zuni Station per the testimony before the Colorado PUC on 12/12/12: *"In 2013, the Company plans to undertake much-needed repairs and improvements at Zuni Electric Generating Station ("Zuni Station") to continue steam production operations until it can be replaced late in the third quarter of 2015 by the proposed new Sun Valley Steam Center ("SVSC"). This new steam production facility will consist of two 300 Mlb per hour package boilers and is expected to cost \$29 million (excluding allowance for funds used during construction and escalations)."*

Near-field (including flagpole receptors at the stadium) ambient air impacts from this new steam center should be assessed for the following reasons regardless of the outcome of any netting exercise (i.e., even if it is a minor modification):

- The SO<sub>2</sub> impact analysis on file indicates that the existing Zuni facility may be contributing and causing violations of the 1-hr NAAQS and 3-hr CAAQS if the facility is using fuel oil.
- There is no NO<sub>2</sub> cumulative impact analysis completed for Zuni that we are aware of. Based on the impacts estimated for lowering the discharge height of Unit 2 boiler, it is reasonable to believe that the existing Zuni facility could cause or contribute to a violation of the 1-hr NO<sub>2</sub> NAAQS.
- We need to consider that this facility site is situated in an area with high population exposure.

Doris

----- Forwarded message -----

From: **R K Hancock III** [redacted]  
Date: Thu, Jan 3, 2013 at 4:14 PM  
Subject: Re: Updated: Sun Valley Steam Plant Permitting Effort Kick off Meeting  
To: "Jung - CDPHE, Doris" [redacted]

OK, thanks.

On Thu, Jan 3, 2013 at 3:00 PM, Jung - CDPHE, Doris [redacted] wrote:

Chip,

We are unable to attend since we already have a meeting scheduled for Jan 14 at 10 am.

Doris

On Thu, Jan 3, 2013 at 2:46 PM, R K Hancock III [redacted] wrote:

Chuck, Doris,

Chad requested I forward this to you. Do not know if he has discussed with you or not.

Chip

----- Forwarded message -----

From: **Campbell, Chad E** [redacted]  
Date: Thu, Jan 3, 2013 at 2:38 PM  
Subject: Updated: Sun Valley Steam Plant Permitting Effort Kick off Meeting  
To: R K Hancock III [redacted], "Magno, Gary J" [redacted],  
"Christopher, Jamie" [redacted], "Reed, Jason" [redacted]

When: Monday, January 14, 2013 10:00 AM-11:00 AM (GMT-07:00) Mountain Time (US & Canada).  
Where: CDPHE Offices

Note: The GMT offset above does not reflect daylight saving time adjustments.

\*~\*~\*~\*~\*~\*~\*~\*~\*~\*

Chip,

This meeting will be to review the Sun Valley Steam Plant and the proposed permitting strategy for the facility.

Thanks,

Chad

STATE OF  
COLORADO

## CC&V Modeling Analysis

1 message

Rosendo Majano

Fri, Oct 19, 2018 at 2:59 PM

To: Garry Kaufman

Garry,

On 09/27/18 I participated in a meeting with Robyn Wille and Jessica Lowrey, lawyers with the Colorado Attorney General's Office. While the meeting was to discuss the legal challenge to the ColoWyo permit and how the revised modeling analysis for this facility should be conducted, the lawyers made some statements that are applicable to any air permit application and that contradict what you have asked to accept as valid for the CC&V permit application (please see the email below).

There are also two technical arguments used to support the ColoWyo modeling analysis that are being accepted by consensus by everyone involved in this case, and that also contradict what you have asked to accept in the CC&V application. I'm referring to the following topics.

1- The CO AG's Office lawyers indicated in very clear terms that the provisions in Appendix W to 40CFR51 are applicable to minor sources. They explained that while Colorado regulations don't require air quality modeling for minor sources, if modeling is used to demonstrate compliance with the NAAQS, then it should be done according to the procedures established by EPA and they explicitly mentioned that the provisions in Appendix W are applicable and should be followed regardless of the minor source status.

2- The CO AG's Office lawyers also indicated that the Air Division does not have the authority to regulate emissions from mobile sources because those are regulated at the federal level, but that the Division does have the authority to regulate the usage of mobile sources within the facility when issuing a permit for such facility.

3- It was explained during the meeting that the Division is not trying to regulate the emissions from ColoWyo's mobile sources, but that in the context of conducting an air quality modeling analysis to determine compliance with the NAAQS, those emissions need to be included and need to be characterized adequately to represent the worst-case scenario. The CO AG's Office lawyers agreed and indicated that the modeling should be done in a way that withstands future legal challenge.

4- ColoWyo has requested to lower the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratio for all Tier 3 and below mobile sources from the previously approved value of 0.4 to a new value of 0.1. In doing this request, ColoWyo has hired two different consulting companies which have presented solid arguments to support that value. Part of those arguments have been the explanation that higher in-stack ratio values are valid only for engines with post-combustion diesel emissions control devices (i.e. Tier 4 diesel engines). While the Division has not reached a final determination on this request, verbally everyone involved is in agreement that these arguments are sound and technically supported, and what is being discussed is not whether those arguments are acceptable or not but rather how many units in the vehicle fleet have those control devices and would therefore have a higher in-stack ratio.

5- ColoWyo has requested to use lower engine loads than the ones in EPA's MOVES for the non-road mobile sources at their site, and for that purpose their consultants have provided actual data from their mining equipment. Some of the issues raised by Division staff, myself included, are: a) That the statistical treatment of the data to calculate the average engine load was not adequate; b) The origin of the data and the procedures for estimating specific segment-specific engine loads used in the calculation of the average, need to be explained in more detail to ensure that the data is representative of actual operations at the mine. Both ColoWyo's and Division's staff were in agreement and ColoWyo has promised to correct the statistical procedures and to provide supporting explanations for the data.

A subsequent meeting took place on 10/11/18 involving not only the CO AG's Office lawyers but also ColoWyo's attorneys, as well as Division's and ColoWyo's technical and management staff. The procedures to conduct the modeling analysis were discussed in detail, including items 3 through 5, and there was consensus that the modeling analysis has to be conducted in a manner that is legally defensible in court. Particular emphasis was made by ColoWyo about the need to represent the worst-case scenario in the model.

In stark contrast to what the Division is agreeing to in the ColoWyo case, for the CC&V air quality modeling analysis, Emmett, Gordon, and you, the three direct supervisors above me in the Division's organizational chart, are asking me to accept as valid the following:

- a) That the provisions in Appendix W are not applicable for minor sources and therefore the use of maximum allowable emissions is not pertinent for their mobile sources. Appendix W states that maximum allowable emissions are conducive to the highest impacts on ambient air and consequently those are the emissions that should be used to conduct a modeling analysis. I have already expressed my professional opinion that some of the emissions used by CC&V are not maximum allowable emissions.
- b) That the Division does not have the authority to regulate mobile sources and therefore using maximum allowable emissions in the modeling analysis is at the discretion of the Division and not regulatory.
- c) That the in-stack ratios of five non-road mining vehicles with Tier 4 diesel engines at CC&V are very low, some as low as 0.01. CC&V has not provided any information to clarify whether those engines have or not post-combustion control devices, yet the emission rates being used very low, corresponding to units with control devices that would raise significantly the in-stack ratio. If the in-stack ratio is low, that means there are not control devices and the total emissions from the engine would be very high, and vice versa, as accepted for the ColoWyo case.
- d) That the engine loads for the non-road mining vehicles at CC&V are significantly lower than those in EPA's MOVES, that the statistical treatment of the raw data used by CC&V is correct and that the data provided by CC&V are representative of the actual operations at the mine. This despite the fact that similar to the ColoWyo case, the Division's subject matter experts also have objections to the statistical calculations and representativeness of the data in the CC&V case.

Considering that both ColoWyo and CC&V are both minor sources, and both are mining operations using similar type of non-road vehicles, how do I reconcile the contradictory technical arguments that are being used to support the air quality modeling analysis in each one of those cases?

My main concern is that, in the context of a legal dispute between an external party and the Division, and as one of the Division's subject matter experts, I am providing information and explanations to the CO AG's lawyers for them to use in the legal dispute, and then I would be turning around and contradict myself by approving as valid the exact opposite arguments that I just provided to the CO AG's lawyers.

Wouldn't that place me at risk of perjuring myself?

What would happen if the CC&V permit were to be challenged in court?

Would I personally be in legal risk for knowingly approving technical arguments that I have previously stated to be different when acting as a subject matter expert on the ColoWyo case?

These are questions that I would like to present to the CO AG's Office before continuing the review of the CC&V case.

The legal concerns are in addition to the possibility of compromising my ethical and professional integrity, and that of the Division, by approving technical arguments that several Division subject matter experts, myself included, agree that are flawed.

In light of all the above I want to request to recuse myself from continuing to review the CC&V modeling analysis. There is a precedent for this back in 2011 when my predecessor Doris Jung, and the previous Modeling Unit manager Chuck Machovec recused themselves from continuing to review a previous CC&V modeling analysis and it ended up being reviewed and approved by a different person (Final Modeling Review report initialed by Gordon Pierce dated 06/20/2011).

There is also the precedent of my supervisor refusing to conduct an additional modeling analysis for the previous ColoWyo application, arguing that it would be enabling actions that would go against EPA guidance (email dated 02/03/2016 from Emmett Malone to Chip Hancock).

Note that in making this request I emphasize that I have already done my job and finalized the review of this application twice (Final Modeling Review Reports dated 09/16/2014 and 06/26/2018), in both cases concluding that compliance with the applicable NAAQS was not demonstrated. My technical analyses and conclusions in those reports have not been challenged and no one has pointed out to any errors or concerns, other than the arguments in your email below that are now being contradicted through what is being approved by the Division in the ColoWyo case.

At this point what I am concluding is that, without anyone pointing out to any errors in my work in the CC&V application, my professional expertise is just not being respected, and consequently I find myself at a dead end with this application, being pressured to accept information that is not technically supported, and according to the aforementioned conversations with the CO AG's Office lawyers, not legally supported. Thus, I am with the CC&V application being placed in an untenable position from an ethical perspective, and possibly also from a legal point of view.

I think that given the circumstances the fresh perspective of a different person reviewing this modeling analysis will be beneficial.

Please let me know if you agree with my request.

Thank you.

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**Rosendo Majano**

----- Forwarded message -----

From: **Kaufman - CDPHE, Garrison**

Date: Thu, Jul 12, 2018 at 5:32 PM

Subject: Re: CC&V

To: "Pierce - CDPHE, Gordon", "Malone - CDPHE, Emmett"

Gordon and Emmett,

Thank you for the opportunity to review the draft modeling report and additional communications regarding the potential treatment of non-road engine emissions and other issues with the CC&V modeling. The draft report and subsequent communications raise several issues regarding the latest round of modeling submitted by CC&V. In response to these issues, I wanted to provide some perspective on the issues raised, as well as direction on how to proceed with finalizing this project.

The draft modeling report raises 4 basic concerns with the latest modeling that CC&V has submitted: 1) the NO<sub>2</sub>/NO<sub>x</sub> in-stack ratios for non-road and stationary engines at the facility; 2) the engine load values used in calculating emissions from non-road engines; 3) the use of source groups in combination with OLM for NO<sub>2</sub> modeling; and 4) the exclusion of certain hiking trails within the facility boundaries from ambient air.

#### NO<sub>2</sub>/NO<sub>x</sub> In-Stack Ratios

The modeling that CC&V submitted utilized a NO<sub>2</sub>/NO<sub>x</sub> ratio of 0.05 for blasting and a weighted average ratio of 0.0927 for the non-road engines based on several ratios for different non-road engines at the facility (0.09 for 55 Tier 1-3 non road engines; 0.5 for six Tier 4 non-road engines; 0.2 for four Tier 4 non-road engines; and 0.01 for one Tier 4 non-road engine). The weighted average of 0.0927 was also applied to the stationary engines at the facility. The draft report notes that the permit engineer looked at the ratios and concluded that they were acceptable except the ratios of 0.2, and .01 used for certain of the Tier 4 engines, and application of the weighted average to the stationary engines.

Regarding the five Tier 4 engines, CC&V submitted information from the representative for the engine manufacturer that for four of the engines an in-stack ration of between 0.15 and 0.20 would be reasonable and that an in-stack ratio of less than 0.01 would be reasonable for the fifth engine. CC&V used the high end of these values. I have passed this information on to Roland Hea and Chip Hancock and they concluded that the ratios CC&V used for these five pieces of equipment was acceptable. With respect to the use of the 0.0927 ratio for the stationary engines, CC&V relied on an e-mail from Chuck Pray in 2016 approving a ratio of .09 for both the non-road and stationary engines. Based on this e-mail, Roland Hea concurred that the use of a more conservative ratio of 0.0927 was acceptable.

Given these determinations from permitting I believe that all of the in-stack ratios that CC&V used are acceptable and therefore the potential issues raised in the draft modeling report are resolved.

#### Non-Road Engine Load

The draft modeling report questions the appropriateness of the engine load factors CC&V used for the various non-road engines at the facility. Engine load is important because it has a large impact on the calculated emissions from the non-road engines. As acknowledged in the draft report and subsequent communications on this issue, determining loads for these types of engines is challenging. Unlike stationary engines that can and do operate close to maximum load, numerous factors preclude non-road engines from operating at or near full load for any extended period of time. In calculating engine loads, CC&V split the various non-road engines into broad categories (e.g. support trucks, shovels, graders, haul trucks) and then calculated average engine loads for these categories utilizing 3 year averages of diesel fuel consumed for each of these categories. As noted in the draft model report and Rebecca Simpson's underlying technical analysis dated May 23, 2018, these practices smooth out both temporal variability and variability between different types and sizes of engines within the broad categories. This, along with the fact that CC&V did not remove outliers, means that CC&V's analysis does not capture peak emissions from a given large category and may in some instances underestimate average load for individual pieces equipment and more narrow categories of equipment of like type and size. Based on all of this, and the assertion that state and federal regulations require that emissions from the permitted facility correspond to potential to emit, the draft modeling report concludes that the load factors CC&V used, and corresponding emissions included in the modeling based on these load factors was improper.

I appreciate the concerns raised and commend MMEIU staff on their excellent analysis of this issue. This analysis helps to advance our thinking on how to best model these extremely challenging mining sources. At the same time, rejecting CC&V's modeling based on this analysis is problematic for a number of reasons. As an initial matter, I don't agree with the conclusion that state and federal regulations require the use of PTE in characterizing emissions from the non-road engines for modeling purposes. Because this is a minor source permit the federal regulations set forth in Appendix W do not directly apply. EPA has made this point on several occasions. Nor do our state regulations mandate the use of PTE for the non-road engines at CC&V. Regulation No. 3 does provide that EPA approved modeling protocols (which presumably means Appendix W) be used, but only where modeling is required under Regulation No. 3. Regulation No. 3 only requires modeling of major stationary sources under the PSD program, and does not require modeling of minor sources. The regulation, does, however, give the Division broad discretion in assessing ambient impacts of any permitted source. As part of this broad discretion, the Division has the discretion to determine if and how minor sources should be modeled including determining the emissions that should be used in that modeling.

In addition to the technical complexities associated with determining emissions from non-road engines, the decision on how best to exercise our discretion is complicated by the treatment on non-road engine mobile equipment under our permitting regulations. As currently written, Regulation No. 3 does not give the Division authority to require permits for mobile equipment non-road engine emissions (this restriction is limited to the engine emissions themselves and does not extend to fugitive dust from roadways and other locations). As you know, at least one operator has raised this issue and asserted that based on this we do not have the authority to require modeling of non-road engine emissions at mining sites. While I would not agree with that conclusion, the treatment of these emission sources under our permitting regulations does raise the question of how to properly characterize these emissions. Should they be treated as a part of the modeled source, where we typically have used our discretion to require modeling at or near PTE levels, or should they be treated more akin to background or non-source emissions which have typically been modeled at levels closer to actual or average emissions or pollutant concentrations? If the latter approach is taken, the variability of fuel consumption over time, the lack of short term fuel consumption records, the non-uniformity of usage of individual pieces or even categories of equipment from month to month, and the extreme variability of emissions over short time periods due to rapidly changing engine loads resulting from different operating parameters, creates an extremely complex challenge in determining actual emissions. In this case CC&V has used a fairly simplified

approach that could certainly be refined. At the same time, they have consistently been using this approach through multiple iterations of modeling over the past several years, and this approach is based on actual fuel use data. Given this, and the fact that even under the more sophisticated approach taken by MMEIU staff there are still significant uncertainties about the emissions from this equipment on both a temporal and spatial basis, I believe allowing CC&V to use the engine load profiles, and resultant non-road engine emissions reflected in their latest modeling submittal is a reasonable and appropriate exercise of the Division's discretion under the regulation.

Source Grouping and OLM

I am not familiar with this issue and defer to the two of you to determine the best approach for this particular case.

Treatment of Hiking Trails

As I understand it the latest CC&V submittal shows newly identified hiking trails within the ambient air boundary that are not included as ambient air in the modeling for at least certain hours of the day. As indicated in the draft modeling report, and consistent with other areas, I agree that CC&V either needs to include these trails as part of ambient air or they need to demonstrate to the Division's satisfaction how the general public will be excluded from these areas for any periods of time that they are not included as ambient air.

Please let me know if you would like to discuss any of these issues

Garry Kaufman  
Division Director  
Air Pollution Control Division  
Colorado Department of Public Health and Environment

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Are you curious about ground-level ozone in Colorado? Visit our [ozone webpage](#) to learn more.

On Mon, Jul 2, 2018 at 11:32 AM, Pierce - CDPHE, Gordon <[gordon.pierce@state.co.us](mailto:gordon.pierce@state.co.us)> wrote:

----- Forwarded message -----

From: **Rosendo Majano** [REDACTED]  
Date: Thu, Jun 28, 2018 at 11:47 AM  
Subject: Fwd: CC&V  
To: Gordon Pierce [REDACTED]  
Cc: Emmett Malone [REDACTED]

Gordon - Emmett just asked me to forward this to you.

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**Rosendo Majano**  
[REDACTED]

----- Forwarded message -----

From: **Rosendo Majano** [REDACTED]  
Date: Tue, Jun 26, 2018 at 10:54 AM  
Subject: CC&V  
To: "Brickey, Jonathan" [REDACTED]  
Cc: Emmett Malone [REDACTED]

Jonathan,

I have finished the review of the CC&V application and I will start preparing the final Modeling Review Report in our regular format. However, that is going to take several days so in the meantime, and as we have done in the past, I'm sending you attached a memo with my findings and conclusions along with two supporting documents from one of the Modeling Unit's mobile sources expert. Hopefully this information will allow you to move forward with your part of the work on this application while I finish my report.

In short, the Cripple Creek & Victor facility will cause modeled violations of the 1-hr NO2 NAAQS. In addition, there are several errors in the modeling analysis that require correction before it can be determined whether the proposed project will or will not cause and/or contribute to modeled violations of the rest of applicable NAAQS.

Let me know if you have any questions.

---  
**Rosendo Majano**  
[REDACTED]

Gordon Pierce  
Program Manager  
Technical Services Program



4300 Cherry Creek Drive South, Denver, CO 80246-1530

[REDACTED]