Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 11/2/2018 6:14:15 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: FOIA email 2
Attachments: RE: FW: O&G Follow-up: Inventory Data; RE: FW: O&G Follow-up: Inventory Data; RE: FW: O&G Follow-up: Inventory Data; Re: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov); Re: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy 4 Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov); Call on Wednesday Feb 28th?; RE: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov); RE: [EXTERNAL] RE: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov); RE: FW: O&G Follow-up: Inventory Data; RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy Ex. 6 Personal Privacy Fw: US engagement in WB flaring initiatives; CH4 from associate gas venting and flaring

This should be all of them.

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 2/26/2018 4:02:57 PM
To: Tichenor, James [jtichenor@blm.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Call on Wednesday Feb 28th?

Hi James,

I know I had the wrong dates for the check in calls on my calendar before and wanted to confirm that we have a call on Wednesday. I won't be able to participate, but Suzie or someone else from our group can.

Thanks!
Melissa

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 7/11/2018 7:01:01 PM
To: Tichenor, James [jtichenor@blm.gov]
Subject: CH4 from associate gas venting and flaring

Hi James,

The information on associated gas that the article is referencing can be found on pages 71-72 at the following link: https://www.epa.gov/sites/production/files/2018-01/documents/2018_chapter_3_energy.pdf.

Melissa

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 7/11/2018 6:51:21 PM
To: Tichenor, James [jtichenor@blm.gov]
Subject: Fw: US engagement in WB flaring initiatives

Hi James,

Following up on our conversation, the specific request is: to see if there has been any official / public change in policy position at BLM (or within the USG) with respect to the US signing / endorsing the Zero routine flaring by 2030 initiative (which the US signed with the understanding that it would apply only to federal /tribal lands and offshore), or the World Bank Global Gas Flaring Reduction.

Thanks for any info you can provide.

Melissa

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 4/25/2018 1:51:44 PM
To: 'Tichenor, James' [jtichenor@blm.gov]
Subject: RE: [EXTERNAL] RE: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov)

Thanks!

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Wednesday, April 25, 2018 9:50 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Subject: Re: [EXTERNAL] RE: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov)

Yes, we cancelled this. I think you need to delete he invite from your end.

Thanks in advance for those numbers.

On Wed, Apr 25, 2018 at 6:47 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

We think this meeting is canceled but we just wanted to check to make sure?

I saw your email the other day on the updated GHGI and I can get you those tables soon (probably by the end of this week).

Melissa

-----Original Appointment-----
From: jtichenor@blm.gov [mailto:jtichenor@blm.gov]
Sent: Tuesday, August 22, 2017 9:13 PM
To: jtichenor@blm.gov; Thompson, Lisa; Hambrick, Amy
Cc: Waltzer, Suzanne; Weitz, Melissa
Subject: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov)
When: Wednesday, April 25, 2018 7:30 AM-8:30 AM America/Los_Angeles.
Where:

This event has been changed.

more details »

Call re Regs; Ex. 6 Personal Privacy

When **Changed:** Monthly from 7:30am to 8:30am on the fourth Wednesday Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Calendar weitz.melissa@epa.gov

Who
- jtichenor@blm.gov - organizer
- thompson.lisa@epa.gov
- hambrick.amy@epa.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Your attendance is **optional**.

Going? All events in this series: **Yes** - **Maybe** - **No** more options »

Invitation from Google Calendar

You are receiving this courtesy email at the account weitz.melissa@epa.gov because you are an attendee of this event.

To stop receiving future updates for this event, decline this event. Alternatively you can sign up for a Google account at https://www.google.com/calendar/ and control your notification settings for your entire calendar.

Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More.

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 6/26/2018 7:20:56 PM
To: jtichenor@blm.gov; Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi James,

We have a few key folks out this week and would like to reschedule.

Would any of these times work for you?

July 3 11:30
July 5 anytime after 11:30
July 6 anytime

Thank you!
Melissa

From: Google Calendar [mailto:calendar-notification@google.com] **On Behalf Of** jtichenor@blm.gov
Sent: Tuesday, June 26, 2018 12:02 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>; Hambrick, Amy <Hambrick.Amy@epa.gov>; jtichenor@blm.gov; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi -
Just checking to make sure we're still on for tomorrow. I think we'll have a bunch to talk about. Let me know if you need to reschedule.

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Jun 27, 2018 7:30am – 8:30am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 10/5/2017 1:13:20 PM
To: Tichenor, James [jtichenor@blm.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: RE: FW: O&G Follow-up: Inventory Data

Hi James,

I can get you the updated information. When do you need this by?

Thanks,
Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Wednesday, October 04, 2017 4:26 PM
To: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Fwd: FW: O&G Follow-up: Inventory Data

Or this file, if possible. I think this one might be less involved and, at the same time, what were are looking for.

---------- Forwarded message ----------
From: **Tichenor, James** <jtichenor@blm.gov>
Date: Thu, Jul 14, 2016 at 7:37 AM
Subject: Re: FW: O&G Follow-up: Inventory Data
To: "Weitz, Melissa" <Weitz.Melissa@epa.gov>
Cc: "Waltzer, Suzanne" <Waltzer.Suzanne@epa.gov>, Eric C Jones <ejones@blm.gov>

Hi Melissa,

Another quick question about the data (I've attached what you sent this year and last year). 'Gathering and Boosting Stations' appears to be a new source category this year (or maybe a new label). Would the correct crosswalk to 2013 be to consider it as 'Gathering Compressors'? Would it be category 5 or 9 or a new one?

Thanks again for your help!

On Tue, Jul 12, 2016 at 11:41 AM, Tichenor, James <jtichenor@blm.gov> wrote:

Thanks so much for your help!

On Tue, Jul 12, 2016 at 8:16 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I've separated oil and gas in the attached.

We made major updates this year to pneumatic controllers, gathering and other sources, so a lot of the numbers have moved around.

For pneumatics, short story is, the GHGRP data showed more pneumatic controllers per well than our previous data source (the 1990's GRI study), and updating the inventory to use the latest GHGRP data resulted in much higher emissions from that category.

For gathering and boosting, we used one of the EDF-Industry studies to update the activity data (total number of gathering stations nationally) and emissions data. This also resulted in higher emissions.

For more information on the updates, please see the Recalculations Discussion of the GHG Inventory—page 63-65 for oil and pages 74-81 for gas, https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Chapter-3-Energy.pdf, and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_to_Production_Segment%20_Emissions_2016-04-14.pdf and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_GB_Station%20Emissions_2016-04-14.pdf for additional information.

Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, July 11, 2016 4:17 PM

To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

Thanks for the data. A couple questions.

For the few rows where the the oil and gas sectors are combined, would it be possible to have them separated? (e.g. rows 3, 4, 6, 8-11) We would like to try to match up as closely as possible to the format that you provided us before, with oil or gas sector and category number.

Second, are the emissions for the pneumatic devices correct? The table you provided shows 139 Bcf of CH4 for 2014, and we had 39 Bcf of CH4 for 2013... Gathering and boosting statiosn also appear to be MUCH higher, 97 Bcf of CH4 in 2014 versus 9 Bcf in 2013?

On Mon, Jul 11, 2016 at 12:53 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Sorry for the delay—here are the numbers. Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, July 07, 2016 10:52 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa,

Yes, so as I understand, this was 2013 emissions for the 1990-2015 GHG Inventory, and would be hoping to get 2014 data for the 1990-2016 Inventory. We we're using it to scale down the emissions per Fed/Ind share of all US production.

So with these categories, though, are you able to provide the volumes in CH4 and raw natural gas? I forget where we landed on this last time.

On Thu, Jul 7, 2016 at 7:45 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Just wanted to confirm that this is that attachment you meant in your email yesterday? I can send you an updated version with the 2014 numbers soon (hopefully tomorrow).

Melissa

From: Weitz, Melissa
Sent: Tuesday, April 21, 2015 1:25 PM
To: Tichenor, James <jtichenor@blm.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: RE: O&G Follow-up: Inventory Data

Hi James,

The net numbers for 2013 are in the attachment. Please let me know if you'd like to discuss.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 20, 2015 4:25 PM
To: Weitz, Melissa
Subject: Re: O&G Follow-up: Inventory Data

On Thu, Mar 26, 2015 at 9:35 AM, Waltzer, Suzanne <Waltzer.Suzanne@epa.gov> wrote:

Hi

To follow-up from our conversation, attached is a spreadsheet that has the oil and natural gas production methane emissions. The first two tabs are summary net emissions data (in Bcf and tonnes of methane) for the sector as a whole and for oil and gas production based on 2012 data (the 2014 GHG Inventory). The subsequent tabs are more detail on the individual source categories including the emission factors and activity data, etc. The data/information is from the inventory but may include some additional internal comments/notes so please do not share broadly.

We pulled this together from existing information quickly as a starting point. This may not be exactly what you need or if anything is unclear, just let us know. We will also take a take a closer look at the table you provided. It may be helpful to set up a meeting to talk through the data early next week.

Thanks,

Suzie

--

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Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 10/10/2017 4:34:44 PM
To: Tichenor, James [jtichenor@blm.gov]
CC: Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: RE: FW: O&G Follow-up: Inventory Data
Attachments: EPA Inventory Emissions 10.6 James.xlsx

Hi James,

I've updated the numbers using 2015 estimates (the latest) from the GHG inventory released in April 2017.

The data used here can be found in the two GHG Inventory annexes available at https://www.epa.gov/ghgemissions/natural-gas-and-petroleum-systems-ghg-inventory-additional-information-1990-2015-ghg.

For petroleum systems, data is from tab 3.5-2. There are no Gas STAR reductions applied to petroleum production, so the data from 3.5-2 were used as-is.

For natural gas systems, adjustments were made to take into account Gas STAR reductions, and also regulatory reductions that are separately accounted (for dehydrator vents). Other regulatory reductions are directly included in the calculations. In the attached, I've color-coded the rows for natural gas systems to indicate how the data were developed. Yellow is for sources that are directly calculated as net (i.e., we have recent data that already take into account technologies/practices). For those, you can find the data on tab 3.6-1. Green is for sources that have source-specific Gas STAR reductions, and orange is for sources with separately applied regulatory reductions. For both green and orange sources, the net emissions are those in tab 3.6-1, minus the reductions on tab 3.6-9. For all other sources, a proportional adjustment was made to reduce calculated potential emissions to take into account unassigned gas star reductions.

This was the same method as used last year for the data we provided to you.

Let me know if you have any questions.

Thanks,
Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, October 05, 2017 9:16 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa!
That would be great. Would it be possible to have by mid-next week?

On Thu, Oct 5, 2017 at 6:13 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

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Thanks,

Melissa

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To: Weitz, Melissa
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202-573-0536

Type	Category	Desc	Source
gas	10	*Normal Fugitives*	Gathering and Boosting Stations
gas	2	*Vented and Combusted*	Pneumatic Devices-gas
gas	6	*Vented and Combusted*	Liquids unloading
gas	7	*Vented and Combusted*	Condensate tanks
gas			Gathering and Boosting episodic events
gas	9	*Normal Fugitives*	Pipeline Leaks
gas	3	*Vented and Combusted*	Chemical Injection Pumps-gas
gas	8	*Vented and Combusted*	Offshore Platforms-gas
gas	4	*Vented and Combusted*	Gas Engines-gas
gas	9	*Normal Fugitives*	Separators-gas
gas	9	*Normal Fugitives*	Meters/Piping
gas	1	*Vented and Combusted*	HF Well Completions-gas
gas	3	*Vented and Combusted*	Kimray Pumps
gas	5	*Normal Fugitives*	Compressors
gas	9	*Vented and Combusted*	Prod Water
gas	9	*Normal Fugitives*	Gas Wells with Hydraulic Fracturing
gas	9	*Vented and Combusted*	Dehydrator Vents
gas	9	*Normal Fugitives*	Heaters
gas	9	*Normal Fugitives*	Non-associated Gas Wells (less fractured wells)
gas	9	*Vented and Combusted*	Compressor Starts
gas	9	*Normal Fugitives*	Dehydrators
gas	9	*Vented and Combusted*	Compressor BD
gas	9	*Vented and Combusted*	Pipeline BD
gas	9	*Vented and Combusted*	Mishaps
gas	9	*Vented and Combusted*	Well Drilling
gas	9	*Vented and Combusted*	Pressure Relief Valves
gas	9	*Vented and Combusted*	Vessel BD
gas	1	*Vented and Combusted*	Gas Well Completions and Workovers without Hydraulic Fracturing
oil	2	*Vented*	Pneumatic Devices-oil
oil	8	*Vented*	Offshore Platforms-oil
oil			Associated Gas Venting
oil	4	*Combusted*	Gas Engines-oil
oil	3	*Vented*	Chemical Injection Pumps-oil
oil	7	*Vented*	Oil tanks
oil	1	*Vented*	HF Well Completions-oil
oil	9	*Fugitive*	Oil Wellheads (light crude)
oil			Associated Gas Flaring
oil	9	*Combusted*	Heaters
oil	9	*Fugitive*	Separators-oil
oil	9	*Fugitive*	Heater/Treaters (light crude)
oil	9	*Fugitive*	Headers (light crude)
oil	9	*Upsets*	Well Blowouts Onshore
oil	9	*Fugitive*	Sales Areas
oil	5	*Fugitive*	Compressors
oil	9	*Fugitive*	Well Drilling

oil	9 Vented	Vessel Blowdowns
oil	9 Vented	Compressor Starts
oil	9 Fugitive	Battery Pumps
oil	9 Vented	Compressor Blowdowns
oil	9 Upsets	Pressure Relief Valves
oil	9 Fugitive	Floating Roof Tanks
oil	1 Vented	Well Workovers
oil	1 Vented	Well Completion Venting
oil	9 Fugitive	Oil Wellheads (heavy crude)
oil	9 Fugitive	Headers (heavy crude)

NET (tonnes)	bcf methane	bcf whole gas
1,968,205	#REF!	#REF!
1,020,246	#REF!	#REF!
209,138	#REF!	#REF!
23,506	#REF!	#REF!
195,212		
161,559	#REF!	#REF!
121,398	#REF!	#REF!
150,565	#REF!	#REF!
112,764	#REF!	#REF!
62,912	#REF!	#REF!
41,170	#REF!	#REF!
26,577	#REF!	#REF!
35,943	#REF!	#REF!
35,563	#REF!	#REF!
32,726	#REF!	#REF!
18,583	#REF!	#REF!
14,154	#REF!	#REF!
11,673	#REF!	#REF!
8,580	#REF!	#REF!
5,201	#REF!	#REF!
2,942	#REF!	#REF!
1,373	#REF!	#REF!
1,384	#REF!	#REF!
749	#REF!	#REF!
528	#REF!	#REF!
378	#REF!	#REF!
333	#REF!	#REF!
406	#REF!	#REF!
	-	-
745,330	#REF!	#REF!
187,604	#REF!	#REF!
105,706		
90,197	#REF!	#REF!
80,738	#REF!	#REF!
80,474	#REF!	#REF!
72,767	#REF!	#REF!
63,776	#REF!	#REF!
42,518		
34,549	#REF!	#REF!
20,503	#REF!	#REF!
18,537	#REF!	#REF!
8,160	#REF!	#REF!
2,853	#REF!	#REF!
2,240	#REF!	#REF!
2,177	#REF!	#REF!
840	#REF!	#REF!

557	#REF!	#REF!
504	#REF!	#REF!
297	#REF!	#REF!
225	#REF!	#REF!
192	#REF!	#REF!
159	#REF!	#REF!
81	#REF!	#REF!
60	#REF!	#REF!
37	#REF!	#REF!
19	#REF!	#REF!

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 2/1/2018 10:31:40 PM
To: 'Tichenor, James' [jtichenor@blm.gov]
Subject: RE: FW: O&G Follow-up: Inventory Data
Attachments: EPA Inventory Emissions 10.6 James 2.1.2018.xlsx

Oddly (I think), when I added the bcf methane values in (dividing tonnes by 19,260), the bcf whole gas values were automatically calculated, apparently by pulling from a mysterious second spreadsheet. I don't understand, but here you go.

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, February 01, 2018 1:46 PM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

I had saved this file to our system, and then I opened it again just now, and I got a lot of #ref in the columns. Then I tracked back to this email and I still get it when I download. Are you seeing those in the file too? Would it be possible to resend? Also, would you have preliminary estimates for FY16?

Our director is being ask for this as a QFR, and I'd like to be able to provide an overall number for FY16, even if it is a preliminary draft estimate.

Thanks, James

On Tue, Oct 10, 2017 at 9:34 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I've updated the numbers using 2015 estimates (the latest) from the GHG inventory released in April 2017.

The data used here can be found in the two GHG Inventory annexes available at https://www.epa.gov/ghgemissions/natural-gas-and-petroleum-systems-ghg-inventory-additional-information-1990-2015-ghg.

For petroleum systems, data is from tab 3.5-2. There are no Gas STAR reductions applied to petroleum production, so the data from 3.5-2 were used as-is.

For natural gas systems, adjustments were made to take into account Gas STAR reductions, and also regulatory reductions that are separately accounted (for dehydrator vents). Other regulatory reductions are directly included in the calculations. In the attached, I've color-coded the rows for natural gas systems to indicate how the data were

developed. Yellow is for sources that are directly calculated as net (i.e., we have recent data that already take into account technologies/practices). For those, you can find the data on tab 3.6-1. Green is for sources that have source-specific Gas STAR reductions, and orange is for sources with separately applied regulatory reductions. For both green and orange sources, the net emissions are those in tab 3.6-1, minus the reductions on tab 3.6-9. For all other sources, a proportional adjustment was made to reduce calculated potential emissions to take into account unassigned gas star reductions.

This was the same method as used last year for the data we provided to you.

Let me know if you have any questions.

Thanks,

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, October 05, 2017 9:16 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>

Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa!

That would be great. Would it be possible to have by mid-next week?

On Thu, Oct 5, 2017 at 6:13 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I can get you the updated information. When do you need this by?

Thanks,

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Wednesday, October 04, 2017 4:26 PM
To: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Fwd: FW: O&G Follow-up: Inventory Data

Or this file, if possible. I think this one might be less involved and, at the same time, what were are looking for.

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Date: Thu, Jul 14, 2016 at 7:37 AM
Subject: Re: FW: O&G Follow-up: Inventory Data
To: "Weitz, Melissa" <Weitz.Melissa@epa.gov>
Cc: "Waltzer, Suzanne" <Waltzer.Suzanne@epa.gov>, Eric C Jones <ejones@blm.gov>

Hi Melissa,

Another quick question about the data (I've attached what you sent this year and last year). 'Gathering and Boosting Stations' appears to be a new source category this year (or maybe a new label). Would the correct crosswalk to 2013 be to consider it as 'Gathering Compressors'? Would it be category 5 or 9 or a new one?

Thanks again for your help!

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Hi James,

I've separated oil and gas in the attached.

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For pneumatics, short story is, the GHGRP data showed more pneumatic controllers per well than our previous data source (the 1990's GRI study), and updating the inventory to use the latest GHGRP data resulted in much higher emissions from that category.

For gathering and boosting, we used one of the EDF-Industry studies to update the activity data (total number of gathering stations nationally) and emissions data. This also resulted in higher emissions.

For more information on the updates, please see the Recalculations Discussion of the GHG Inventory—page 63-65 for oil and pages 74-81 for gas, https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Chapter-3-Energy.pdf, and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_to_Production_Segment%20_Emissions_2016-04-14.pdf and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_GB_Station%20Emissions_2016-04-14.pdf for additional information.

Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, July 11, 2016 4:17 PM

To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

Thanks for the data. A couple questions.

For the few rows where the the oil and gas sectors are combined, would it be possible to have them separated? (e.g. rows 3, 4, 6, 8-11) We would like to try to match up as closely as possible to the format that you provided us before, with oil or gas sector and category number.

Second, are the emissions for the pneumatic devices correct? The table you provided shows 139 Bcf of CH4 for 2014, and we had 39 Bcf of CH4 for 2013... Gathering and boosting statiosn also appear to be MUCH higher, 97 Bcf of CH4 in 2014 versus 9 Bcf in 2013?

On Mon, Jul 11, 2016 at 12:53 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Sorry for the delay—here are the numbers. Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, July 07, 2016 10:52 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa,

Yes, so as I understand, this was 2013 emissions for the 1990-2015 GHG Inventory, and would be hoping to get 2014 data for the 1990-2016 Inventory. We we're using it to scale down the emissions per Fed/Ind share of all US production.

So with these categories, though, are you able to provide the volumes in CH4 and raw natural gas? I forget where we landed on this last time.

On Thu, Jul 7, 2016 at 7:45 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Just wanted to confirm that this is that attachment you meant in your email yesterday? I can send you an updated version with the 2014 numbers soon (hopefully tomorrow).

Melissa

From: Weitz, Melissa
Sent: Tuesday, April 21, 2015 1:25 PM
To: Tichenor, James <jtichenor@blm.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: RE: O&G Follow-up: Inventory Data

Hi James,

The net numbers for 2013 are in the attachment. Please let me know if you'd like to discuss.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 20, 2015 4:25 PM
To: Weitz, Melissa
Subject: Re: O&G Follow-up: Inventory Data

On Thu, Mar 26, 2015 at 9:35 AM, Waltzer, Suzanne <Waltzer.Suzanne@epa.gov> wrote:

Hi

To follow-up from our conversation, attached is a spreadsheet that has the oil and natural gas production methane emissions. The first two tabs are summary net emissions data (in Bcf and tonnes of methane) for the sector as a whole and for oil and gas production based on 2012 data (the 2014 GHG Inventory). The subsequent tabs are more detail on the individual source categories including the emission factors and activity data, etc. The data/information is from the inventory but may include some additional internal comments/notes so please do not share broadly.

We pulled this together from existing information quickly as a starting point. This may not be exactly what you need or if anything is unclear, just let us know. We will also take a take a closer look at the table you provided. It may be helpful to set up a meeting to talk through the data early next week.

Thanks,

Suzie

--

James Tichenor
Economist

Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management

jtichenor@blm.gov

202-573-0536

--

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202-573-0536

Type	Category	Desc	Source
gas	10	*Normal Fugitives*	Gathering and Boosting Stations
gas	2	*Vented and Combusted*	Pneumatic Devices-gas
gas	6	*Vented and Combusted*	Liquids unloading
gas	7	*Vented and Combusted*	Condensate tanks
gas			Gathering and Boosting episodic events
gas	9	*Normal Fugitives*	Pipeline Leaks
gas	3	*Vented and Combusted*	Chemical Injection Pumps-gas
gas	8	*Vented and Combusted*	Offshore Platforms-gas
gas	4	*Vented and Combusted*	Gas Engines-gas
gas	9	*Normal Fugitives*	Separators-gas
gas	9	*Normal Fugitives*	Meters/Piping
gas	1	*Vented and Combusted*	HF Well Completions-gas
gas	3	*Vented and Combusted*	Kimray Pumps
gas	5	*Normal Fugitives*	Compressors
gas	9	*Vented and Combusted*	Prod Water
gas	9	*Normal Fugitives*	Gas Wells with Hydraulic Fracturing
gas	9	*Vented and Combusted*	Dehydrator Vents
gas	9	*Normal Fugitives*	Heaters
gas	9	*Normal Fugitives*	Non-associated Gas Wells (less fractured wells)
gas	9	*Vented and Combusted*	Compressor Starts
gas	9	*Normal Fugitives*	Dehydrators
gas	9	*Vented and Combusted*	Compressor BD
gas	9	*Vented and Combusted*	Pipeline BD
gas	9	*Vented and Combusted*	Mishaps
gas	9	*Vented and Combusted*	Well Drilling
gas	9	*Vented and Combusted*	Pressure Relief Valves
gas	9	*Vented and Combusted*	Vessel BD
gas	1	*Vented and Combusted*	Gas Well Completions and Workovers without Hydraulic Fracturing
oil	2	*Vented*	Pneumatic Devices-oil
oil	8	*Vented*	Offshore Platforms-oil
oil			Associated Gas Venting
oil	4	*Combusted*	Gas Engines-oil
oil	3	*Vented*	Chemical Injection Pumps-oil
oil	7	*Vented*	Oil tanks
oil	1	*Vented*	HF Well Completions-oil
oil	9	*Fugitive*	Oil Wellheads (light crude)
oil			Associated Gas Flaring
oil	9	*Combusted*	Heaters
oil	9	*Fugitive*	Separators-oil
oil	9	*Fugitive*	Heater/Treaters (light crude)
oil	9	*Fugitive*	Headers (light crude)
oil	9	*Upsets*	Well Blowouts Onshore
oil	9	*Fugitive*	Sales Areas
oil	5	*Fugitive*	Compressors
oil	9	*Fugitive*	Well Drilling

oil	9 Vented	Vessel Blowdowns
oil	9 Vented	Compressor Starts
oil	9 Fugitive	Battery Pumps
oil	9 Vented	Compressor Blowdowns
oil	9 Upsets	Pressure Relief Valves
oil	9 Fugitive	Floating Roof Tanks
oil	1 Vented	Well Workovers
oil	1 Vented	Well Completion Venting
oil	9 Fugitive	Oil Wellheads (heavy crude)
oil	9 Fugitive	Headers (heavy crude)

NET (tonnes)	bcf methane	bcf whole gas
1,968,205	102.2	129.7
1,020,246	53.0	67.2
209,138	10.9	13.8
23,506	1.2	1.5
195,212	10.1	
161,559	8.4	10.6
121,398	6.3	8.0
150,565	7.8	9.9
112,764	5.9	7.4
62,912	3.3	4.1
41,170	2.1	2.7
26,577	1.4	1.8
35,943	1.9	2.4
35,563	1.8	2.3
32,726	1.7	2.2
18,583	1.0	1.2
14,154	0.7	0.9
11,673	0.6	0.8
8,580	0.4	0.6
5,201	0.3	0.3
2,942	0.2	0.2
1,373	0.1	0.1
1,384	0.1	0.1
749	0.0	0.0
528	0.0	0.0
378	0.0	0.0
333	0.0	0.0
406	0.0	0.0
	-	-
745,330	38.7	49.1
187,604	9.7	12.4
105,706	5.5	
90,197	4.7	5.9
80,738	4.2	5.3
80,474	4.2	5.3
72,767	3.8	4.8
63,776	3.3	4.2
42,518	2.2	
34,549	1.8	2.3
20,503	1.1	1.4
18,537	1.0	1.2
8,160	0.4	0.5
2,853	0.1	0.2
2,240	0.1	0.1
2,177	0.1	0.1
840	0.0	0.1

557	0.0	0.0
504	0.0	0.0
297	0.0	0.0
225	0.0	0.0
192	0.0	0.0
159	0.0	0.0
81	0.0	0.0
60	0.0	0.0
37	0.0	0.0
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Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 4/27/2018 2:33:43 PM
To: 'Tichenor, James' [jtichenor@blm.gov]
CC: 'Adam Stern' [adam_stern@ios.doi.gov]
Subject: RE: FW: O&G Follow-up: Inventory Data
Attachments: EPA Inventory Emissions 10.6 James 2.1.2018 mw.xlsx

Hi James,

I've attached the latest GHG Inventory data (for year 2016, from GHG inventory published 2 weeks ago).

I've highlighted in orange some categories that weren't included in the previous spreadsheet from last year's inventory.
--Miscellaneous production flaring (both oil and gas): this source is new to the GHG Inventory (added using GHG reporting program data)
--Non-completion well testing (both oil and gas): this source is new to the GHG Inventory (added using GHG reporting program data)

Let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 23, 2018 6:56 PM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Adam Stern <adam_stern@ios.doi.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

Would you be able to pull the same data for 2016, since the 2018 Inventory was just published? We would like to be able to include 2016 venting estimates in our final rule.

Thanks, James

On Thu, Feb 1, 2018 at 2:31 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Oddly (I think), when I added the bcf methane values in (dividing tonnes by 19,260), the bcf whole gas values were automatically calculated, apparently by pulling from a mysterious second spreadsheet. I don't understand, but here you go.

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This was the same method as used last year for the data we provided to you.

Let me know if you have any questions.

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Please let me know if you have any questions.

Melissa

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To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa,

Yes, so as I understand, this was 2013 emissions for the 1990-2015 GHG Inventory, and would be hoping to get 2014 data for the 1990-2016 Inventory. We we're using it to scale down the emissions per Fed/Ind share of all US production.

So with these categories, though, are you able to provide the volumes in CH4 and raw natural gas? I forget where we landed on this last time.

On Thu, Jul 7, 2016 at 7:45 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Just wanted to confirm that this is that attachment you meant in your email yesterday? I can send you an updated version with the 2014 numbers soon (hopefully tomorrow).

Melissa

From: Weitz, Melissa
Sent: Tuesday, April 21, 2015 1:25 PM
To: Tichenor, James <jtichenor@blm.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: RE: O&G Follow-up: Inventory Data

Hi James,

The net numbers for 2013 are in the attachment. Please let me know if you'd like to discuss.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 20, 2015 4:25 PM
To: Weitz, Melissa
Subject: Re: O&G Follow-up: Inventory Data

On Thu, Mar 26, 2015 at 9:35 AM, Waltzer, Suzanne <Waltzer.Suzanne@epa.gov> wrote:

Hi

To follow-up from our conversation, attached is a spreadsheet that has the oil and natural gas production methane emissions. The first two tabs are summary net emissions data (in Bcf and tonnes of methane) for the sector as a whole and for oil and gas production based on 2012 data (the 2014 GHG Inventory). The subsequent tabs are more detail on the individual source categories including the emission factors and activity data, etc. The data/information is from the inventory but may include some additional internal comments/notes so please do not share broadly.

We pulled this together from existing information quickly as a starting point. This may not be exactly what you need or if anything is unclear, just let us know. We will also take a take a closer look at the table you provided. It may be helpful to set up a meeting to talk through the data early next week.

Thanks,

Suzie

--

James Tichenor
Economist

Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management

jtichenor@blm.gov

202-573-0536

--

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Bureau of Land Management
jtichenor@blm.gov
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Type	Category	Desc	Source
gas	10	*Normal Fugitives*	Gathering and Boosting Stations
gas	2	*Vented and Combusted*	Pneumatic Devices-gas
gas	6	*Vented and Combusted*	Liquids unloading
gas	7	*Vented and Combusted*	Condensate tanks
gas			Gathering and Boosting episodic events
gas	9	*Normal Fugitives*	Pipeline Leaks
gas	3	*Vented and Combusted*	Chemical Injection Pumps-gas
gas	8	*Vented and Combusted*	Offshore Platforms-gas
gas	4	*Vented and Combusted*	Gas Engines-gas
gas	9	*Normal Fugitives*	Separators-gas
gas	9	*Normal Fugitives*	Meters/Piping
gas	1	*Vented and Combusted*	HF Well Completions-gas
gas	3	*Vented and Combusted*	Kimray Pumps
gas	5	*Normal Fugitives*	Compressors
gas	9	*Vented and Combusted*	Prod Water
gas	9	*Normal Fugitives*	Gas Wells with Hydraulic Fracturing
gas	9	*Vented and Combusted*	Dehydrator Vents
gas	9	*Normal Fugitives*	Heaters
gas	9	*Normal Fugitives*	Non-associated Gas Wells (less fractured wells)
gas	9	*Vented and Combusted*	Compressor Starts
gas	9	*Normal Fugitives*	Dehydrators
gas	9	*Vented and Combusted*	Compressor BD
gas	9	*Vented and Combusted*	Pipeline BD
gas	9	*Vented and Combusted*	Mishaps
gas	9	*Vented and Combusted*	Well Drilling
gas	9	*Vented and Combusted*	Pressure Relief Valves
gas	9	*Vented and Combusted*	Vessel BD
gas	1	*Vented and Combusted*	Gas Well Completions and Workovers without Hydraulic Fracturing
oil	2	*Vented*	Pneumatic Devices-oil
oil	8	*Vented*	Offshore Platforms-oil
oil			Associated Gas Venting
oil	4	*Combusted*	Gas Engines-oil
oil	3	*Vented*	Chemical Injection Pumps-oil
oil	7	*Vented*	Oil tanks
oil	1	*Vented*	HF Well Completions-oil
oil	9	*Fugitive*	Oil Wellheads (light crude)
oil			Associated Gas Flaring
oil	9	*Combusted*	Heaters
oil	9	*Fugitive*	Separators-oil
oil	9	*Fugitive*	Heater/Treaters (light crude)
oil	9	*Fugitive*	Headers (light crude)
oil	9	*Upsets*	Well Blowouts Onshore
oil	9	*Fugitive*	Sales Areas
oil	5	*Fugitive*	Compressors
oil	9	*Fugitive*	Well Drilling

oil	9 Vented	Vessel Blowdowns
oil	9 Vented	Compressor Starts
oil	9 Fugitive	Battery Pumps
oil	9 Vented	Compressor Blowdowns
oil	9 Upsets	Pressure Relief Valves
oil	9 Fugitive	Floating Roof Tanks
oil	1 Vented	Well Workovers
oil	1 Vented	Well Completion Venting
oil	9 Fugitive	Oil Wellheads (heavy crude)
oil	9 Fugitive	Headers (heavy crude)

NET (tonnes)	bcf methane	bcf whole gas
1,968,205	102.2	129.7
1,020,246	53.0	67.2
209,138	10.9	13.8
23,506	1.2	1.5
195,212	10.1	
161,559	8.4	10.6
121,398	6.3	8.0
150,565	7.8	9.9
112,764	5.9	7.4
62,912	3.3	4.1
41,170	2.1	2.7
26,577	1.4	1.8
35,943	1.9	2.4
35,563	1.8	2.3
32,726	1.7	2.2
18,583	1.0	1.2
14,154	0.7	0.9
11,673	0.6	0.8
8,580	0.4	0.6
5,201	0.3	0.3
2,942	0.2	0.2
1,373	0.1	0.1
1,384	0.1	0.1
749	0.0	0.0
528	0.0	0.0
378	0.0	0.0
333	0.0	0.0
406	0.0	0.0
	-	-
745,330	38.7	49.1
187,604	9.7	12.4
105,706	5.5	
90,197	4.7	5.9
80,738	4.2	5.3
80,474	4.2	5.3
72,767	3.8	4.8
63,776	3.3	4.2
42,518	2.2	
34,549	1.8	2.3
20,503	1.1	1.4
18,537	1.0	1.2
8,160	0.4	0.5
2,853	0.1	0.2
2,240	0.1	0.1
2,177	0.1	0.1
840	0.0	0.1

557	0.0	0.0
504	0.0	0.0
297	0.0	0.0
225	0.0	0.0
192	0.0	0.0
159	0.0	0.0
81	0.0	0.0
60	0.0	0.0
37	0.0	0.0
19	0.0	0.0

Type	Category	Desc	Source
gas	10	*Normal Fugitives*	Gathering and Boosting Stations
gas	2	*Vented and Combusted*	Pneumatic Devices-gas
gas	6	*Vented and Combusted*	Liquids unloading
gas	7	*Vented and Combusted*	Condensate tanks
gas			Gathering and Boosting episodic events
gas	9	*Normal Fugitives*	Pipeline Leaks
gas	3	*Vented and Combusted*	Chemical Injection Pumps-gas
gas	8	*Vented and Combusted*	Offshore Platforms-gas
gas	4	*Vented and Combusted*	Gas Engines-gas
gas	9	*Normal Fugitives*	Separators-gas
gas	9	*Normal Fugitives*	Meters/Piping
gas	1	*Vented and Combusted*	HF Well Completions and workovers-gas
gas	3	*Vented and Combusted*	Kimray Pumps
gas	5	*Normal Fugitives*	Compressors
gas	9	*Vented and Combusted*	Prod Water
gas	9	*Normal Fugitives*	Gas Wells with Hydraulic Fracturing
gas	9	*Vented and Combusted*	Dehydrator Vents
gas	9	*Normal Fugitives*	Heaters
gas	9	*Normal Fugitives*	Non-associated Gas Wells (less fractured wells)
gas	9	*Vented and Combusted*	Compressor Starts
gas	9	*Normal Fugitives*	Dehydrators
gas	9	*Vented and Combusted*	Compressor BD
gas	9	*Vented and Combusted*	Pipeline BD
gas	9	*Vented and Combusted*	Mishaps
gas	9	*Vented and Combusted*	Well Drilling
gas	9	*Vented and Combusted*	Pressure Relief Valves
gas	9	*Vented and Combusted*	Vessel BD
gas	1	*Vented and Combusted*	Gas Well Completions and Workovers without Hydraulic Fracturing
gas			Miscellanous production flaring
gas			Non-completion Well Testing
oil	2	*Vented*	Pneumatic Devices-oil
oil	8	*Vented*	Offshore Platforms-oil
oil			Associated Gas Venting
oil	4	*Combusted*	Gas Engines-oil
oil	3	*Vented*	Chemical Injection Pumps-oil
oil	7	*Vented*	Oil tanks
oil	1	*Vented*	HF Well Completions-oil
oil	9	*Fugitive*	Oil Wellheads (light crude)
oil			Associated Gas Flaring
oil	9	*Combusted*	Heaters
oil	9	*Fugitive*	Separators-oil
oil	9	*Fugitive*	Heater/Treaters (light crude)
oil	9	*Fugitive*	Headers (light crude)
oil	9	*Upsets*	Well Blowouts Onshore
oil	9	*Fugitive*	Sales Areas

oil	5	*Fugitive*	Compressors
oil	9	*Fugitive*	Well Drilling
oil	9	*Vented*	Vessel Blowdowns
oil	9	*Vented*	Compressor Starts
oil	9	*Fugitive*	Battery Pumps
oil	9	*Vented*	Compressor Blowdowns
oil	9	*Upsets*	Pressure Relief Valves
oil	9	*Fugitive*	Floating Roof Tanks
oil	1	*Vented*	Well Workovers
oil	1	*Vented*	Well Completion Venting
oil	9	*Fugitive*	Oil Wellheads (heavy crude)
oil	9	*Fugitive*	Headers (heavy crude)
oil			Non-completion Well Testing
oil			miscellaneous production flaring

NET (tonnes)	bcf methane	bcf whole gas		
			CH4 content	0.788
1,955,148	101.5	128.8		
1,053,207	54.7	69.4		
132,871	6.9	8.8		
30,144	1.6	2.0		
193,917	10.1	12.8		
123,139	6.4	8.1		
112,577	5.8	7.4		
150,565	7.8	9.9		
106,423	5.5	7.0		
90,660	4.7	6.0		
56,510	2.9	3.7		
37,212	1.9	2.5		
57,519	3.0	3.8		
52,504	2.7	3.5		
47,561	2.5	3.1		
26,948	1.4	1.8		
22,983	1.2	1.5		
10,436	0.5	0.7		
11,198	0.6	0.7		
5,300	0.3	0.3		
4,545	0.2	0.3		
2,028	0.1	0.1		
1,961	0.1	0.1		
1,062	0.1	0.1		
767	0.0	0.1		
554	0.0	0.0		
453	0.0	0.0		
8,672	0.5	0.6		
4,662	0.2	0.3		
616	0.0	0.0		
739,125	38.4	48.7		
187,604	9.7	12.4		
14,375	0.7	0.9		
88,642	4.6	5.8		
80,974	4.2	5.3		
127,025	6.6	8.4		
78,525	4.1	5.2		
61,066	3.2	4.0		
28,782	1.5	1.9		
32,446	1.7	2.1		
17,743	0.9	1.2		
14,430	0.7	1.0		
7,464	0.4	0.5		
2,853	0.1	0.2		
2,104	0.1	0.1		

2,140	0.1	0.1
840	0.0	0.1
464	0.0	0.0
495	0.0	0.0
284	0.0	0.0
221	0.0	0.0
180	0.0	0.0
159	0.0	0.0
78	0.0	0.0
47	0.0	0.0
35	0.0	0.0
17	0.0	0.0
2,968	0.2	0.2
7,703	0.4	0.5

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 4/25/2018 1:47:52 PM
To: 'jtichenor@blm.gov' [jtichenor@blm.gov]
Subject: RE: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov)

Hi James,

We think this meeting is canceled but we just wanted to check to make sure?

I saw your email the other day on the updated GHGI and I can get you those tables soon (probably by the end of this week).

Melissa

-----Original Appointment-----
From: jtichenor@blm.gov [mailto:jtichenor@blm.gov]
Sent: Tuesday, August 22, 2017 9:13 PM
To: jtichenor@blm.gov; Thompson, Lisa; Hambrick, Amy
Cc: Waltzer, Suzanne; Weitz, Melissa
Subject: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov)
When: Wednesday, April 25, 2018 7:30 AM-8:30 AM America/Los_Angeles.
Where:

This event has been changed.

more details »
Call re Regs; Ex. 6 Personal Privacy

When **Changed:** Monthly from 7:30am to 8:30am on the fourth Wednesday Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Calendar weitz.melissa@epa.gov

Who
- jtichenor@blm.gov - organizer
- thompson.lisa@epa.gov
- hambrick.amy@epa.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Your attendance is **optional**.
Going? All events in this series: **Yes** - **Maybe** - **No** more options »

Invitation from Google Calendar

You are receiving this courtesy email at the account weitz.melissa@epa.gov because you are an attendee of this event.

To stop receiving future updates for this event, decline this event. Alternatively you can sign up for a Google account at https://www.google.com/calendar/ and control your notification settings for your entire calendar.

Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 2/14/2018 3:37:21 PM
To: jtichenor@blm.gov; Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: Re: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)

Hi James--

Lisa and I were on the line earlier but we think this meeting may have been cancelled? Let us know if we should call back in.

Thanks!
Melissa

From: jtichenor@blm.gov
Sent: Monday, November 20, 2017 10:50 AM
To: jtichenor@blm.gov; Thompson, Lisa; Hambrick, Amy; jabernathy@blm.gov; epionke@blm.gov
Cc: Waltzer, Suzanne; Weitz, Melissa
Subject: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)
When: Wednesday, February 14, 2018 10:30 AM-11:30 AM.
Where:

This event has been changed.

more details »

Changed: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When **Changed:** Monthly from 7:30am to 8:30am on the second Wednesday Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Calendar weitz.melissa@epa.gov

Who
- jtichenor@blm.gov - organizer
- thompson.lisa@epa.gov
- hambrick.amy@epa.gov
- jabernathy@blm.gov
- epionke@blm.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Your attendance is **optional**.
Going? All events in this series: **Yes** - **Maybe** - **No** more options »

Invitation from Google Calendar
You are receiving this courtesy email at the account weitz.melissa@epa.gov because you are an attendee of this event.
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Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More.

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 2/14/2018 3:53:25 PM
To: Tichenor, James [jtichenor@blm.gov]
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: Re: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)

https://www.eenews.net/stories/1060073843

From: Tichenor, James <jtichenor@blm.gov>
Sent: Wednesday, February 14, 2018 10:42 AM
To: Weitz, Melissa
Cc: Thompson, Lisa
Subject: Re: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)

Hi sorry, it's not on my calendar. Let's call in and have a quick call and we can at least get on the same page about scheduling. I'll call in now and sit tight.

On Wed, Feb 14, 2018 at 7:37 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James--

Lisa and I were on the line earlier but we think this meeting may have been cancelled? Let us know if we should call back in.

Thanks!
Melissa

From: jtichenor@blm.gov
Sent: Monday, November 20, 2017 10:50 AM
To: jtichenor@blm.gov; Thompson, Lisa; Hambrick, Amy; jabernathy@blm.gov; epionke@blm.gov
Cc: Waltzer, Suzanne; Weitz, Melissa
Subject: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)
When: Wednesday, February 14, 2018 10:30 AM-11:30 AM.
Where:

This event has been changed.

more details »

Changed: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When **Changed:** Monthly from 7:30am to 8:30am on the second Wednesday Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Calendar weitz.melissa@epa.gov

Who
- jtichenor@blm.gov - organizer
- thompson.lisa@epa.gov
- hambrick.amy@epa.gov
- jabernathy@blm.gov
- epionke@blm.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Your attendance is **optional**.
Going? All events in this series: **Yes** - **Maybe** - **No** more options »

Invitation from Google Calendar
You are receiving this courtesy email at the account weitz.melissa@epa.gov because you are an attendee of this event
To stop receiving future updates for this event, decline this event. Alternatively you can sign up for a Google account at https://www.google.com/calendar/ and control your notification settings for your entire calendar.
Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More.

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 11/2/2018 6:11:26 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
Subject: FOIA
Attachments: Re: [EXTERNAL] Saw your FR; Re: [EXTERNAL] RE: Do you have time for a quick chat?; Do you have time for a quick chat?; Re: [EXTERNAL] RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy EPA/BLM Call re Regs; Ex. 6 Personal Privacy Ex. 6 Personal Privacy EPA/BLM Call re Regs; Ex. 6 Personal Privacy Re: [EXTERNAL] RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy Ex. 6 Personal Privacy EPA/BLM Call re Regs; Ex. 6 Personal Privacy Re: [EXTERNAL] using the same social cost language as the NODA; Re: EPA/BLM Call re Regs; Ex. 6 Personal Privacy EPA/BLM Call re Regs; Ex. 6 Personal Privacy Ex. 6 Personal Privacy Update: Waste Prevention Proposed Rule is Officially Published; Complaints against the Waste Prevention Delay Rule; Re: FW: O&G Follow-up: Inventory Data; Re: FW: O&G Follow-up: Inventory Data; Fwd: FW: O&G Follow-up: Inventory Data; Fwd: O&G Follow-up: Inventory Data; Re: [EXTERNAL] Saw your FR; Re: [EXTERNAL] meeting tomorrow?; Re: [EXTERNAL] check in Ex. 6 Personal Privacy); Declined: check in Ex. 6 Personal Privacy @ Tue Jul 10, 2018 9:45am - 10:30am (PDT) (Hambrick, Amy); Re: [EXTERNAL] using the same social cost language as the NODA; Re: [EXTERNAL] EPA technical proposal went to OMB last Friday 4/27; EPA/BLM Call re Regs; Ex. 6 Personal Privacy Re: Clarification; Clarification; Re: FW: O&G Follow-up: Inventory Data; Re: check in call 10/25; Saw your FR; RE: Do you have time for a quick chat?; Accepted: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Fri Sep 28, 2018 7:30am - 8:30am (PDT) (hambrick.amy@epa.gov); RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy yi; RE: [EXTERNAL] meeting tomorrow?; meeting tomorrow?; check in Ex. 6 Personal Privacy; check in (Ex. 6 Personal Privacy check in Ex. 6 Personal Privacy; check in Ex. 6 Personal Privacy Accepted: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Tue Jul 3, 2018 8:30am - 9:30am (PDT) (hambrick.amy@epa.gov); RE: [EXTERNAL] using the same social cost language as the NODA; RE: [EXTERNAL] using the same social cost language as the NODA; RE: [EXTERNAL] EPA technical proposal went to OMB last Friday 4/27; Accepted: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy Thu Oct 26, 2017 7:30am - 8:30am (PDT) (hambrick.amy@epa.gov); Accepted: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PST) (hambrick.amy@epa.gov); Accepted: Updated invitation: Call re Regs; Ex. 6 Personal Privacy Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (hambrick.amy@epa.gov); Accepted: Updated invitation: Call re Regs; Ex. 6 Personal Privacy @ Thu Oct 26, 2017 7:30am - 8:30am (PDT) (hambrick.amy@epa.gov); RE: check in call 10/25; check in call 10/25; Accepted: Updated invitation: Call re Regs; Ex. 6 Personal Privacy Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (hambrick.amy@epa.gov); Accepted: Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 8am to 9am on day 27 (PDT) (hambrick.amy@epa.gov); Accepted: Updated invitation: Call re Regs; 877-958- Ex. 6 Personal Privacy Wed Sep 27, 2017 8am - 9am (PDT) (hambrick.amy@epa.gov)

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 9/27/2017 4:01:21 PM
To: 'jtichenor@blm.gov' [jtichenor@blm.gov]

Subject: Accepted: Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 8am to 9am on day 27 (PDT) (hambrick.amy@epa.gov)

Start: 9/27/2017 3:00:00 PM
End: 9/27/2017 4:00:00 PM
Show Time As: Busy

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 10/25/2017 2:15:27 PM
To: jtichenor@blm.gov

Subject: Accepted: Updated invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (hambrick.amy@epa.gov)

Start: 9/27/2017 2:30:00 PM
End: 9/27/2017 3:30:00 PM
Show Time As: Busy

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 10/17/2017 4:19:35 PM
To: jtichenor@blm.gov

Subject: Accepted: Updated invitation: Call re Regs; Ex. 6 Personal Privacy @ Thu Oct 26, 2017 7:30am - 8:30am (PDT) (hambrick.amy@epa.gov)

Start: 10/26/2017 2:30:00 PM
End: 10/26/2017 3:30:00 PM
Show Time As: Busy

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 9/27/2017 2:35:06 PM
To: jtichenor@blm.gov

Subject: Accepted: Updated invitation: Call re Regs; Ex. 6 Personal Privacy @ Wed Sep 27, 2017 8am - 9am (PDT) (hambrick.amy@epa.gov)

Start: 9/27/2017 3:00:00 PM
End: 9/27/2017 4:00:00 PM
Show Time As: Busy

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 8/23/2018 5:10:55 PM
To: jtichenor@blm.gov

Subject: Accepted: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Fri Sep 28, 2018 7:30am - 8:30am (PDT) (hambrick.amy@epa.gov)

Start: 9/28/2018 2:30:00 PM
End: 9/28/2018 3:30:00 PM
Show Time As: Busy

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 10/25/2017 2:15:29 PM
To: 'jtichenor@blm.gov' [jtichenor@blm.gov]

Subject: Accepted: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PST) (hambrick.amy@epa.gov)

Start: 11/22/2017 3:30:00 PM
End: 11/22/2017 4:30:00 PM
Show Time As: Busy

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 10/25/2017 2:15:32 PM
To: 'jtichenor@blm.gov' [jtichenor@blm.gov]

Subject: Accepted: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Thu Oct 26, 2017 7:30am - 8:30am (PDT) (hambrick.amy@epa.gov)

Start: 10/26/2017 2:30:00 PM
End: 10/26/2017 3:30:00 PM
Show Time As: Busy

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 7/2/2018 2:48:08 PM
To: jtichenor@blm.gov

Subject: Accepted: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Tue Jul 3, 2018 8:30am - 9:30am (PDT) (hambrick.amy@epa.gov)

Start: 7/3/2018 3:30:00 PM
End: 7/3/2018 4:30:00 PM
Show Time As: Busy

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 7/9/2018 4:03:31 PM
To: Tichenor, James [jtichenor@blm.gov]; Marsh, Karen [Marsh.Karen@epa.gov]; Miller, Elizabeth [Miller.Elizabeth@epa.gov]; Hoffmann, Jucilene [hoffmann.jucilene@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
BCC: Ex. 6 Personal Privacy

Subject: check in Ex. 6 Personal Privacy
Location: Ex. 6 Personal Privacy

Start: 7/10/2018 7:00:00 PM
End: 7/10/2018 7:45:00 PM
Show Time As: Tentative

EPA/BLM monthly check in

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 7/9/2018 1:32:19 PM
To: Tichenor, James [jtichenor@blm.gov]; Marsh, Karen [Marsh.Karen@epa.gov]; Miller, Elizabeth [Miller.Elizabeth@epa.gov]; Hoffmann, Jucilene [hoffmann.jucilene@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
BCC: Ex. 6 Personal Privacy

Subject: check in Ex. 6 Personal Privacy
Location: Ex. 6 Personal Privacy

Start: 7/10/2018 4:45:00 PM
End: 7/10/2018 5:30:00 PM
Show Time As: Tentative

EPA/BLM monthly check in

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 7/3/2018 4:36:52 PM
To: Tichenor, James [jtichenor@blm.gov]; Marsh, Karen [Marsh.Karen@epa.gov]; Miller, Elizabeth [Miller.Elizabeth@epa.gov]; Hoffmann, Jucilene [hoffmann.jucilene@epa.gov]
BCC: Ex. 6 Personal Privacy

Subject: check in Ex. 6 Personal Privacy
Location: Ex. 6 Personal Privacy

Start: 7/9/2018 5:00:00 PM
End: 7/9/2018 6:00:00 PM
Show Time As: Tentative

EPA/BLM monthly check in

Appointment

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 7/3/2018 4:32:34 PM
To: Tichenor, James [jtichenor@blm.gov]; Marsh, Karen [Marsh.Karen@epa.gov]
BCC: Ex. 6 Personal Privacy

Subject: check in Ex. 6 Personal Privacy
Location: Ex. 6 Personal Privacy

Start: 7/9/2018 5:00:00 PM
End: 7/9/2018 6:00:00 PM
Show Time As: Tentative

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 10/17/2017 3:54:44 PM
To: jtichenor@blm.gov
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: check in call 10/25

Hi James,

It looks like we have our next check in call on 10/25. We have an all-day meeting conflict. Any chance we can reschedule for just that day- either moving up a day or pushing back a day?

Thanks for considering,

Amy

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 11/6/2017 7:32:59 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]
CC: Pionke, Erica [epionke@blm.gov]
Subject: Clarification

Hi Lisa and Amy,

I know we discusses this on our last call, but can you please verify this statement, and/or provide language that would make it more accurate? Thanks!

"However, the EPA recently proposed to delay the fugitive emissions, pneumatic pumps at well sites, and professional engineer certification for close vent system requirements for two years. The EPA has not yet finalized this proposal."

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 1/10/2018 5:24:04 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Complaints against the Waste Prevention Delay Rule
Attachments: document_gw_14.pdf; document_gw_15.pdf

All,

Please see the 2 complaints attached.

--

James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov<mailto:jtichenor@blm.gov>
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Attorneys for Plaintiff State of New Mexico

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

STATE OF CALIFORNIA, by and through XAVIER BECERRA, ATTORNEY GENERAL, and the CALIFORNIA AIR RESOURCES BOARD; and STATE OF NEW MEXICO, by and through HECTOR BALDERAS, ATTORNEY GENERAL, Plaintiffs, **v.** **UNITED STATES BUREAU OF LAND MANAGEMENT; KATHARINE S. MACGREGOR,** Acting Assistant Secretary for Land and Minerals Management, United States Department of the Interior; and **RYAN ZINKE,** Secretary of the Interior, Defendants.	Case No. _____ **COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF** (Administrative Procedure Act, 5 U.S.C. § 551 *et seq.*)

INTRODUCTION

1. Plaintiffs State of California, by and through Xavier Becerra, Attorney General, and the California Air Resources Board, and State of New Mexico, by and through Hector Balderas, Attorney General ("Plaintiffs") bring this action to challenge the latest decision by the U.S. Bureau of Land Management, *et al.* ("BLM" or "Defendants") to undermine the Waste

Prevention Rule—a commonsense measure that would reduce the enormous waste of natural gas on public lands that results from venting, flaring, and equipment leaks. Defendants have prioritized a negligible increase in oil and gas operators' profits over the public interest in preventing the waste of a public resource that belongs to the American people. In doing so, Defendants dismiss out of hand the harmful impacts of the thousands of tons of toxic air pollutants and hundreds of thousands of tons of greenhouse gases emitted as a result of operators' inefficient, outdated, and wasteful practices. BLM's current action—to suspend for one year the compliance dates for key requirements of the Waste Prevention Rule—lacks any reasoned analysis, contravenes BLM's statutory mandates, and ignores significant environmental consequences. Thus, BLM has violated the Administrative Procedure Act ("APA"), several federal land management statutes, and the National Environmental Protection Act ("NEPA").

2. BLM, a division of the U.S. Department of the Interior ("DOI"), finalized the Waste Prevention, Production Subject to Royalties and Resource Conservation rule ("Waste Prevention Rule" or "Rule"), on November 18, 2016, after conducting a multi-year stakeholder process and reviewing thousands of public comments. 81 Fed. Reg. 83,008 (Nov. 18, 2016). The Waste Prevention Rule provides a much-needed update to 38-year-old regulations governing the release of natural gas from new and existing oil and gas operations on federal and Indian lands, and clarifies when gas lost through venting, flaring, or leaks is subject to royalties. BLM estimated that the Rule would have substantial annual benefits, including producing up to 41 billion cubic feet of additional natural gas, eliminating 175,000–180,000 tons of methane emissions, cutting emissions of volatile organic compounds by 250,000–267,000 tons, reducing toxic air pollutants by 1,860 to 2,030 tons, and generating up to $14 million in additional royalties. The Rule became effective on January 17, 2017.

3. On June 15, 2017, BLM published a notice in the Federal Register purporting "to postpone the compliance dates for certain sections of the Rule" pursuant to Section 705 of the APA, 5 U.S.C. § 705. 82 Fed. Reg. 27,430 (June 15, 2017). Following a legal challenge by Plaintiffs, on October 4, 2017, this district court enjoined BLM's attempt to cut corners in its rush to effectively block the Rule—finding that its summary action purporting to postpone significant

compliance dates was not authorized under APA section 705 and was otherwise arbitrary and capricious. *State of California v. U.S. Bureau of Land Mgmt.*, --- F. Supp. 3d ---, 2017 WL 4416409 (N.D. Cal. Oct. 4, 2017) ("*California v. BLM*"), *appeal docketed*, No. 17-17456 (9th Cir. Dec. 4, 2017).

4. On October 5, 2017, BLM issued a proposal to suspend major impending deadlines and requirements of the Waste Prevention Rule until January 17, 2019, which Plaintiffs opposed in public comments submitted on November 6, 2017. On December 8, 2017, BLM issued a final rule suspending key requirements of the Waste Prevention Rule. 82 Fed. Reg. 58,050 (Dec. 8, 2017) ("Suspension"). To justify the Suspension, BLM stated it had "concerns regarding the statutory authority, cost, complexity, feasibility, and other implications" of the Rule, and therefore sought to suspend "requirements that may be rescinded or significantly revised in the near future." *Id.*

5. Defendants' Suspension of the Waste Prevention Rule's requirements is arbitrary and capricious because the agency attempts to delay and effectively revoke key provisions of the Rule without supplying a reasoned basis for doing so. Defendants entirely failed to consider how the Suspension would fulfill the important statutory mandates that the Waste Prevention Rule was designed to address, failed to explain why it reversed course based on the same information that it considered when it formulated and promulgated the Rule just a year earlier, and offered a purported justification for the Suspension that runs counter to the evidence before the agency. The Suspension also violates Defendants' statutory mandates to prevent waste and regulate royalties from oil and gas operations on federal and Indian lands, protect the interests of the United States, and to safeguard the public welfare. Furthermore, Defendants' perfunctory conclusion that the Suspension would result in no significant environmental impacts violates the requirements of NEPA.

6. Accordingly, Plaintiffs seek a declaration that Defendants' action violated the APA, NEPA, and multiple federal land management statutes, and an injunction requiring Defendants to vacate the Suspension or, in the alternative, vacate the Suspension and immediately reinstate all of the Rule's provisions.

JURISDICTION AND VENUE

7. This Court has jurisdiction pursuant to 28 U.S.C. § 1331 (action arising under the laws of the United States), 28 U.S.C. § 1361 (action to compel officer or agency to perform duty owed to Plaintiffs), and 5 U.S.C. §§ 701–706 (Administrative Procedure Act). An actual controversy exists between the parties within the meaning of 28 U.S.C. § 2201(a), and this Court may grant declaratory relief, injunctive relief, and other relief pursuant to 28 U.S.C. §§ 2201–2202 and 5 U.S.C. §§ 705–706.

8. Venue is proper in this Court pursuant to 28 U.S.C. § 1391(e) because this is the judicial district in which Plaintiff State of California resides, and this action seeks relief against federal agencies and officials acting in their official capacities.

INTRADISTRICT ASSIGNMENT

9. Pursuant to Civil Local Rules 3-5(b) and 3-2(c), there is no basis for assignment of this action to any particular location or division of this Court. However, this case is related to Case No. 3:17-cv-03804-EDL, which challenged BLM's illegal attempt to delay the Waste Prevention Rule pursuant to APA Section 705, 5 U.S.C. § 705, and was recently decided in the San Francisco Division. Pursuant to Civil Local Rule 3-12(b), Plaintiffs intend to promptly file an Administrative Motion to Consider Whether Cases Should Be Related.

PARTIES

10. Plaintiff, STATE OF CALIFORNIA, brings this action by and through Attorney General Xavier Becerra. The Attorney General is the chief law enforcement officer of the State and has the authority to file civil actions in order to protect public rights and interests, including actions to protect the natural resources of the State. Cal. Const., art. V, § 13; Cal. Gov. Code §§ 12600-12612. This challenge is brought in part pursuant to the Attorney General's independent constitutional, statutory, and common law authority to represent the public interest.

11. The California Air Resources Board ("CARB") is a public agency of the State of California within the California Environmental Protection Agency. The mission of CARB is to promote and protect public health, welfare, and ecological resources of California's citizens through the monitoring and protection of air quality. CARB's major goals include providing safe,

clean air to all Californians, reducing California's emission of greenhouse gases, and providing leadership and innovative approaches for implementing air pollution controls. In addition to developing statewide rules, CARB works with local California air districts, many of which regulate oil and gas pollution at the regional or county level. This action is thus brought, in part, by the Attorney General at the request of CARB and in the name of the State of California.

12. California contains millions of acres of federal and tribal lands that are managed by Defendants for energy production. These lands contain approximately 600 producing oil and gas leases covering more than 200,000 acres and 7,900 usable oil and gas wells. California is a leading state in terms of oil extraction on public lands—producing about 15 million barrels annually—and also produces approximately 7 billion cubic feet of natural gas annually.

13. Plaintiff STATE OF NEW MEXICO brings this action by and through Attorney General Hector Balderas. The Attorney General of New Mexico is authorized to prosecute in any court or tribunal all actions and proceedings, civil or criminal, when, in his judgment, the interest of the state requires such action. N.M. Stat. Ann. § 8-5-2.

14. More than one-third of New Mexico's land is federally administered, and New Mexico is second-highest in the nation in the number of producing oil and natural gas leases on federal land. Annually, New Mexico produces approximately 1,220 billion cubic feet of natural gas (of which approximately 60 percent is from federal and Indian lands) and 85,200 million barrels of crude oil (of which approximately 45 percent is from federal and Indian lands). New Mexico has the third highest volume of flared oil-well gas among all states.

15. Plaintiffs have a clear monetary stake in Defendants' decision to suspend certain provisions of the Waste Prevention Rule. Since 2008, California has received an annual average of $82.5 million in royalties from federal mineral extraction within the State. Royalties from federal oil and gas development in California are deposited into the State School Fund, which supports public education. New Mexico has received an annual average of $470 million in federal mineral extraction royalties during this same time period. New Mexico, whose per-pupil education spending is below the national average, uses its federal mineral leasing royalty payments for educational purposes. One study estimates that New Mexico lost between $39

million and $46 million in royalties from venting and flaring between 2010 and 2015. This figure does not include lost royalties from leaks. Thus, minimizing waste of natural gas in order to maximize royalty recovery in California and New Mexico serves vital societal interests.

16. Plaintiffs further have a strong interest in preventing adverse air quality impacts from the production of fossil fuels in their States. More than 95 percent of federal drilling in California occurs in Kern County, parts of which are in nonattainment with the 2008 federal 8-hour ozone standard and federal fine particulate matter standards, as well as numerous state ambient air quality standards. Excess pollution in this part of California—including methane, particulate matter, volatile organic compounds ("VOCs"), and toxic air pollution from the oil and gas industry—significantly increases rates of asthma, heart disease, and lung disease, and raises cancer risk. While California has state regulations issued by CARB and local air districts, certain provisions of CARB's oil and gas regulation do not require compliance until 2019. BLM's Suspension of the Waste Prevention Rule will result in the emission, in California, of an estimated 150 tons of VOCs, 4.9 tons of toxic air contaminants, and 70,675 metric tons of carbon dioxide equivalent of methane between January 17, 2018 and January 17, 2019. The Waste Prevention Rule provides an additional federal layer of regulation and enforcement that addresses the air pollution issues related to oil and gas production on federal and tribal lands within California.

17. In New Mexico, the San Juan Basin in the Four Corners region is the home of the nation's largest methane "cloud," which has been linked to the extensive oil and gas development in that region. VOC emissions from oil and gas development have led to high ozone concentrations, resulting in an "F" grade for San Juan County from the American Lung Association in 2016. Because New Mexico represents a disproportionately large share of federal and tribal natural gas emissions, BLM's Suspension of the Rule will result in thousands of additional tons of VOC being emitted in New Mexico. New Mexico does not have state regulations in place to adequately address venting, flaring, and leaks from oil and gas production.

18. Plaintiffs also have a strong interest in preventing and mitigating harms that climate change poses to human health and the environment, including increased heat-related deaths,

damaged coastal areas, disrupted ecosystems, more severe weather events, and longer and more frequent droughts. *See Massachusetts v. EPA*, 549 U.S. 497, 521 (2007). Methane is an extremely potent greenhouse gas, with climate impacts roughly 86 times those of carbon dioxide if measured over a 20-year period, or 25 times if measured over a 100-year period.

19. California is already experiencing the adverse effects of climate change, including increased risk of wildfires, a decline in the average annual snowpack that provides approximately 35 percent of the State's water supply, increased erosion of beaches and low-lying coastal properties from rising sea levels, and increased formation of ground-level ozone (or smog), which is linked to asthma, heart attacks, and pulmonary problems, especially in children and the elderly. California law establishes targets to reduce the State's greenhouse gas emissions to 1990 levels by 2020 and to 40 percent below 1990 levels by 2030. California has committed to reducing greenhouse gas emissions, including through the development of methane-curbing regulations for oil and gas operations and pipelines.

20. As a state in the arid southwest, New Mexico is also experiencing the adverse effects of climate change and will suffer additional impacts in the future. Average temperatures in New Mexico have been increasing 50 percent faster than the global average over the past century, streamflow totals in the Rio Grande and other rivers in the Southwest are declining, and projections of further reduction of late-winter and spring snowpack pose increased risks to water supplies needed to maintain cities, agriculture, and ecosystems. Further, drought and increased temperatures due to climate change have contributed to extensive tree death across the Southwest.

21. By suspending several provisions of the Waste Prevention Rule, including requirements that operators capture a certain percentage of the gas they produce, measure volumes of flared gas, upgrade or replace equipment, and implement leak detection and repair programs, Defendants' action will adversely impact Plaintiffs by increasing emissions of hazardous air pollutants and greenhouse gases, reducing royalty collections, and wasting fossil fuel resources that belong to the public. Consequently, Plaintiffs have suffered a legal wrong as a result of Defendants' action and have standing to bring this suit.

22. Defendant UNITED STATES BUREAU OF LAND MANAGEMENT is an agency within the United States Department of the Interior that is charged with managing the federal onshore oil and gas program and bears responsibility, in whole or in part, for the acts complained of in this Complaint.

23. Defendant KATHARINE S. MACGREGOR is the Acting Assistant Secretary for Land and Minerals Management, United States Department of the Interior, and is sued in her official capacity. Ms. MacGregor signed the Suspension at issue and the Finding of No Significant Impact and bears responsibility, in whole or in part, for the acts complained of in this Complaint.

24. Defendant RYAN ZINKE is the Secretary of the United States Department of the Interior, and is sued in his official capacity. Mr. Zinke has responsibility for implementing and fulfilling the duties of the United States Department of the Interior, including the development of fossil fuel resources on public lands, and bears responsibility, in whole or in part, for the acts complained of in this Complaint.

STATUTORY BACKGROUND

I. Federal Land Management Statutes.

25. Defendants' duties to minimize waste and to regulate royalties from oil and gas operations on federal and Indian lands are established by several federal statutes. First, the Mineral Leasing Act of 1920 ("MLA"), 30 U.S.C. § 181 *et seq.*, instructs BLM to require oil and gas lessees to observe "such rules … for the prevention of undue waste as may be prescribed by [the] Secretary," to protect "the interests of the United States," and to safeguard "the public welfare." *Id.* § 187. The MLA specifically requires that "[a]ll leases of lands containing oil or gas … shall be subject to the condition that the lessee will … use all reasonable precautions to prevent waste of oil or gas developed in the land … ." *Id.* § 225.

26. Pursuant to the Indian Mineral Leasing Act of 1938, 25 U.S.C. §§ 396a–396g, and the Indian Mineral Development Act of 1982, 25 U.S.C. §§ 2101–08, BLM has authority to regulate oil and gas development on 56 million acres of Indian mineral estate held in trust by the federal government. *See, e.g.*, 25 U.S.C. § 396d (oil and gas operations on Indian lands subject "to the

rules and regulations promulgated by the Secretary"). As stated by BLM, the Waste Prevention Rule "helps to meet the Secretary's statutory trust responsibilities with respect to the development of Indian oil and gas interests" because it "will help ensure that the extraction of natural gas from Indian lands results in the payment of royalties to Indian mineral owners, rather than the waste of owners' mineral resources." 81 Fed. Reg. at 83,020. The Rule also meets these responsibilities because "tribal members and individual Indian mineral owners who live near Indian oil and gas development will realize environmental benefits as a result of this rule's reductions in flaring and air pollution from Indian oil and gas development." 81 Fed. Reg. at 83,021.

27. BLM has authority to regulate royalty payments pursuant to the Federal Oil and Gas Royalty Management Act of 1982 ("FOGRMA"), 30 U.S.C. § 1701 *et seq.* In FOGRMA, Congress reiterated its concern about waste by providing that: "Any lessee is liable for royalty payments on oil or gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator of the lease, or due to the failure to comply with any rule or regulation, order or citation issued under this chapter or any mineral leasing law." *Id.* § 1756.

28. The Federal Land Policy and Management Act ("FLPMA"), 43 U.S.C. § 1701 *et seq.*, provides BLM with broad authority to regulate "the use, occupancy, and development of the public lands" under the principles of "multiple use and sustained yield." *Id.* § 1732. Among other requirements, FLPMA mandates that BLM manage public lands "in a manner that will protect the quality of … ecological, environmental, [and] air and atmospheric … values," *id.* § 1701(a)(8), and provides that BLM "shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands." *Id.* § 1732(b).

II. National Environmental Policy Act.

29. The National Environmental Policy Act, 42 U.S.C. § 4321 *et seq.*, is the "basic national charter for the protection of the environment." 40 C.F.R. § 1500.1. The fundamental purposes of the statute are to ensure that "environmental information is available to public officials and citizens before decisions are made and before actions are taken," and that "public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment." *Id.* § 1500.1(b)-(c).

30. To achieve these purposes, NEPA requires the preparation of a detailed environmental impact statement ("EIS") for any "major federal action significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). As a preliminary step, an agency may first prepare an environmental assessment ("EA") to determine whether the effects of an action may be significant. 40 C.F.R. § 1508.9. If an agency decides not to prepare an EIS, it must supply a "convincing statement of reasons" to explain why a project's impacts are insignificant. *Nat'l Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 730 (9th Cir. 2001). However, an EIS must be prepared if "substantial questions are raised as to whether a project ... may cause significant degradation of some human environmental factor." *Idaho Sporting Congress v. Thomas*, 137 F.3d 1146, 1149 (9th Cir. 1998).

31. To determine whether a proposed project may significantly affect the environment, NEPA requires that both the context and the intensity of an action be considered. 40 C.F.R. § 1508.27. In evaluating the context, "[s]ignificance varies with the setting of the proposed action" and includes an examination of "the affected region, the affected interests, and the locality." *Id.* § 1508.27(a). Intensity "refers to the severity of impact," and NEPA's implementing regulations list ten factors to be considered in evaluating intensity, including "[u]nique characteristics of the geographic area such as proximity to ... ecologically critical areas," "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial," "[t]he degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks," and "[t]he degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration." *Id.* § 1508.27(b). The presence of just "one of these factors may be sufficient to require the preparation of an EIS in appropriate circumstances." *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 865 (9th Cir. 2005).

III. The Administrative Procedure Act.

32. The Administrative Procedure Act, 5 U.S.C. § 551 *et seq.*, governs the procedural requirements for agency decision-making, including the agency rule making process. Under the APA, a "reviewing court shall…hold unlawful and set aside" agency action found to be "arbitrary,

capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706. If an agency reverses course by suspending a fully-promulgated regulation, it is "obligated to supply a reasoned analysis for the change." *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mutual Automobile Ins. Co.*, 463 U.S. 29, 42 (1983). Further, an agency must show that "there are good reasons" for the reversal. *F.C.C. v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009). An agency must "provide a more detailed justification than what would suffice for a new policy created on a blank slate" when "its new policy rests upon factual findings that contradict those which underlay its prior policy." *Id.* Moreover, an agency cannot suspend a validly promulgated rule without first "pursu[ing] available alternatives that might have corrected the deficiencies in the program which the agency relied upon to justify the suspension." *Public Citizen v. Steed*, 733 F.2d 93, 103 (D.C. Cir. 1984).

33. Prior to formulating, amending, or repealing a rule, agencies must engage in a notice-and-comment process. 5 U.S.C. §§ 551(5), 553. Notice must include "either the terms or substance of the proposed rule or a description of the subjects and issues involved." *Id.* § 553(b). To satisfy the requirements of APA Section 553(b), notice of a proposed rule must "provide an accurate picture of the reasoning that has led the agency to the proposed rule," so as to allow an "opportunity for interested parties to participate in a meaningful way in the discussion and final formulation of rules." *Connecticut Light & Power Co. v. Nuclear Regulatory Comm'n*, 673 F.2d 525, 528-30 (D.C. Cir. 1982). The public may then submit comments which the agency must consider before promulgating a final rule. *Id.* § 553(c). This process is designed to "give interested persons an opportunity to participate in the rule making through submission of written data, views, or arguments." *Id.*

FACTUAL AND PROCEDURAL BACKGROUND

34. BLM oversees more than 245 million acres of land and 700 million subsurface acres of federal mineral estate, on which reside nearly 100,000 producing onshore oil and gas wells. 81 Fed. Reg. at 83,014. In fiscal year 2015, the production value of this oil and gas exceeded $20 billion and generated over $2.3 billion in royalties which were shared with tribes and states. *Id.*; *see* 30 U.S.C. § 191(a).

35. Oil and gas production in the United States has increased dramatically over the past decade due to technological advances such as hydraulic fracturing and directional drilling. 81 Fed. Reg. at 83,009. However, the American public has not fully benefitted from this increase in domestic energy production because it "has been accompanied by significant and growing quantities of wasted natural gas." 81 Fed. Reg. at 83,014. For example, between 2009 and 2015, nearly 100,000 oil and gas wells on federal land vented or flared enough gas to serve about 6.2 million households for a year. 81 Fed. Reg. at 83,009. In 2014 alone, operators vented and flared approximately 4.1 percent of the total production from BLM-administered leases, or enough natural gas to supply 1.5 million households for a year. 81 Fed. Reg. at 83,010.

36. Prior to 2016, BLM's regulatory scheme governing the minimization of resource waste had not been updated in over three decades. 81 Fed. Reg. at 83,008. Several oversight reviews, including those by the Government Accountability Office ("GAO") and the Department of the Interior's Office of the Inspector General, specifically called on BLM to update its "insufficient and outdated" regulations regarding waste and royalties. 81 Fed. Reg. at 83,009-10. The reviews recommended that BLM require operators to augment their waste prevention efforts and clarify policies regarding royalty-free, on-site use of oil and gas. *Id.*

37. In 2014, BLM responded to these reports by initiating the development of a rule to update its existing regulations on these issues. *Id.* After soliciting and reviewing input from stakeholders and the public, BLM released its proposal in February 2016. 81 Fed. Reg. 6,616 (Feb. 8, 2016) ("Proposed Rule"). BLM received approximately 330,000 public comments, including approximately 1,000 unique comments, on the Proposed Rule. 81 Fed. Reg. at 83,021. The agency also hosted stakeholder meetings and met with regulators from states with significant federal oil and gas production. *Id.*

38. BLM issued the final Waste Prevention Rule in November 2016. 81 Fed. Reg. at 83,008. In the final Rule, BLM refined many of the provisions of the Proposed Rule based on public comments to ensure both that compliance was feasible for operators and that the Rule achieved its waste prevention objectives. 81 Fed. Reg. at 83,022–23.

39. The Rule addresses each major source of natural gas waste from oil and gas production—venting, flaring, and equipment leaks—through different requirements. 81 Fed. Reg. at 83,010–13. In particular, the Rule prohibits venting except under specified conditions, and requires updates to existing equipment. 81 Fed. Reg. at 83,011–13. The Rule's flaring regulations reduce waste by requiring gas capture percentages that increase over time, providing exemptions that are scaled down over time, and requiring operators to submit Waste Minimization Plans. 81 Fed. Reg. at 83,011. Leak detection provisions require semi-annual inspections for well sites and quarterly inspections for compressor stations. *Id.*

40. In promulgating the Rule, BLM stated that it was advancing the mandates placed on the agency by Congress to oversee federal oil and gas activities, and to ensure that lessees use all reasonable precautions to prevent waste of public resources. 81 Fed. Reg. at 83,009.

41. BLM determined that the Rule's benefits outweighed its costs "by a significant margin." 81 Fed. Reg. at 83,014. BLM measured the benefits of the Rule by considering "the cost savings that the industry would receive from the recovery and sale of natural gas and the environmental benefits of reducing the amount of methane (a potent GHG) and other air pollutants released into the atmosphere." *Id.* BLM estimated that the Rule would result in monetized benefits of $209–$403 million annually, including the monetized benefits of reducing methane emissions by roughly 35 percent, and would improve air quality and overall quality of life for residents living near oil and gas wells. *Id.* The Rule's costs, on the other hand, would be minimal—between $114 and $275 million per year industry-wide—which even for small operators would result in an average reduction in profit margin of just 0.15 percentage points. 81 Fed. Reg. at 83,013–14. BLM acknowledged that these cost estimates could be overstated because they did not take into account operators that were already in compliance with the requirements of the Rule. 81 Fed. Reg. at 83,013.

42. The Rule was immediately challenged by two industry groups and the States of Wyoming and Montana (later joined by North Dakota and Texas) (collectively, "Petitioners") in federal district court in Wyoming, on the alleged basis that BLM did not have statutory authority to regulate air pollution and that the Rule was arbitrary and capricious. *Western Energy Alliance*

v. Jewell, No. 2:16-cv-00280-SWS (D. Wyo. petition filed Nov. 16, 2016); *State of Wyoming v. Jewell*, No. 2:16-cv-00285-SWS (D. Wyo. petition filed Nov. 18, 2016) (collectively, the "Wyoming Litigation"). The industry groups and several states then moved for a preliminary injunction. The California Attorney General's Office, on behalf of the California Air Resources Board, and the State of New Mexico, intervened in December 2016 on the side of BLM to defend the Rule. Several environmental organizations also intervened on the side of BLM to defend the Rule. On January 16, 2017, the Wyoming district court denied Petitioners' motions for a preliminary injunction, finding that Petitioners had failed to establish a likelihood of success on the merits or irreparable harm in the absence of an injunction.

43. The Rule became effective on January 17, 2017.

44. On March 28, 2017, President Donald Trump issued Executive Order 13783, entitled "Promoting Energy Independence and Economic Growth." 82 Fed. Reg. 16,093 (Mar. 31, 2017). Section 7 of that Executive Order, entitled "Review of Regulations Related to United States Oil and Gas Development," specifically called on the Secretary of the Interior to review and "as soon as practicable, suspend, revise, or rescind" the Waste Prevention Rule.

45. The following day, Secretary of the Interior Ryan Zinke issued Secretarial Order 3349, which provided that within 21 days, BLM would review the Rule and issue an internal report as to "whether the rule is fully consistent with the policy set forth in Section 1 of the March 28, 2017 E.O." BLM published the results of its review on October 24, 2017. *See* 82 Fed. Reg. 50,540 (Nov. 1, 2017). This review consists of less then a single page where BLM concludes, without any rationale or justification, that "the 2016 final rule poses a substantial burden on industry, particularly those requirements that are set to become effective on January 17, 2018."

46. Various states and industry groups also lobbied members of Congress to repeal the Waste Prevention Rule using the Congressional Review Act. On May 10, 2017, the United States Senate voted to reject such a measure, leaving the Rule in effect.

47. On June 15, 2017, BLM published a notice in the Federal Register purporting to postpone certain compliance dates of the Rule subject to APA Section 705. 82 Fed. Reg. 27,430 ("Postponement Notice"). The States of California and New Mexico challenged this unlawful

action on July 5, 2017 in the U.S. District Court for the Northern District of California. On October 4, 2017, the court ruled that Section 705 did not apply to an already-effective rule, and that the postponement amounted to a rulemaking that required compliance with the APA's notice and comment procedures. The Court also found that BLM's failure to consider the benefits of compliance with the provisions that were postponed rendered their action arbitrary and capricious and in violation of the APA. Thus, the court vacated the Postponement Notice and the Rule went back into effect. On December 4, 2017, BLM filed a notice of appeal.

48. On October 5, 2017, BLM published a notice in the Federal Register proposing to delay and suspend key requirements of the Rule that were already in effect, or set to take effect in January 2018, until January 17, 2019. 82 Fed. Reg. 46,458 (Oct. 5, 2017) ("Proposed Suspension"). These requirements include those covered by the Postponement Notice, as well as already-effective provisions governing waste minimization plans, well drilling, well completion and related operations, and downhole well maintenance and liquids unloading.

49. BLM's stated rationale for the Proposed Suspension was that it was "currently reviewing the 2016 final rule and want[ed] to avoid imposing temporary or permanent compliance costs on operators for requirements that may be rescinded or significantly revised in the near future." *Id.* However, BLM provided no justification regarding how the Proposed Suspension would fulfill its statutory mandates to prevent waste, ensure the adequate payment of royalties, protect the interests of the United States or public welfare, or meet its statutory trust responsibilities on tribal lands. To the contrary, BLM admitted that the benefits of the Rule in reducing waste, increasing royalty payments, and cutting air pollution and greenhouse gas emissions would not be achieved. 82 Fed. Reg. at 46,464-65 ("BLM's proposed rule would temporarily suspend or delay almost all of the requirements in the 2016 final rule that we estimated would generate benefits of gas savings or reductions in methane emissions.").

50. BLM prepared a Regulatory Impact Analysis for the Proposed Suspension. Regulatory Impact Analysis for the Proposed Suspension Rule (Sept. 27, 2017) ("Proposed RIA"). Rather than considering substantive amendments to the Rule that could have addressed

BLM's purported concerns, the only alternatives to the one-year extension that BLM considered were suspensions of other lengths (six months and two years). *Id.* at 48-49.

51. The public was permitted 30 days to submit comments, and no public hearing was held. *Id.* The States of California and New Mexico, by and through their Attorneys General, commented in opposition to the Proposed Suspension. The California Air Resources Board also submitted comments in opposition to the Proposed Suspension. On October 20, 2017, while the public comment period was ongoing, BLM represented to the court in the Wyoming Litigation that: "Once the Suspension Rule is completed, it will provide the immediate relief sought by Petitioners—relief from the portions of the Waste Prevention Rule that would otherwise come into effect on January 17, 2018, as well as other provisions of the Waste Prevention Rule already in effect—and thereby obviate the need for immediate judicial review of the Waste Prevention Rule." Wyoming Litigation, Fed. Mot. to Extend Briefing Deadlines (Dkt. No. 155) at 4.

52. On December 8, 2017, BLM issued a final rule suspending key requirements of the Waste Prevention Rule until January 17, 2019. 82 Fed. Reg. 58,050 (Dec. 8, 2017) ("Suspension"). To justify the Suspension, BLM stated it had "concerns regarding the statutory authority, cost, complexity, feasibility, and other implications" of the Rule, and therefore sought to "avoid imposing likely considerable and immediate compliance costs on operators for requirements that may be rescinded or significantly revised in the near future." *Id.* The Suspension also makes reference BLM's "initial review" of the Rule conducted pursuant to Executive Order 13783 and Secretarial Order No. 3349, which allegedly uncovered a "newfound concern" regarding the Rule's burdens on operators of marginal or low-producing wells. *Id.* The Suspension further references Executive Order 13371, entitled "Reducing Regulatory and Controlling Regulatory Costs," although BLM does not indicate how the Suspension fulfills the direction of this order. *Id.* BLM acknowledged that the Suspension "suspends or delays almost all of the requirements in the 2016 final rule that we estimated would…generate benefits of gas savings or reductions in methane emissions." *Id.* at 58,056. BLM also stated that although it "is currently considering revisions to the 2016 final rule, it cannot definitively determine what form

those revisions will take until it completes the notice-and-comment rulemaking process." *Id.* at 58,061.

53. On December 12, 2017, BLM released a final regulatory impact analysis for the Suspension ("Final RIA") that did not change materially from the Proposed RIA. *See* U.S. Bureau of Land Management, Regulatory Impact Analysis for the Final Rule to Suspend or Delay Certain Requirements of the 2016 Waste Prevention Rule ("Final RIA"). The Final RIA states that it "draws heavily upon the analysis conducted for the RIA for the 2016 final rule," Final RIA at 5, although it makes dramatic changes in calculating the costs of increased methane emissions by relying on an "interim" measure that only considers "the domestic social cost of methane." *Id.* at 33-35. This interim measure lacks substantial analysis, much less peer review, and ignores nearly ninety-percent of the costs imposed by methane emissions. Further, despite the Suspension's justification of avoiding compliance costs for operators, the Final RIA states that such costs would be insignificant and that the Suspension would increase the profit margin for the smallest operators by just 0.17 percentage points. *Id.* at 61. BLM also determined that the Suspension "would not have a significant impact" on small companies, and that it would not "significantly impact the supply, distribution, or use of energy." *Id.* at 55, 67. Also, contrary to BLM's stated justification for the Suspension, the Final RIA calculates costs and benefits based on an assumption that the Rule will go into effect, unaltered and in its entirety, on January 17, 2019. *Id.* at 27-39. Finally, BLM bases its estimates of industry cost savings on the unfounded assumption that oil and gas operators have not already undergone compliance activities to meet the January 17, 2018 deadlines. *Id.* at 33.

54. BLM also issued a Final Environmental Assessment ("Final EA") and Finding of No Significant Impact ("FONSI") for the Suspension, which determined that the Suspension "would not have a significant effect on the quality of the human environment; therefore, an EIS is not required." The FONSI, like the Final RIA, relies on the premise that the Rule will be implemented completely on January 17, 2019. *See* FONSI at 5 ("While a delay in implementing the rule would postpone any anticipated reductions, delaying the rule would not result in an increase of GHG, air pollutant, and HAP emissions over current conditions.").

55. On December 11, 2017, BLM moved to dismiss or stay the Wyoming Litigation based on the Suspension and its ongoing reconsideration of the Rule.

FIRST CAUSE OF ACTION

(Violation of the APA, 5 U.S.C. § 706)

56. Paragraphs 1 through 55 are realleged and incorporated herein by reference.

57. An agency action is arbitrary and capricious under the APA where the agency (i) has relied on factors which Congress has not intended it to consider; (ii) entirely failed to consider an important aspect of the problem; (iii) offered an explanation for its decision that runs counter to the evidence before the agency; or (iv) is so implausible that it could not be ascribed to a difference of view or the product of agency expertise. *State Farm*, 463 U.S. at 43. Moreover, an "agency changing its course by rescinding a rule is obligated to supply a reasoned analysis for the change." *State Farm*, 463 U.S. at 42. "[E]ven when reversing a policy after an election, an agency may not simply discard prior factual findings without a reasoned explanation." *Organized Village of Kake v. U.S. Dept. of Agriculture*, 795 F.3d 956, 968 (9th Cir. 2015). Moreover, an agency cannot suspend a validly-promulgated rule without first "pursu[ing] available alternatives that might have corrected the deficiencies in the program which the agency relied upon to justify the suspension." *Public Citizen v. Steed*, 733 F.2d 93, 103 (D.C. Cir. 1984).

58. Here, Defendants have failed to provide an explanation for suspending the Waste Prevention Rule based on the same factual record that was before the agency during the multi-year rulemaking proceeding that resulted in the adoption of the Rule. Defendants also entirely failed to consider how the Suspension will achieve their statutory mandates to prevent waste, ensure the adequate payment of royalties, protect the interests of the United States and public welfare, or fulfill its statutory trust responsibilities on tribal lands.

59. Defendants' stated justification of avoiding compliance costs for operators is contradicted by its own findings that these compliance costs represent just a fraction of a percent of the profit margins for even the smallest operators.

60. Defendants' citation to Executive Order 13783 and Secretarial Order 3349 to justify the Suspension is inconsistent with their admission that the Suspension will have almost no

impact on operator compliance costs or energy development on federal or Indian lands. Further, these Executive Orders cannot contravene statutory mandates imposed upon Defendants by Congress.

61. Defendants' reliance on the Final RIA is also arbitrary and capricious for several reasons, including its assumptions that the Waste Prevention Rule will take full effect in January 2019 and that operators have not already incurred costs to comply with the requirements affected by the Suspension, its use of an "interim" domestic social cost of methane measure, and its failure to consider the full costs of the Suspension.

62. Finally, Defendants failed to consider alternative solutions to address any alleged deficiencies with the Rule, such as through the issuance of guidance or making adjustments necessary to clarify certain provisions, rather than a suspension of the Rule's key requirements.

63. Accordingly, Defendants acted in a manner that was arbitrary, capricious, an abuse of discretion, not in accordance with law, and in excess of their statutory authority. 5 U.S.C. § 706. Consequently, the Suspension should be held unlawful and set aside.

SECOND CAUSE OF ACTION

(Violation of the MLA, FOGRMA, FLPMA and the APA;

30 U.S.C. §§ 187, 225; 30 U.S.C. § 1756; 43 U.S.C. §§ 1701, 1732; 5 U.S.C. § 706)

64. Paragraphs 1 through 63 are realleged and incorporated herein by reference.

65. The MLA vests BLM with broad responsibility to require oil and gas lessees to observe "such rules … for the prevention of undue waste as may be prescribed by [the] Secretary," to protect "the interests of the United States," and to safeguard "the public welfare." 30 U.S.C. § 187. The MLA also requires that "[a]ll leases of lands containing oil or gas … shall be subject to the condition that the lessee will … use all reasonable precautions to prevent waste of oil or gas developed in the land … ." *Id.* § 225.

66. FOGRMA provides that, "Any lessee is liable for royalty payments on oil or gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator of the lease, or due to the failure to comply with any rule or regulation, order or citation issued under this chapter or any mineral leasing law." 30 U.S.C. § 1756.

67. FLPMA mandates that BLM manage public lands "in a manner that will protect the quality of … ecological, environmental, [and] air and atmospheric … values," 43 U.S.C. § 1701(a)(8), and provides BLM with authority to take any action, by regulation or otherwise, "necessary to prevent unnecessary or undue degradation of the lands." *Id.* § 1732(b).

68. In promulgating the Suspension, Defendants entirely failed to consider or fulfill their statutory trust responsibilities or mandates to prevent waste of oil and gas, to protect the interests of the United States and safeguard the public welfare, and otherwise ensure the environmentally responsible development of oil and gas on public lands.

69. Accordingly, Defendants acted in a manner that was arbitrary, capricious, an abuse of discretion, not in accordance with law, and in excess of their statutory authority, in violation of the FOGRMA, FLPMA, MLA and APA. 30 U.S.C. §§ 187, 225; 30 U.S.C. § 1756; 43 U.S.C. §§ 1701, 1732; 5 U.S.C. § 706. Consequently, the Suspension should be held unlawful and set aside.

THIRD CAUSE OF ACTION

(Violation of NEPA and the APA;

42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1502.3; 5 U.S.C. § 706)

70. Paragraphs 1 through 69 are realleged and incorporated herein by reference.

71. NEPA requires federal agencies to take a "hard look" at the environmental consequences of a proposed activity before taking action. *See* 42 U.S.C. § 4332. To achieve this purpose, a federal agency must prepare an EIS for all "major Federal actions significantly affecting the quality of the human environment." *Id.* § 4332(2)(C); 40 C.F.R. § 1502.3. To determine whether a federal action will result in significant environmental impacts, the federal agency may first conduct an EA. 40 C.F.R. §§ 1501.4, 1508.9. An EA must include a discussion of the need for the proposal, alternatives to the proposed action, the environmental impacts of the proposed action and alternatives, and must provide "sufficient evidence and analysis for determining whether to prepare" an EIS or a FONSI. *Id.* § 1508.9.

72. NEPA's implementing regulations specify several factors that an agency must consider in determining whether an action may significantly affect the environment, thus warranting the preparation of an EIS. 40 C.F.R. § 1508.27. The presence of any single

significance factor can require the preparation of an EIS. "The agency must prepare an EIS if substantial questions are raised as to whether a project may cause significant environmental impacts." *Friends of the Wild Swan v. Weber*, 767 F.3d 936, 946 (9th Cir. 2014).

73. As the comment letters from Plaintiffs, as well as BLM's own analysis, demonstrate, there are substantial questions, if not certainties, as to whether the Suspension may have significant environmental impacts. In particular, the Suspension will result in significant adverse impacts including increased air pollution and related public health impacts, climate change harms, and increased visual and noise impacts from venting, flaring or leaking billions of cubic feet of natural gas.

74. Defendants' determination that the Suspension would result in no significant impacts, and its reliance on a FONSI and failure to prepare an EIS, constitutes agency action unlawfully or unreasonably withheld or delayed, in violation of the requirements of NEPA. 5 U.S.C. § 706(1). Alternatively, Defendants' determination that the Suspension would result in no significant impacts, and its reliance on a FONSI and failure to prepare an EIS, is arbitrary and capricious, an abuse of discretion, and contrary to the requirements of NEPA. 5 U.S.C. § 706(2).

FOURTH CAUSE OF ACTION

(Violation of the APA, 5 U.S.C. §§ 553(b), 706)

75. Paragraphs 1 through 74 are realleged and incorporated herein by reference.

76. The Proposed Suspension provided no explanation as to why certain provisions of the Waste Prevention Rule might no longer be valid or prudent, and no data to support such purported deficiencies. *See* 5 U.S.C. § 553. Further, Defendants' statements indicate that BLM had already made up its mind to finalize the Suspension prior to considering public comments. Defendants therefore "did not provide a meaningful opportunity for comment, and did not solicit or receive relevant comments regarding the substance or merits of either set of regulations." *N. Carolina Growers' Ass'n, Inc. v. United Farm Workers*, 702 F.3d 755, 770 (4th Cir. 2012). Hence, the public has not had an opportunity to "participate in the rule making through submission of written data, views, or arguments…on the relevant matter presented," as required by the APA. 5 U.S.C. § 553(c).

77. Accordingly, Defendants acted in a manner that was arbitrary, capricious, an abuse of discretion, not in accordance with law, and in excess of their statutory authority, and the Suspension should be held unlawful and set aside. 5 U.S.C. §§ 553, 706.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs respectfully request that this Court:

1. Issue a declaratory judgment that Defendants acted arbitrarily, capriciously, contrary to law, abused their discretion, and failed to follow the procedure required by law in their promulgation of the Suspension, in violation of the MLA, FOGRMA, FLPMA, NEPA, and the APA;

2. Vacate the Suspension;

3. Issue a mandatory injunction compelling Defendants to reinstate the Waste Prevention Rule in its entirety;

4. Award Plaintiffs their costs, expenses, and reasonable attorneys' fees; and

5. Award such other relief as the Court deems just and proper.

Dated: December 19, 2017

Respectfully Submitted,

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UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA

SIERRA CLUB; CENTER FOR BIOLOGICAL DIVERSITY; EARTHWORKS; ENVIRONMENTAL DEFENSE FUND; NATURAL RESOURCES DEFENSE COUNCIL; THE WILDERNESS SOCIETY; NATIONAL WILDLIFE FEDERATION; CITIZENS FOR A HEALTHY COMMUNITY; DINÉ CITIZENS AGAINST RUINING OUR ENVIRONMENT; ENVIRONMENTAL LAW AND POLICY CENTER; FORT BERTHOLD PROTECTORS OF WATER AND EARTH RIGHTS; MONTANA ENVIRONMENTAL INFORMATION CENTER; SAN JUAN CITIZENS ALLIANCE; WESTERN ORGANIZATION OF RESOURCE COUNCILS; WILDERNESS WORKSHOP; WILDEARTH GUARDIANS; and WYOMING OUTDOOR COUNCIL, Plaintiffs, v. RYAN ZINKE, in his official capacity as Secretary of the Interior; BUREAU OF LAND MANAGEMENT; and UNITED STATES DEPARTMENT OF THE INTERIOR, Defendants.	Case No. _____ **COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF** (Administrative Procedure Act, 5 U.S.C. § 551, *et seq.*)

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INTRODUCTION

1. This case challenges the U.S. Bureau of Land Management's (BLM) final decision, 82 Fed. Reg. 58,050 (Dec. 8, 2017) (Amendment), to amend the compliance deadlines for the majority of the requirements of its Waste Prevention, Production Subject to Royalties, and Resource Conservation Rule (Waste Prevention Rule or Rule). 81 Fed. Reg. 83,008 (Nov. 18, 2016). The Amendment unlawfully pushes the compliance deadlines one year into the future while BLM considers other changes to the Waste Prevention Rule.

2. The Waste Prevention Rule sets standards to limit the pervasive problem of waste of natural gas by oil and gas companies operating on federal or tribal oil and gas leases. These companies waste publicly-owned gas by deliberately venting it into the atmosphere, flaring it (burning it without capturing the energy), or otherwise allowing it to leak into the air. The Rule requires operators to control this waste and bring more gas to market using proven, widely-available technologies that are already required in some states and used by leading companies.

3. BLM adopted the Waste Prevention Rule in response to numerous federal studies and its own findings showing that waste of publicly and tribally owned natural gas is a problem that must be addressed. BLM determined that its existing waste regulation, Notice to Lessees and Operators of Onshore Federal and Indian Oil and Gas Leases (NTL-4A), 44 Fed. Reg. 76,600 (Dec. 27, 1979)—which had not been updated in more than 35 years—was outdated and inadequate.

4. The Waste Prevention Rule has many benefits beyond controlling waste: it increases revenues for states, local governments, tribes, and individual Indian mineral owners that receive royalties paid on oil and gas production, and reduces air pollution, including greenhouse gas emissions and other smog-forming and hazardous air pollutants.

5. In response to direction from President Trump, BLM has announced its intention to reverse course and revise or rescind the Waste Prevention Rule. Although BLM has yet to issue a proposal to revise or rescind the Rule (beyond amending its compliance dates), it has twice attempted to put off those compliance deadlines while it more broadly reconsiders the Rule. On June 15, 2017, without providing notice or an opportunity for public comment, BLM announced that it was indefinitely staying all of the Rule's provisions with future compliance dates, pursuant to

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purported authority under 5 U.S.C. § 705. 82 Fed. Reg. 27,430 (June 15, 2017). The Conservation and Tribal Citizen Groups and the States of California and New Mexico filed suit over that action in this Court. This Court granted plaintiffs' motions for summary judgment, declared that BLM's purported attempt to stay the Rule's compliance dates violated the APA, vacated the stay, and ordered BLM to reinstate the Rule in its entirety. *California v. BLM*, Nos. 17-cv-3804-EDL & 17-cv-3885-EDL, 2017 WL 4416409, at *14 (Oct. 4, 2017).

6. The very next day, BLM published a proposal to suspend or delay compliance with the same requirements that the Court had just ordered BLM to reinstate, plus additional requirements, for a year, and opened a 30-day public comment period. 82 Fed. Reg. 46,458 (Oct. 5, 2017). BLM explained that its proposed suspension was based on its desire to avoid imposing compliance costs on operators while the agency reconsiders the Rule. On December 8th, 2017, BLM took final action, amending the compliance dates for the Rule's most significant provisions by delaying them for a year, until January 17, 2019 (the Amendment).

7. In the Amendment, BLM neither analyzes nor offers interim rules or guidance to satisfy its statutory responsibility to prevent waste. The Amendment does not even reinstate BLM's prior, outdated waste regulation, NTL-4A. Instead, BLM's action creates a regulatory and policy vacuum that BLM concedes will decrease the amount of natural gas brought to market by nine billion cubic feet (bcf). This will result in a reduction in royalties and will have harmful impacts on public health and the environment by increasing emissions of methane—a potent greenhouse gas—and other air pollutants.

8. The Conservation and Tribal Citizen groups challenge the Amendment's unlawful modification of the Waste Prevention Rule based on violations of the Mineral Leasing Act (MLA), 30 U.S.C. §§ 187, 225, the Federal Land Policy and Management Act (FLPMA), 43 U.S.C. §§ 1701(a)(8), 1702(c), 1732(b), the National Environmental Policy Act (NEPA), 42 U.S.C. § 4332(C); and the Administrative Procedure Act (APA), 5 U.S.C. §§ 553, 706(2)(A), (C).

9. The Conservation and Tribal Citizen Groups respectfully seek a declaration that BLM's Amendment violates the MLA, FLPMA, NEPA, and the APA, and is arbitrary, capricious, contrary to law, and in excess of authority within the meaning of 5 U.S.C. §§ 706(2)(A), (C). The

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Conservation and Tribal Citizen Groups also seek an order vacating the Amendment and immediately reinstating all provisions of the Waste Prevention Rule.

JURISDICTION AND VENUE

10. This Court has jurisdiction pursuant to 28 U.S.C. § 1331 (federal question jurisdiction) and 5 U.S.C. § 702 (the APA).

11. An actual controversy exists between the parties within the meaning of 28 U.S.C. § 2201(a), and this Court may grant declaratory relief, injunctive relief, and other relief pursuant to 28 U.S.C. §§ 2201–2202 and 5 U.S.C. §§ 705–706.

12. Venue is proper in this Court pursuant to 28 U.S.C. § 1391 because Defendant BLM maintains offices in this district. BLM administers 15 million acres of public lands, more than 49 million acres of subsurface mineral estate, and nearly 600,000 acres of Native American tribal mineral estate in California. At the end of fiscal year 2016, BLM administered 530 oil and gas leases in California, covering around 200,000 acres and containing around 6,800 oil and gas wells. BLM specifically manages public oil and gas resources in this district that are subject to the Waste Prevention Rule. In 2016, California operators developed more than 11 million barrels of federal oil and 12 bcf of federal natural gas, and flared more than 0.4 bcf of federal natural gas.

13. Venue is further proper in this district because Plaintiffs Sierra Club and Center for Biological Diversity are nonprofit corporations in good standing incorporated in the State of California. Plaintiff Sierra Club is headquartered in Oakland, and Center for Biological Diversity and Earthworks have offices in Oakland. Additionally, Plaintiffs Environmental Defense Fund, Natural Resources Defense Council, and The Wilderness Society maintain offices in this district. The Conservation and Tribal Citizen Groups collectively have more than half a million members living in California. This includes more than 160,000 members residing in the Northern District.

INTRADISTRICT ASSIGNMENT

14. Pursuant to Civil Local Rules 3-5(b) and 3-2(c), there is no basis for assignment of this action to any particular location or division of this Court. However, this case is related to Case No. 3:17-cv-07186, which is currently pending in the San Francisco Division. Case No. 3:17-cv-07186, filed by the States of California and New Mexico, also challenges the Amendment. The legal

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claims in that case are nearly identical to the legal claims in this case. Pursuant to Civil Local Rule 3-12(b), Plaintiffs intend to promptly file an Administrative Motion to Consider Whether Cases Should Be Related.

PARTIES

15. Plaintiff SIERRA CLUB, founded in 1892, is the nation's oldest and largest grassroots environmental organization. Sierra Club is incorporated and headquartered in California, with a principal place of business at 2101 Webster St., Suite 1300, Oakland, CA 94612. Sierra Club has about 250 employees who work in California, including about 200 employees who work at its headquarters in Oakland. Sierra Club California has thirteen local chapters, including five chapters in northern California that collectively have about 96,600 members: the Loma Prieta, Mother Lode, Redwood, San Francisco Bay, and Ventana Chapters. Sierra Club currently has more than 830,000 members nationwide, including more than 182,000 in California. More than 71,000 of these members reside in the Northern District of California. Sierra Club's mission is to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; to educate and enlist humanity to protect and restore the quality of the natural and human environment; and to use all lawful means to carry out these objectives. In addition to helping people from all backgrounds explore nature and our outdoor heritage, Sierra Club works to promote clean energy, safeguard the health of our communities, protect wildlife, and preserve our remaining wild places through grassroots activism, public education, lobbying, and legal action. Sierra Club pursues these objectives nationwide, including in California. For example, Sierra Club has been actively involved in raising awareness about the public health consequences of oil and gas activities on public lands, including in northern California. Sierra Club sued BLM for failing to consider the impacts of hydraulic fracturing before leasing public lands in Monterrey County for oil and gas development. *Ctr. for Biological Diversity v. BLM*, 937 F. Supp. 2d 1140 (N.D. Cal. 2013). In April 2017, Sierra Club submitted comments on BLM's Draft Resource Management Plan Amendment/Environmental Impact Statement for oil and gas leasing and development within the Central Coast Field Office. The Central Coast Field Office includes all or

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part of several counties within the Northern District of California: Alameda, Contra Costa, Monterey, San Benito, San Francisco, San Mateo, Santa Clara, and Santa Cruz.

16. Plaintiff CENTER FOR BIOLOGICAL DIVERSITY (the Center) is a nonprofit organization incorporated in the State of California that works through science, law, and policy to secure a future for all species, great or small, hovering on the brink of extinction. The Center has offices throughout the country, including an office in Oakland, California. The Center has over 58,500 members, including more than 13,000 in California, and more than 1.3 million online supporters worldwide. Specifically, the Center has more than 4,000 members residing in the Northern District of California. The Center's members use BLM-managed public lands for recreational, scientific, educational, and other pursuits and intend to continue to do so in the future, and are particularly interested in protecting the many native, imperiled, and sensitive species and their habitats that may be affected by oil and gas leasing. Although the Center pursues its objectives of protecting threatened and endangered species and their habitats nationwide, the Center specifically works to protect public lands administered by BLM in the Northern District of California from the harmful impacts of oil and gas development, including methane emissions. The Center researches, documents, and raises awareness of the environmental consequences of oil and gas development and hydraulic fracturing in California. This campaign includes, among other efforts, publishing reports on aquifer contamination and seismic risks from oil and gas activities, rallying local governments, including Monterey County, to prohibit hydraulic fracturing, and litigating BLM's oil and gas leasing activities on California public lands. Like Sierra Club, the Center was a plaintiff in a 2011 lawsuit challenging BLM's failure to consider the impacts of hydraulic fracturing in the Northern District of California. *Ctr. for Biological Diversity v. BLM*, 937 F. Supp. 2d 1140 (N.D. Cal. 2013).

17. Plaintiff EARTHWORKS is a membership-based 501(c)(3) nonprofit organization dedicated to protecting communities and the environment from the adverse impacts of mineral and energy development while promoting sustainable solutions. Earthworks was created in 2005, when two organizations (the Mineral Policy Center and the Oil & Gas Accountability Project) joined forces. Earthworks collaborates with communities and grassroots groups to reform government

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policies to better protect air, water, public lands and communities from threats posed by mineral development. Earthworks has an office in California. Earthworks has more than 70,000 members nationwide, including over 9,200 members in California. Among Earthworks' members, approximately 4,200 live in the Northern District of California.

18. Plaintiff ENVIRONMENTAL DEFENSE FUND (EDF) is a national nonprofit organization representing over 420,000 members nationwide, including over 70,000 in California. Over 25,000 of these members reside in the Northern District of California. Since 1967, EDF has linked science, economics, and law to create innovative, equitable, and cost-effective solutions to urgent environmental problems. EDF employs more than 150 scientists, economists, engineers, business school graduates, and lawyers to help solve challenging environmental problems in a scientifically sound and cost-effective way. These staff work throughout the nation, including in two California offices, one in San Francisco, and one in Sacramento. More than 100 EDF staff members live and work in California. EDF pursues initiatives at the state and national levels designed to protect human health and the environment. Among these initiatives, EDF has worked to reduce waste from oil and gas operations on public lands along with its associated health-harming and climate-altering air pollution.

19. Plaintiff NATURAL RESOURCES DEFENSE COUNCIL (NRDC) is a non-profit environmental membership organization that uses law, science, and the support of more than 408,000 members throughout the United States, including nearly 80,000 in California, to protect wildlife and wild places and to ensure a safe and healthy environment for all living things. More than 33,000 NRDC's members reside in the Northern District of California. NRDC has offices throughout the country, including offices in San Francisco and Santa Monica, California. NRDC has a long-established history of working to protect public lands and clean air. In particular, NRDC has worked for decades to protect public lands, nearby communities, wildlife habitat and air quality from the threats posed by oil and gas development.

20. Plaintiff THE WILDERNESS SOCIETY (TWS) has a mission to protect wilderness and inspire Americans to care for our wild places. TWS has offices throughout the country, including offices in San Francisco and Pasadena, California, and a California Desert representative.

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TWS has more than 1,000,000 members and supporters around the West, including more than 91,000 in California. TWS has a long-standing interest in the management of public lands across the nation, and engages frequently in land use planning and project proposals that could potentially affect wilderness quality lands, wildlife habitat, and other natural resources, as well as the health, safety and quality of life of surrounding communities. TWS also has a long-standing interest in the use of our public and tribal lands for energy development, including supporting a transition to renewable energy, and ensuring that oil and gas and other energy development are focused in suitable locations and completed in a manner that does not harm other values. TWS has been actively involved in planning, policy, and conservation efforts in California, including the Northwest California Integrated Resource Management Plan for BLM lands in Humboldt, Mendocino, Del Norte, Trinity, Shasta, Siskiyou, Butte, and Tehama Counties. TWS also focuses on protecting the Cascade-Siskiyou National Monument, the San Gabriel Mountains, Sierra Nevada, the California Desert, and the Central Coast.

21. Plaintiff NATIONAL WILDLIFE FEDERATION (NWF), founded in 1936, is one of the nation's premier grassroots non-profit conservation advocacy and education organizations. The group is America's largest conservation organization with a mission to ensure that wildlife thrive in a rapidly-changing world. Headquartered in Reston, Virginia, NWF has offices throughout the country, including an office in California. NWF has more than six million members and supporters and has affiliate organizations in 51 states and territories, including more than 57,000 members and 3,500 affiliate members in California. More than 25,000 of NWF's members reside in the Northern District of California. NWF has a strong history of protecting public lands for wildlife and outdoor recreation by its members and is known among conservation groups for its ability to combine strong science, federal and state policy development, education, litigation, and grassroots organizing.

22. Plaintiff CITIZENS FOR A HEALTHY COMMUNITY (CHC) is a grass-roots organization with more than 500 members formed in 2009 for the purpose of protecting people and their environment from the impacts of BLM-authorized oil and gas development in the Delta County region of Colorado. CHC's members and supporters include organic farmers, ranchers, vineyard and winery owners, sportsmen, realtors, and other concerned citizens impacted by oil and gas

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development. CHC members have been actively involved in commenting on BLM's oil and gas activities.

23. Plaintiff DINÉ CITIZENS AGAINST RUINING OUR ENVIRONMENT (Diné C.A.R.E.) is an all-Navajo organization comprised of a federation of grassroots community activists in Arizona, New Mexico and Utah who strive to educate and advocate for traditional teachings derived from Diné Fundamental Laws. Diné C.A.R.E.'s goal is to protect all life in their ancestral homeland by empowering local and traditional people to organize, speak out, and determine the outlook of the environment through civic involvement and engagement in decision-making processes relating to tribal development, including oil and gas development on public and tribal lands in the San Juan Basin of New Mexico.

24. Plaintiff ENVIRONMENTAL LAW AND POLICY CENTER (ELPC) is a Midwest based not-for-profit corporation and legal advocacy organization concerned with improving environmental quality and protecting natural resources in the Midwest and Great Plains states. ELPC works on a variety of issues throughout the Midwest and Great Plains states, including advocating for clean air, clean water, renewable energy, sustainable transportation, and protecting natural places. ELPC's work includes efforts to minimize negative environmental impacts from oil and gas development. ELPC has members in North Dakota whose recreational and aesthetic interests are impacted by the wasteful and polluting practices of venting and flaring natural gas from oil wells.

25. Plaintiff FORT BERTHOLD PROTECTORS OF WATER AND EARTH RIGHTS (Fort Berthold POWER) is a grassroots, member-led community group that works to promote responsible energy development in and around Fort Berthold Indian Reservation in North Dakota. Fort Berthold POWER is committed to working toward a sustainable society with an awareness for all life. The mission of Fort Berthold POWER is to conserve and protect the land, water, and air on which all life depends. Fort Berthold POWER works to engage citizens in activities that protect the environment, facilitates learning for members to disseminate information on environmental issues that affect all people, and expands members' ability to take effective action to address issues that affect land, air, and water.

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26. Plaintiff MONTANA ENVIRONMENTAL INFORMATION CENTER (MEIC) is a nonprofit organization founded in 1973 with approximately 5,000 members and supporters throughout the United States, including in California. MEIC is dedicated to the preservation and enhancement of the natural resources and natural environment of Montana and to the gathering and disseminating of information concerning the protection and preservation of the human environment through education of its members and the general public concerning their rights and obligations under local, state, and federal environmental protection laws and regulations. MEIC is also dedicated to assuring that federal officials comply with and fully uphold the laws of the United States that are designed to protect the environment from pollution.

27. Plaintiff SAN JUAN CITIZENS ALLIANCE (SJCA), founded in 1986, organizes people to protect our water and air, our lands, and the character of our rural communities in the San Juan Basin. SJCA focuses on four program areas, one of which is the San Juan Basin Energy Reform Campaign, which seeks to ensure proper regulation and enforcement of the oil, gas, and coal industry and facilitate a transition to a renewable energy economy. SJCA has been active in BLM oil and gas issues in the San Juan Basin since the early 1990s. SJCA has 800 members.

28. Plaintiff WESTERN ORGANIZATION OF RESOURCE COUNCILS (WORC) is a nonprofit organization that works to advance the vision of a democratic, sustainable, and just society through community action. WORC is committed to building sustainable environmental and economic communities that balance economic growth with the health of people and stewardship of their land, water, and air resources. WORC is a network of grassroots organizations from seven states that includes over 12,000 members and 39 local community group chapters. WORC's members are family farmers and ranchers, townspeople, and rural residents concerned about their communities and environment. WORC's current goals include organizing and educating landowners, residents, mineral estate owners and water users about the impacts of oil and gas exploration and development and ensuring that the BLM enforces all applicable laws and regulations related to oil and gas leasing and development.

29. Plaintiff WILDERNESS WORKSHOP is a nonprofit organization based in Carbondale, Colorado that is dedicated to preservation and conservation of the wilderness and

natural resources of the White River National Forest and adjacent public lands. Wilderness Workshop engages in research, education, legal advocacy and grassroots organizing to protect the ecological integrity of local landscapes and public lands. Wilderness Workshop focuses on the monitoring and conservation of air and water quality, wildlife species and habitat, natural communities and lands of wilderness quality. Wilderness Workshop was founded in 1967 and has approximately 800 members.

30. Plaintiff WILDEARTH GUARDIANS (Guardians) is a non-profit conservation organization dedicated to protecting and restoring the wildlife, wild places, wild rivers, and health of the American West. Guardians has offices in Colorado, Montana, New Mexico, Arizona, Washington, and Oregon. With more than 120,000 members and supporters, Guardians works to sustain a transition from fossil fuels to clean energy in order to safeguard the West.

31. Plaintiff WYOMING OUTDOOR COUNCIL (WOC) was founded in 1967. It is Wyoming's oldest independent conservation organization. WOC works to protect Wyoming's environment and quality of life for future generations. Its goal is to develop productive and lasting solutions for managing natural resources through collaborative engagement with stakeholders and decision makers. WOC believes responsible environmental stewardship is fundamental to safeguarding public health and Wyoming's quality of life. WOC's nearly 2,000 members recognize that Wyoming's landscapes, wildlife, and diverse cultural history are vital resources, and that everyone relies on the state's clean air and water.

32. The Conservation and Tribal Citizen Groups bring this action on behalf of themselves and their adversely affected members. For many years, the Conservation and Tribal Citizen Groups have actively advocated for strong BLM standards for the reduction of waste and associated air pollution from federal and tribal leases, and have devoted significant resources toward that effort. For example, the Conservation and Tribal Citizen Groups and their members submitted scoping comments and comments on the proposed Waste Prevention Rule and participated in public meetings and hearings. The Conservation and Tribal Citizen Groups also have intervened to defend the Waste Prevention Rule from a lawsuit filed by several states and industry groups. Further, the Conservation and Tribal Citizen Groups' staff and members helped to successfully oppose an

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attempt to persuade Congress to repeal the Rule using the Congressional Review Act. Moreover, the Conservation and Tribal Citizen Groups successfully sued BLM when it unlawfully attempted to stay the Waste Prevention Rule's compliance dates. *California v. BLM*, Nos. 17-cv-3804-EDL & 17-cv-3885-EDL, 2017 WL 4416409, at *14 (Oct. 4, 2017). Finally, the Conservation and Tribal Citizen Groups and their members submitted comments on BLM's proposed Amendment.

33. Many Conservation and Tribal Citizen Group members live in communities that receive income from royalties from oil and gas development on public and tribal lands that is used to fund schools, healthcare, and infrastructure. Other Conservation and Tribal Citizen Group members are partial royalty owners of tribal leases. The Amendment will lead to reductions in these royalty payments.

34. Numerous Conservation and Tribal Citizen Group members live, work, and recreate in and around, and otherwise use and enjoy, lands where oil and gas development is occurring or has been proposed on federal and tribal leases and are therefore likely to be affected by the associated air pollution and other impacts from such development. For example, some members live on or near split estate lands (where the federal government owns the minerals underlying their property) that are already subject to oil and gas development or are likely to be developed in the future. Other members use public lands in and around federal and tribal leases for recreation, solitude, and scientific study. These members will be adversely affected by the Amendment. As a result of BLM modifying the compliance deadlines in the Waste Prevention Rule, operators will be permitted to release more air pollution and flare more gas—which causes bright, incandescent fires at flare stacks and excessive noise—than if the Rule remained in effect. This harms the Conservation and Tribal Citizen Groups' members by disrupting their daily lives, subjecting them to adverse health risks, and reducing their enjoyment of the public, split estate, and tribal lands where they live and recreate.

35. Defendant RYAN ZINKE is the Secretary of the Interior. The Conservation and Tribal Citizen Groups sue Secretary Zinke in his official capacity. Secretary Zinke oversees the development of energy, including natural resource extraction, on federal and tribal leases. Secretary Zinke is ultimately responsible for BLM's Amendment.

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36. Defendant BUREAU OF LAND MANAGEMENT is an agency of the United States within the Department of the Interior. BLM is responsible for managing publicly-owned lands and minerals, in accordance with federal law. BLM promulgated the Waste Prevention Rule, and later promulgated the Amendment.

37. Defendant U.S. DEPARTMENT OF THE INTERIOR is an executive branch department that oversees BLM, and is thus ultimately responsible for BLM's Amendment.

LEGAL FRAMEWORK

I. Mineral Leasing Act and Indian Mineral Leasing Act

38. Under the MLA, the Secretary of the Interior must ensure that when oil and gas companies are permitted to develop publicly-owned natural resources, they "use all reasonable precautions to prevent waste of oil or gas." 30 U.S.C. § 225.

39. The MLA also requires that leases include provisions to ensure "the exercise of reasonable diligence, skill, and care in the operation of said property," that "such rules . . . for the prevention of waste as may be prescribed by [the] Secretary shall be observed," and such other provisions as are necessary "for the protection of the interests of the United States," and for "the safeguarding of the public welfare." *Id.* § 187.

40. The Secretary of the Interior also is "authorized to prescribe necessary and proper rules and regulations and to do any and all things necessary to carry out and accomplish the purposes of [the MLA]." 30 U.S.C. § 189.

41. BLM regulates tribal minerals pursuant to the Indian Mineral Leasing Act (IMLA), which provides that "[a]ll operations under any oil, gas, or other mineral lease" issued pursuant to the IMLA or other related statutes "shall be subject to the rules and regulations promulgated by the Secretary of the Interior." 25 U.S.C. § 396d.

II. Federal Land Policy and Management Act

42. FLPMA directs BLM to manage the public lands "in a manner that will protect the quality of the . . . scenic . . . environmental, [and] air and atmospheric . . . values." 43 U.S.C. § 1701(a)(8).

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43. FLPMA further provides that BLM "shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the [public] lands." *Id.* § 1732(b).

44. FLPMA requires that "[t]he Secretary shall manage the public lands under the principles of multiple use and sustained yield." *Id.* § 1732(a). "Multiple use" is defined as "management of the public lands . . . that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation . . . minerals . . . and natural, scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily the combination of uses that will give the greatest economic return or the greatest unit output." *Id.* § 1702(c).

III. National Environmental Policy Act

45. Prior to undertaking any "major Federal action[] significantly affecting the quality of the human environment," NEPA requires federal agencies to provide a "detailed statement" explaining "the environmental impact of the proposed action . . . alternatives to the proposed action, . . . and any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." 42 U.S.C. § 4332(2)(C)(i), (iii), (v). Agencies must "integrate the NEPA process with other planning at the earliest possible time." 40 C.F.R. § 1501.2.

46. NEPA analyses are intended "to foster excellent action" and "to help public officials make decisions that are based on [an] understanding of environmental consequences, and take actions that protect, restore, and enhance the environment." *Id.*

47. To determine if preparing an environmental impact statement (EIS) is necessary, Council on Environmental Quality (CEQ) regulations implementing NEPA allow agencies to prepare an environmental assessment (EA) with "sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact." 40 C.F.R. § 1508.9. Department of the Interior regulations include a similar requirement. *See* 43 C.F.R. § 46.300.

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48. Relevant factors in determining whether an EIS is necessary include "consideration of both context and intensity." 40 C.F.R. § 1508.27. Factors relevant to "intensity" include "[t]he degree to which the proposed action affects public health or safety," "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial," and "[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts." *Id.* § 1508.27(b)(2), (4), (7).

49. Regardless of whether agencies choose to prepare an EIS or EA, they must "[r]igorously explore and objectively evaluate all reasonable alternatives." *Id.* § 1502.14(a). In mandating the comparative analysis of reasonable alternatives, agencies are able to "sharply defin[e] the issues and provid[e] a clear basis for choice among options by the decisionmaker and the public." *Id.* § 1502.14. CEQ regulations implementing NEPA identify the alternatives analysis as the "heart" of a NEPA document. *Id.* § 1502.14.

50. An EIS or EA must take a hard look at the direct, indirect, and cumulative impacts of each reasonable alternative. *Id.* §§ 1502.16(a), (b), 1508.7, 1508.8, 1508.25(c). Direct impacts are those impacts "caused by the action and [that] occur at the same time and place." *Id.* § 1508.8. Indirect impacts are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." *Id.* Cumulative impacts are "the impact[s] on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." *Id.* § 1508.7.

51. "Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." *Id.* § 1502.24. An agency's environmental analysis must be based on "high quality" information, "[a]ccurate scientific analysis," and "expert agency comments." *Id.* § 1500.1(b).

IV. Administrative Procedure Act

52. The APA requires agencies to provide the public with notice before they adopt, amend, or repeal a regulation. 5 U.S.C. § 553(b). The notice shall include "reference to the legal

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authority under which the rule is proposed; and either the terms or substance of the proposed rule." *Id.* Agencies must also solicit comments, "giv[ing] interested persons an opportunity to participate in the rule making through submission of written data, views, or arguments." *Id.* § 553(c). After consideration of the comments, "the agency shall incorporate in the rules adopted a concise general statement of their basis and purpose." *Id.*

53. The APA also authorizes judicial review of agency actions and provides that courts "shall . . . hold unlawful and set aside agency action, findings, and conclusions found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law . . . in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; . . . [or] without observance of procedure required by law." *Id.* § 706(2)(A), (C), (D).

54. As a component of judicial review, "to prevent irreparable injury, the reviewing court . . . may issue all necessary and appropriate process to postpone the effective date of an agency action or to preserve status or rights pending conclusion of the review proceedings." *Id.* § 705.

FACTUAL BACKGROUND

I. BLM Develops the Waste Prevention Rule

55. BLM adopted the Waste Prevention Rule pursuant to its authority under the MLA, FLPMA, and other statutes to address wasteful venting, flaring, and leaking of natural gas from oil and gas leases developing federal or tribal minerals.

56. BLM has long regulated venting and flaring of publicly owned natural gas produced from federal leases, and determined when operators must pay the federal government royalties for wasted gas. *See* Notice To Lessees and Operators of Onshore Federal and Indian Oil and Gas Leases (NTL-4A), 44 Fed. Reg. 76,600 (Dec. 27, 1979). When BLM promulgated the Waste Prevention Rule in 2016, it replaced NTL-4A. This was the first update of its standards for venting and flaring publicly-owned natural gas since NTL-4A was issued in 1979. BLM determined that it was necessary to update NTL-4A because it did not reflect modern technologies and practices, was subject to inconsistent application, and was not effective in minimizing waste and lost royalties.

57. BLM also adopted the Rule in response to recommendations from several oversight reviews, including reviews by the Office of the Inspector General of the Department of the Interior

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and the Government Accountability Office (GAO). An October 2010 report by the GAO raised concerns about waste of public resources and the inadequacies of BLM's existing requirements. The GAO specifically recommended that BLM update its regulations to take advantage of opportunities to capture additional recoverable natural gas using available technologies.

58. BLM estimates that federal oil and gas lessees vented or flared more than 462 bcf of natural gas on public and tribal lands between 2009 and 2015. This figure does not include natural gas that leaked from various pieces of drilling, storage, and processing equipment. As a result of this waste, states, tribes, and federal taxpayers lost millions of dollars annually in royalty revenues. These revenues otherwise would have been available to fund schools, health care, and infrastructure.

59. In 2014 BLM commenced the rulemaking process for the Waste Prevention Rule. BLM solicited extensive stakeholder feedback through public forums held in communities across the country. BLM issued a proposed rule, incorporating this feedback, in early 2016. BLM again held public hearings, as well as tribal outreach sessions, at locations around the country. The agency received more than 330,000 public comments. BLM finalized the Waste Prevention Rule on November 18, 2016. The Rule's effective date was January 17, 2017.

60. BLM determined that the Rule's requirements were reasonable and cost-effective measures to minimize waste. The Rule requires operators to capture and sell natural gas that would otherwise be vented or flared by establishing a phased-in capture target that tightens from 85% in January 2018 to 98% by 2026. The Rule also sets specific performance standards to reduce waste from some types of equipment, including storage tanks and pneumatic controllers. The Rule further requires operators to periodically inspect their facilities for leaks, and to promptly repair any leaks identified. The Rule includes exemptions if compliance would cause operators to abandon development of significant oil or gas resources.

61. Operators were required to comply with some of the Rule's requirements, such as the requirement to submit unenforceable waste minimization plans with applications for permits to drill, starting on January 17, 2017. For other requirements provisions, BLM set an initial compliance deadline of January 17, 2018, one year after the Rule's effective date.

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62. BLM estimates that the Rule would reduce wasteful venting and methane emissions by 35% and wasteful flaring by 49%. BLM also estimates that the Rule would increase royalties by up to $14 million per year.

63. BLM also found that the Rule would significantly benefit local communities, public health, and the environment. For example, BLM found that the Rule would reduce the visual and noise impacts associated with flaring. BLM further found that the Rule would protect communities from smog and carcinogenic air toxic emissions, and reduce greenhouse gas emissions. BLM estimated that the Rule would reduce emissions of methane by 175,000 to 180,000 tons per year (tpy), volatile organic compounds by 250,000 to 267,300 tpy, and hazardous air pollutants by 1,859 to 2,031 tpy.

64. In accordance with Executive Order 12,866, BLM prepared a regulatory impact analysis (RIA) that examined the costs and benefits of the Rule. Overall, BLM concluded that the Waste Prevention Rule's benefits outweighed its costs "by a significant margin" with "net benefits ranging from $46 million to $199 million per year." 81 Fed. Reg. at 83,014.

65. BLM also evaluated the cost of the Rule on small businesses. It determined that the average annual compliance costs would range from about $44,600 to $65,800 for each company. Based on the midpoint average of $55,200, BLM estimated that compliance costs would constitute approximately 0.15% of per company profits. Based on this analysis, BLM concluded that the Rule was not expected to impact investment decisions or employment in the oil and gas industry.

66. Part of BLM's net benefits calculation was based on the social cost of methane. BLM relied upon an estimate of the social cost of methane that was published in peer-reviewed literature and approved for use by an inter-agency working group, made up of representatives of 12 agencies, including the Department of the Interior and the White House Office of Management and Budget. This social cost of methane estimate was based on a closely related social cost estimate for carbon dioxide developed by the interagency working group in 2010, which has been subject to extensive public comment and peer review, including review by the National Academy of Sciences. In the preamble to the Waste Prevention Rule, BLM discussed the limitations of the social cost of methane

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metric, but nevertheless concluded that it represents the best available information about the social benefits of methane reductions to be used in a cost-benefit analysis.

II. The New Presidential Administration Decides to Revise or Rescind the Rule and Unsuccessfully Attempts to Alleviate Compliance Obligations.

67. The Western Energy Alliance (WEA), other industry groups, and the states of North Dakota, Wyoming, and Montana challenged the Waste Prevention Rule in the District of Wyoming. The district court denied their request for a preliminary injunction, and the Waste Prevention Rule went into effect on January 17, 2017.

68. WEA, the American Petroleum Institute (API) and other industry groups, as well as some states, also lobbied members of Congress to repeal the Rule using the Congressional Review Act (CRA).

69. While still a member of the U.S. House of Representatives, Secretary Zinke voted in favor of repealing the Waste Prevention Rule through the CRA. Once he became the Secretary of the Interior, Secretary Zinke lobbied Congress to repeal the Rule. When asked about the Waste Prevention Rule by a reporter, Secretary Zinke characterized it as "duplicative and unnecessary." He later answered "yes" when asked by a Senate committee if he supported congressional efforts to repeal the Rule through the CRA.

70. However, a majority of Senators voted against the motion to proceed to debate on the CRA resolution on May 10, 2017. On May 11, 2017, the window for expedited consideration under the CRA expired.

71. Prior to the Senate vote, on March 28, 2017, President Trump issued Executive Order No. 13,783, directing the Secretary of the Interior to consider revising or rescinding the Waste Prevention Rule. Exec. Order No. 13,783, Promoting Energy Independence and Economic Growth, at § 7(b)(iv), 82 Fed. Reg. 16,093, 16,093 (Mar. 28, 2017).

72. The next day, Secretary Zinke issued Secretarial Order No. 3349 directing the BLM Director to review the Rule and report to the Assistant Secretary of Land and Minerals Management within 21 days on whether the Rule is fully consistent with the policies set forth in Executive Order

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No. 13,783. Secretary of the Interior, Order No. 3349, American Energy Independence, at § 5(c)(ii) (Mar. 29, 2017).

73. On April 4, 2017, WEA sent a written request to Secretary Zinke, asking BLM to suspend the Waste Prevention Rule during the ongoing administrative review of the Rule.

74. On May 16, 2017, API also sent a letter requesting that BLM postpone the Rule's compliance dates.

75. BLM's Acting Director completed the 21-day report required by the Secretarial Order. A copy of that report has not been made public. BLM has failed to release copies of the 21-day report in response to multiple requests under the Freedom of Information Act submitted by the Conservation and Tribal Citizen Groups.

76. BLM then developed a "three-step plan" to propose to revise or rescind the Waste Prevention Rule and prevent any costs associated with compliance with the Rule in the interim.

77. BLM took the first step on June 15, 2017 when, without notice or an opportunity for public comment, BLM issued a notice under 5 U.S.C. § 705 staying all sections of the Rule with compliance dates one year or more after the Rule's effective date. 82 Fed. Reg. 27,430 (June 15, 2017). BLM stayed the Rule in response to WEA's and API's claims that the Rule was too costly. BLM also concluded a stay was necessary because of the uncertain future of the requirements due to the administration's decision to reconsider the Rule.

78. The Conservation and Tribal Citizen Groups, as well as the States of California and New Mexico, filed suit against BLM's stay in the Northern District of California. BLM moved to transfer venue to the District of Wyoming. This Court denied that motion, holding that the Northern District of California had a significant interest in the litigation as a result of the millions of acres of BLM-managed lands and minerals in the state. Order Denying Defs.' Mot. to Transfer at 4, 7, *California v. BLM*, Nos. 17-cv-3804-EDL (Sept. 7, 2017), ECF No. 73. The Court also held that the Conservation and Tribal Citizen groups have close ties to California sufficient to support venue. *Id.* at 4.

79. This Court later granted the Conservation and Tribal Citizen Groups' and the states' motions for summary judgment, declared that BLM's purported attempt to stay the Rule's

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compliance dates violated the APA, vacated the stay, and ordered BLM to reinstate the Rule in its entirety. *California v. BLM*, Nos. 17-cv-3804-EDL & 17-cv-3885-EDL, 2017 WL 4416409, at *14 (Oct. 4, 2017).

80. The Court explained that "[t]he retraction of a duly-promulgated regulation requires compliance with the APA's notice-and-comment procedures." *Id.* at *9. It further explained that "the policy underlying the statutory requirement of notice-and-comment is equally applicable to the repeal of regulations as to their adoption." *Id.* at *10.

81. The Court further held that BLM "entirely failed to consider the benefits of the Rule, such as decreased resource waste, air pollution, and enhanced public revenues." *Id.* at *11. It reasoned that "[w]ithout considering both the costs and the benefits of postponement of the compliance dates, the Bureau's decision failed to take this 'important aspect' of the problem into account and was therefore arbitrary." *Id.*

82. As a result of this Court's Order, the Waste Prevention Rule was in effect until BLM finalized the Amendment.

III. BLM Proposes and Finalizes the Amendment.

83. One day after the Court reinstated the Rule, BLM took the second step of its three-step plan, proposing a rule to amend most of the Rule's compliance deadlines by extending them for a year. 82 Fed. Reg. 46,458 (Oct. 5, 2017). BLM proposed the one-year extension to allow sufficient time for the agency to further revise or rescind the Rule.

84. After issuing the proposal, BLM publicly represented that it *would* modify the Rule's compliance dates. BLM informed the Wyoming district court that it planned to finalize the Amendment by December 8, 2017 and that its final action would alleviate the Petitioners' concerns about compliance with the Rule. BLM also informed the court that it was working on a second rulemaking to revise or rescind the Waste Prevention Rule, which would obviate the need to proceed with the merits.

85. BLM solicited public comment on its proposal for just 30 days. This was much shorter than the 74-day comment period on the Waste Prevention Rule. BLM did not hold any public hearings, as it had when developing the Waste Prevention Rule. Although BLM received

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numerous requests to extend the public comment period and hold public hearings, BLM refused to do so.

86. The sum total of BLM's stakeholder outreach involved two letters and a follow-up call to tribal governments.

87. BLM received over 158,000 public comments on the Amendment, including approximately 750 unique comments. The Conservation and Tribal Citizen Groups submitted extensive comments objecting to the Amendment.

88. BLM finalized the Amendment on December 8, 2017.

89. The Amendment will take effect on January 8, 2017. Despite having stated in its proposal that the Amendment is a major rule (and would therefore could not take effect until February 8, 2017), in its final Rule BLM states that the Amendment is *not* a major rule. BLM provides no explanation for this change.

90. The Amendment modifies the Waste Prevention Rule by suspending until January 17, 2019 the obligation to comply with requirements of the Rule that have been in place since January 17, 2017, such as the requirement to prepare a waste management plan prior to drilling. The Amendment also revises the Waste Prevention Rule by delaying for a year the provisions of the Rule with compliance deadlines on or after January 18, 2017. BLM states that the Amendment suspends or delays all the requirements that "generate benefits of gas savings or reductions in methane emissions." 82 Fed. Reg. at 58,051.

91. BLM prepared an RIA for the Amendment. The RIA estimates that the Amendment will lead to decreased natural gas production of around 9.0 billion cubic feet during the year it is in place. This gas would have been captured and put to use under the Waste Prevention Rule. BLM estimates that the Amendment will lead to a corresponding reduction in royalties of $2.61 million.

92. BLM projects additional emissions of 175,000 tons of methane and 250,000 tons of volatile organic compounds during the year of the Amendment. These methane emissions are the climate equivalent of adding 3,000,000 passenger vehicles to the road during that time (at the 20-year global warming potential).

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93. BLM states that the Amendment is authorized under its authority to revise its existing regulations. At the same time, BLM claims that the Amendment does not substantively change the Waste Prevention Rule. BLM provides no explanation for how the Amendment is consistent with its statutory mandates under the MLA, FLPMA, or other statutes.

94. The Waste Prevention Rule replaced BLM's existing waste prevention regulations found in NTL-4A. The Amendment neither reinstates NTL-4A nor analyzes or provides any interim regulations or guidance to prevent waste. But BLM's Amendment RIA erroneously assumes that the suspension will result in a return to NTL-4A and thereby underestimates the waste of natural gas, lost royalties and social harms that will occur under the Amendment.

95. BLM points to other federal, tribal, and state regulations that limit waste. In the Waste Prevention Rule, however, BLM determined that these existing regulations were not sufficient to adequately limit waste. BLM offers no explanation for its change in position. BLM also does not discuss the impact of EPA's similar proposal to suspend its regulations in anticipation of later revising or rescinding them.

96. BLM states that the purpose of the Amendment is to avoid imposing compliance costs on operators for provisions that may be revised or rescinded in the future. BLM also expresses its desire to avoid expending agency resources implementing the Rule.

97. BLM concedes that the Amendment is a direct outgrowth of President Trump's direction in Executive Order 13,783 to consider whether it is appropriate to rescind or revise the Waste Prevention Rule. BLM claims that its initial review of the Waste Prevention Rule found that "some provisions of the 2016 final rule add considerable regulatory burdens that unnecessarily encumber energy production, constrain economic growth and prevent job creation." 82 Fed. Reg. at 58,050. BLM offers no evidence in support of this conclusion, which conflicts with its prior position that compliance costs are modest and unlikely to significantly affect even the smallest companies or affect employment in the industry.

98. Although BLM did not identify any specific burdens to industry in the proposed rule, in the final Amendment BLM states, without support, that there is "newfound concern" that the Waste Prevention Rule's requirements would pose a burden to operators of marginal or low-

producing wells. This conflicts with BLM's prior position that the Rule reasonably accounted for marginal or low-producing wells.

99. Nor does the agency explain how its conclusions regarding the burdens to industry are consistent with its own findings in the Amendment RIA. Indeed, BLM determines that the Amendment will have no significant economic benefit for even the smallest companies. The Amendment RIA concludes that the average reduction in compliance costs associated with the Amendment would be a small fraction of a percent (0.17%) of the profit margin for small companies. Based on this analysis, BLM concludes that a one-year suspension would not substantially alter the investment or employment decisions of firms.

100. BLM also fails to explain how its decision to amend the compliance deadlines is consistent with its stated goal of not substantially burdening the industry, or its previous analysis finding that several of the Waste Prevention Rule requirements would pay for themselves through cost savings. For example, in the Waste Prevention Rule RIA, BLM estimated that the pneumatic controller requirement would pay for itself, imposing costs of about $2 million per year while generating cost savings from product recovery of $3 to $4 million per year. Likewise, BLM had estimated that the liquids unloading provisions would impose costs of about $6 million per year and would generate cost savings of $5 to $9 million per year. BLM did not explain in the Amendment RIA why or how it changed its estimates of cost savings associated with the Waste Prevention Rule from those in the Waste Prevention Rule RIA. BLM acknowledged in the Amendment RIA that the capture target requirements would entail no compliance costs during the year of the Compliance Revision, yet proceeded to suspend those requirements anyway.

101. In the Amendment RIA, BLM uses a new estimate of the social cost of methane that diverges from the one approved by the interagency working group and used to evaluate the Waste Prevention Rule. The estimate used to evaluate the Waste Prevention Rule is based on peer-reviewed literature and analyses that have undergone extensive public comment and external review. The estimate used to evaluate the Amendment has undergone no such review. Indeed, the Amendment is the first time the federal government has relied on this estimate in a rulemaking.

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BLM states that the new estimate is an "interim" value to be used until additional estimates can be developed.

102. BLM made two "interim" changes to the federal government's prior standardized estimates of the social cost of methane. First, BLM reduced the cost estimate to attempt to exclude all harms from climate change that occur outside of the United States. The National Academies and the interagency working group have concluded that no good methodologies for excluding non-domestic harms exist. Second, BLM reduced the apparent benefits of the Rule still further by discounting them at a much higher rate than in the Waste Prevention Rule. This change is contrary to expert consensus and OMB guidance on discounting for policies with long-term, intergenerational benefits.

103. The two "interim" changes that BLM made to the estimates of the social cost of methane eliminate 95% or 87% (depending on the discount rate used) of the estimated cost of the harm from climate change associated from one ton of methane as compared to the social cost of methane that BLM used in the Waste Prevention Rule.

104. The RIA also assumes that the costs and benefits of the Rule will be shifted one year into the future. But the purpose of the Amendment is to relieve operators from compliance obligations while BLM completes the process of revising or rescinding the Rule. By assuming the Waste Prevention Rule will go into effect a year later when that is not BLM's plan, BLM underestimates the impacts of the Amendment.

105. BLM's EA analyzed only two alternatives: a no action alternative and the chosen alternative of suspending the Waste Prevention Rule. BLM did not analyze other reasonable alternatives proposed by members of the public in their comments on the proposed rule. For example, BLM did not analyze the alternative of suspending oil and gas leasing and permitting activities for the duration of the Amendment.

106. BLM committed to its chosen alternative—suspending the Waste Prevention Rule—before completing the draft EA. BLM committed to its chosen alternative before it reviewed public comments.

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107. BLM chose to complete an EA for the Amendment, rather than an Environmental Impact Statement (EIS). It explained its decision in a Finding of No Significant Impact (FONSI).

108. BLM recognizes that the impacts of the action are national in scope, but would primarily be felt in the West. BLM states that the temporary nature of the Amendment mitigates against a finding of significance. In the FONSI, BLM assumes that at the end of the year the Amendment is in place, the requirements of the Waste Prevention Rule will come back into effect. At the same time, BLM acknowledges in the FONSI that the purpose of the Amendment is to ensure operators do not have to comply with the Waste Prevention Rule while BLM considers revising or rescinding the Rule. In the Amendment, BLM indicates that it chose to suspend compliance for one year because that would provide sufficient time for BLM to finalize its revision or rescission.

109. The FONSI does not discuss the significant controversy associated with BLM's "interim" social cost of methane estimate or concerns raised in comments that it dramatically underestimates the harm from the Amendment.

110. In the EA, BLM projects additional emissions of 175,000 tons of methane, 250,000 tons of volatile organic compounds, and 1,860 tons of hazardous air pollutants during the year of the Amendment. Although the EA quantified these increased emissions, BLM did not analyze how those increased emissions would impact human health and the environment. In the FONSI, BLM discounted the significance of these impacts by arguing that they would occur largely in sparsely populated areas.

111. BLM has previously completed EISs for oil and gas development projects with much lower methane, volatile organic compound, and hazardous air pollutant emissions. Despite the Amendment's significant air quality and climate impacts on public health, BLM did not complete an EIS.

112. In the EA, BLM did not analyze how increased flaring will negatively impact people who live and/or recreate on or near lands managed by BLM.

113. BLM did not analyze the environmental justice concerns that result from increased flaring and air pollution, including disproportionate impacts on tribal communities.

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114. In the EA, BLM acknowledges that EPA recently proposed to delay portions of new source performance standards for the oil and gas sector. EPA is also considering whether to revise or rescind those standards. BLM did not analyze the cumulative impacts of the Amendment and EPA's potential suspension, revision, or rescission of its new source performance standards for the oil and gas sector.

115. BLM has yet to take the third step of its "three-step plan," proposing a rule to revise or rescind the Waste Prevention Rule. But it has promised that it will use the period during which the Waste Prevention Rule's obligations are lifted in order to issue such a proposal. The EA does not analyze the impacts of completely repealing or partially rescinding the Waste Prevention Rule. BLM also did not analyze the cumulative impacts of the Amendment and any potential future action to revise or rescind the Waste Prevention Rule.

FIRST CLAIM FOR RELIEF

(*Failure to Take Reasonable Precautions to Prevent Waste: Violation of the MLA and APA*)

116. The allegations in paragraphs 1–115 are incorporated herein by reference.

117. Under the MLA, BLM has a duty to ensure that oil and gas companies developing publicly-owned natural resources "use all reasonable precautions to prevent waste of oil or gas." 30 U.S.C. § 225. Likewise, the MLA requires that each federal lease "shall contain provisions . . . for the prevention of undue waste." *Id.* § 187.

118. BLM adopted the Waste Prevention Rule to fulfill its legal mandates under the MLA. Consistent with its statutory duties, BLM determined that the Waste Prevention Rule's requirements constituted "reasonable precautions to prevent waste of oil or gas" and would "prevent undue waste."

119. BLM's Amendment removes the obligation to implement these "reasonable precautions to prevent waste of oil or gas" for one year. BLM has not explained how a one-year suspension of the Rule constitutes all reasonable precautions to prevent waste.

120. The Amendment does not even reinstate NTL-4A, which BLM found was inadequate. Instead, BLM relies on other state or federal laws and regulations to fill the regulatory void created by BLM's Amendment. However, BLM can neither delegate nor abdicate its distinct, independent

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MLA obligations to prevent waste to states or other agencies. Moreover, BLM does not analyze or explain how those regulations are sufficient to meet its independent mandate. In fact, BLM previously determined that they were insufficient.

121. BLM's suspension or delay of reasonable precautions to prevent waste and failure to have any rules in place to prevent waste violates the MLA, 30 U.S.C. §§ 187, 225, and is not in accordance with law in violation of the APA, 5 U.S.C. § 706(2)(A). At a minimum, BLM's failure to address its statutory mandate to prevent waste is arbitrary and capricious in violation of the APA. 5 U.S.C. § 706(2)(A).

122. BLM's reliance on the existing laws and regulations of other state or federal agencies as sufficient also represents an arbitrary and capricious change in position without adequate explanation or support in the administrative record in violation of the APA. 5 U.S.C. § 706(2)(A).

SECOND CLAIM FOR RELIEF

(Arbitrary Revision of the Waste Prevention Rule: Violation of the APA)

123. The allegations in paragraphs 1–115 are incorporated herein by reference.

124. BLM's Amendment changes the compliance dates of a duly promulgated regulation and therefore amounts to a substantive revision of the Waste Prevention Rule. But BLM has not gone through the proper procedure to make a substantive revision, including (1) demonstrating that the new approach is permissible under the governing statutes, (2) showing there are "good reasons" for changing the rule, and (3) offering a "reasoned explanation" for its changed position. *FCC v. Fox Television Stations, Inc.* 556 U.S. 502, 514–16 (2009).

125. BLM fails to explain how the Amendment is consistent with its statutory duties to prevent waste under the MLA, 30 U.S.C. §§ 187, 225, to protect the interests of the United States and the public welfare under the MLA, *id.* § 187, and to manage the public lands "in a manner that will protect the quality of the . . . scenic . . . environmental, [and] air and atmospheric . . . values" and "prevent unnecessary or undue degradation" under FLPMA, 43 U.S.C. §§ 1701(a)(8), 1732(b).

126. BLM fails to offer a reasoned explanation for its claim that the Rule's provisions "add considerable regulatory burdens that unnecessarily encumber energy production, constrain economic growth and prevent job creation," which conflicts with its prior conclusions and evidence in the

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record. Even accepting BLM's stated purpose for the Amendment, BLM fails to provide good reasons for suspending requirements that have no compliance costs during the year of the Amendment or pay for themselves, or explain its changed positions with respect to these issues.

127. BLM also fails to offer good reasons for relying on a new "interim" estimate of the social cost of methane that relies on methodologies that are unsupported in the record and contrary to expert consensus.

128. In adopting the Amendment, BLM omits consideration of relevant factors and data, relies on factors which Congress did not intend the agency to consider, and offers rationales that are unsupported or run counter to the evidence in the administrative record, lack a rational basis, represent unexplained and unsupported changes in position, and are otherwise arbitrary and capricious in violation of the APA. 5 U.S.C. § 706(2)(A).

THIRD CLAIM FOR RELIEF

(*Ultra Vires Action: Exceeding Authority of MLA and APA*)

129. The allegations in paragraphs 1–115 are incorporated herein by reference.

130. To the extent that BLM claims it has authority to suspend compliance with a final rule while it considers further changes to the rule, neither the MLA, the APA, nor any other statutory provision provide BLM with such authority.

131. BLM also does not have inherent authority to suspend compliance with a final rule while it considers changes to the rule.

132. BLM's attempt to suspend compliance with the Waste Prevention Rule while it considers revising or rescinding it exceeds its statutory authority in violation of the APA. 5 U.S.C. § 706(2)(A), (C).

FOURTH CLAIM FOR RELIEF

(*Failure to Provide for Meaningful Public Comment: Violation of the APA*)

133. The allegations in paragraphs 1–115 are incorporated herein by reference.

134. The APA requires agencies to engage in a public, notice-and-comment rulemaking process prior to adopting, amending, or repealing a regulation. 5 U.S.C. § 553. This process is designed to "give interested persons an opportunity to participate in the rule making through

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submission of written data, views, or arguments." *Id.* § 553(c). The purpose of § 553 is to allow for meaningful public comment.

135. By inappropriately treating the Rule as a non-substantive revision, BLM failed to put forward any analysis of why the Rule is permissible under the MLA or other statutory authorities, or the factual basis supporting the revisions to specific provisions. BLM's failure to do so precluded meaningful comment on BLM's proposal, including the substantive legal and factual reasons to retain the existing compliance deadlines.

136. In its response to comments, BLM further deemed any comments about the merits of the Waste Prevention Rule or its requirements "beyond the scope of this rulemaking," disregarding comments that were directly relevant to its substantive revision of the Rule.

137. BLM failed to keep an open mind during the notice and comment process and instead committed to revising the compliance deadlines in the Rule before taking public comment, rendering the public comment period meaningless. Indeed, BLM failed to make any significant changes to the final rule in response to public comments.

138. BLM's rushed process also precluded meaningful public comment. For example, BLM failed to provide adequate time to comment on its proposal, did not provide for any public hearing, and the extent of its consultation with tribes was two letters informing the tribes of this action. This was all despite the fact that BLM's proposal constituted a significant reversal of its prior positions. For example, BLM fundamentally changed the way it evaluates and monetizes the harm caused by methane emissions by relying on a novel and unsupported "interim" social cost of methane rather than the peer-reviewed social cost of methane developed through multi-year inter-agency effort. BLM's rush to get the final Amendment out the door also led to perfunctory—rather than searching or careful—consideration of public comments.

139. BLM's decision to suspend or delay provision of the Waste Prevention Rule without providing a meaningful opportunity for public comment violates § 553 and is arbitrary and capricious, an abuse of discretion, not in accordance with law, and without observance of procedure required by law in violation of the APA. 5 U.S.C. § 706(2)(A), (D).

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FIFTH CLAIM FOR RELIEF

(Violation of NEPA)

140. The allegations in paragraphs 1–115 are incorporated herein by reference.

141. NEPA requires agencies to take a "hard look" at the environmental impacts of proposed actions *before* the agency makes a decision or takes action to implement it. 42 U.S.C. § 4332; 40 C.F.R. §§ 1500.1, 1508.9. Agencies must consider the direct, indirect, and cumulative impacts of their actions. *Id.* §§ 1502.15, 1508.7, 1508.8, 1508.25(c).

142. NEPA requires federal agencies to analyze "alternatives to the proposed action." 42 U.S.C. § 4332(2)(C)(iii); *see also id.* § 4332(2)(E). Agencies must "[r]igorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 1502.16.

143. NEPA requires federal agencies to prepare an environmental impact statement (EIS) for all "major Federal actions significantly affecting the environment." *Id.* § 4332(2)(C); 40 C.F.R. § 1501.4. To determine whether an action has significant environmental impacts, an agency must consider, among other factors, "[t]he degree to which the proposed action affects public health or safety," "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial," and "whether the action is related to other actions with individually insignificant but cumulative significant impacts." 40 C.F.R. § 1508.27. These factors must be assessed relative to both their "context" and "intensity." *Id.* § 1508.27(a), (b).

144. An agency's environmental analysis must be based on "high quality" information, "[a]ccurate scientific analysis," and "expert agency comments." 40 C.F.R. § 1500.1(b). "Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." 40 C.F.R. § 1502.24.

145. An agency may only forgo preparation of an EIS and rely on an Environmental Assessment (EA) if it issues a Finding of No Significant Impact (FONSI) that supplies a convincing statement of reasons explaining why a proposed action's impacts are insignificant.

146. BLM failed to consider a reasonable range of alternatives, including the alternative of suspending or deferring oil and gas leasing and permitting for the duration of the Amendment as a mechanism to prevent waste. BLM failed to provide any explanation for rejecting this alternative.

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147. BLM failed to take a hard look at the direct, indirect, and cumulative impacts of the Amendment, including the negative impacts of increased air pollution on public health, the negative impacts of increased flaring, and the climate impacts of increasing methane emissions. BLM also failed to take a look at the disproportionate impacts of such impacts on tribal communities.

148. BLM's reliance on the "interim" social cost of methane lacks professional and scientific integrity, is not based on high quality information, ignores information from expert agencies, and underscores the significance, in particular the highly controversial nature, of its proposed action.

149. BLM failed to prepare an EIS despite the context and intensity of its proposed action and despite the extensive negative public health impacts, the high degree of controversy, and the cumulative impacts of the Amendment render it a "significant" action. Accordingly, BLM failed to provide a convincing statement of reasons justifying its decision to forgo preparation of an EIS.

150. For these reasons, BLM's decision to finalize the Amendment violates NEPA and is arbitrary, capricious, an abuse of discretion, otherwise not in accordance with law, and without observance of procedure required by law. 5 U.S.C. § 706(2)(A), (D).

PRAYER FOR RELIEF

Plaintiffs respectfully request that this Court:

1. Issue a declaratory judgment that BLM violated the MLA FLPMA, NEPA, and acted arbitrarily, capriciously, contrary to law, and in excess of statutory authority, and failed to follow the procedure required by the APA by suspending and delaying the Waste Prevention Rule's compliance dates;

2. Vacate the Amendment and reinstate the Waste Prevention Rule in its entirety;

3. Award the Conservation and Tribal Citizen Groups their costs, expenses, and reasonable attorney fees; and

4. Provide such other relief as the Court deems just and proper.

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Respectfully submitted this 19th day of December, 2017,

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Appointment

From: Google Calendar [calendar-notification@google.com]
Sent: 7/9/2018 2:52:13 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]

Subject: Declined: check in Ex. 6 Personal Privacy @ Tue Jul 10, 2018 9:45am - 10:30am (PDT) (Hambrick, Amy)
Attachments: invite.ics
Location: Ex. 6 Personal Privacy

Start: 7/10/2018 4:45:00 PM
End: 7/10/2018 5:30:00 PM
Show Time As: Tentative

Recurrence: (none)

jtichenor@blm.gov has declined this invitation.

check in Ex. 6 Personal Privacy

When Tue Jul 10, 2018 9:45am – 10:30am Pacific Time

Where Ex. 6 Personal Privacy

Calendar Hambrick, Amy

Who
- Hambrick, Amy - organizer
- jtichenor@blm.gov - creator
- Hoffmann, Jucilene
- Marsh, Karen
- Weitz, Melissa
- Miller, Elizabeth

EPA/BLM monthly check in

Invitation from Google Calendar

You are receiving this courtesy email at the account hambrick.amy@epa.gov because you are an attendee of this event.

To stop receiving future updates for this event, decline this event. Alternatively you can sign up for a Google account at https://www.google.com/calendar/ and control your notification settings for your entire calendar.

Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More.

Appointment

From: jtichenor@blm.gov [jtichenor@blm.gov]
To: Hambrick, Amy [hambrick.amy@epa.gov]; jtichenor@blm.gov

Subject: check in Ex. 6 Personal Privacy
Location: Ex. 6 Personal Privacy

Start: 7/10/2018 4:45:00 PM
End: 7/10/2018 5:30:00 PM
Show Time As: Tentative

Recurrence: (none)

EPA/BLM monthly check in

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 9/11/2018 5:33:01 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
Subject: Do you have time for a quick chat?

I would call but I can't locate your number...

--
James Tichenor
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Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 8/23/2018 4:46:53 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; christopher.rhymes@sol.doi.gov; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi Amy, All:
Looking at the calendar, I'll need to move our September call (wed, 9/26) to either that Monday or Friday. Is there a time that works for you?

EPA/BLM Call re Regs Ex. 6 Personal Privacy

When Wed Sep 26, 2018 7:30am – 8:30am Pacific Time - Los Angeles

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov
- christopher.rhymes@sol.doi.gov

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 8/21/2018 5:09:00 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; christopher.rhymes@sol.doi.gov; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi All,
I have this on my calendar, just wanted to make sure that we are all on the same page. Let me know if we need to reschedule.

EPA/BLM Call re Regs Ex. 6 Personal Privacy

When Wed Aug 22, 2018 7:30am – 8:30am Pacific Time - Los Angeles

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov
- christopher.rhymes@sol.doi.gov

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 6/26/2018 4:02:04 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi -
Just checking to make sure we're still on for tomorrow. I think we'll have a bunch to talk about. Let me know if you need to reschedule.

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Jun 27, 2018 7:30am – 8:30am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 4/18/2018 2:25:37 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; jabernathy@blm.gov; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/methane-and-waste-prevention-rule

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Apr 18, 2018 7:15am – 8am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- hambrick.amy@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 4/17/2018 8:53:45 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; jabernathy@blm.gov; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: EPA/BLM Call re Regs; **Ex. 6 Personal Privacy**

Hi Melissa, Suzie, Lisa, and Amy:
Justin and I can join tomorrow but only for the first 30 minutes. If you are able to start 15-30 minutes earlier, please let us know.

Thanks, James

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Apr 18, 2018 7:30am – 8:30am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- hambrick.amy@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 10/4/2017 8:26:17 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Fwd: FW: O&G Follow-up: Inventory Data
Attachments: EPA Inventory Emissions 13-14.xlsx

Or this file, if possible. I think this one might be less involved and, at the same time, what were are looking for.

---------- Forwarded message ----------
From: **Tichenor, James** <jtichenor@blm.gov>
Date: Thu, Jul 14, 2016 at 7:37 AM
Subject: Re: FW: O&G Follow-up: Inventory Data
To: "Weitz, Melissa" <Weitz.Melissa@epa.gov>
Cc: "Waltzer, Suzanne" <Waltzer.Suzanne@epa.gov>, Eric C Jones <ejones@blm.gov>

Hi Melissa,

Another quick question about the data (I've attached what you sent this year and last year). 'Gathering and Boosting Stations' appears to be a new source category this year (or maybe a new label). Would the correct crosswalk to 2013 be to consider it as 'Gathering Compressors'? Would it be category 5 or 9 or a new one?

Thanks again for your help!

On Tue, Jul 12, 2016 at 11:41 AM, Tichenor, James <jtichenor@blm.gov> wrote:
Thanks so much for your help!

On Tue, Jul 12, 2016 at 8:16 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I've separated oil and gas in the attached.

We made major updates this year to pneumatic controllers, gathering and other sources, so a lot of the numbers have moved around.

For pneumatics, short story is, the GHGRP data showed more pneumatic controllers per well than our previous data source (the 1990's GRI study), and updating the inventory to use the latest GHGRP data resulted in much higher emissions from that category.

For gathering and boosting, we used one of the EDF-Industry studies to update the activity data (total number of gathering stations nationally) and emissions data. This also resulted in higher emissions.

For more information on the updates, please see the Recalculations Discussion of the GHG Inventory—page 63-65 for oil and pages 74-81 for gas, https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Chapter-3-Energy.pdf, and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_to_Production_Segment%20_Emissions_2016-04-14.pdf and

https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_GB_Station%20Emissions_2016-04-14.pdf for additional information.

Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, July 11, 2016 4:17 PM

To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

Thanks for the data. A couple questions.

For the few rows where the the oil and gas sectors are combined, would it be possible to have them separated? (e.g. rows 3, 4, 6, 8-11) We would like to try to match up as closely as possible to the format that you provided us before, with oil or gas sector and category number.

Second, are the emissions for the pneumatic devices correct? The table you provided shows 139 Bcf of CH4 for 2014, and we had 39 Bcf of CH4 for 2013... Gathering and boosting statiosn also appear to be MUCH higher, 97 Bcf of CH4 in 2014 versus 9 Bcf in 2013?

On Mon, Jul 11, 2016 at 12:53 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Sorry for the delay—here are the numbers. Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, July 07, 2016 10:52 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa,

Yes, so as I understand, this was 2013 emissions for the 1990-2015 GHG Inventory, and would be hoping to get 2014 data for the 1990-2016 Inventory. We we're using it to scale down the emissions per Fed/Ind share of all US production.

So with these categories, though, are you able to provide the volumes in CH4 and raw natural gas? I forget where we landed on this last time.

On Thu, Jul 7, 2016 at 7:45 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Just wanted to confirm that this is that attachment you meant in your email yesterday? I can send you an updated version with the 2014 numbers soon (hopefully tomorrow).

Melissa

From: Weitz, Melissa
Sent: Tuesday, April 21, 2015 1:25 PM
To: Tichenor, James <jtichenor@blm.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: RE: O&G Follow-up: Inventory Data

Hi James,

The net numbers for 2013 are in the attachment. Please let me know if you'd like to discuss.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 20, 2015 4:25 PM
To: Weitz, Melissa
Subject: Re: O&G Follow-up: Inventory Data

On Thu, Mar 26, 2015 at 9:35 AM, Waltzer, Suzanne <Waltzer.Suzanne@epa.gov> wrote:

> Hi
>
> To follow-up from our conversation, attached is a spreadsheet that has the oil and natural gas production methane emissions. The first two tabs are summary net emissions data (in Bcf and tonnes of methane) for the sector as a whole and for oil and gas production based on 2012 data (the 2014 GHG Inventory). The subsequent tabs are more detail on the individual source categories including the emission factors and activity data, etc. The data/information is from the inventory but may include some additional internal comments/notes so please do not share broadly.
>
> We pulled this together from existing information quickly as a starting point. This may not be exactly what you need or if anything is unclear, just let us know. We will also take a take a closer look at the table you provided. It may be helpful to set up a meeting to talk through the data early next week.
>
> Thanks,
>
> Suzie

--

James Tichenor
Economist

Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management

jtichenor@blm.gov

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--

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			Category No.
gas	*Normal Fugitives*	Gas Wells	
gas	*Normal Fugitives*	Associated Gas Wells	9
gas	*Normal Fugitives*	Non-associated Gas Wells (less fractured wells)	9
gas	*Normal Fugitives*	Gas Wells with Hydraulic Fracturing	9
gas	*Normal Fugitives*	Field Separation Equipment	
gas	*Normal Fugitives*	Heaters	9
gas	*Normal Fugitives*	Separators	9
gas	*Normal Fugitives*	Dehydrators	9
gas	*Normal Fugitives*	Meters/Piping	9
gas	*Normal Fugitives*	Gathering Compressors	
gas	*Normal Fugitives*	Small Reciprocating Comp.	3
gas	*Normal Fugitives*	Large Reciprocating Comp.	3
gas	*Normal Fugitives*	Large Reciprocating Stations	9
gas	*Normal Fugitives*	Pipeline Leaks	9
gas	*Vented and Combusted*	Drilling, Well Completion, and Well Workover	
gas	*Vented and Combusted*	Gas Well Completions without Hydraulic Fracturing	1
gas	*Vented and Combusted*	Gas Well Workovers without Hydraulic Fracturing	1
gas	*Vented and Combusted*	Hydraulic Fracturing Completions and Workovers that vent	1
gas	*Vented and Combusted*	Flared Hydraulic Fracturing Completions and Workovers	1
gas	*Vented and Combusted*	Hydraulic Fracturing Completions and Workovers with RECs	1
gas	*Vented and Combusted*	Hydraulic Fracturing Completions and Workovers with RECs that flare	1
gas	*Vented and Combusted*	Well Drilling	9
gas	*Vented and Combusted*	Produced Water from Coal Bed Methane	
gas	*Vented and Combusted*	Powder River	9
gas	*Vented and Combusted*	Black Warrior	9
gas	*Vented and Combusted*	Normal Operations	
gas	*Vented and Combusted*	Pneumatic Device Vents	2
gas	*Vented and Combusted*	Chemical Injection Pumps	3
gas	*Vented and Combusted*	Kimray Pumps	3
gas	*Vented and Combusted*	Dehydrator Vents	9
gas	*Vented and Combusted*	Condensate Tank Vents	
gas	*Vented and Combusted*	Condensate Tanks without Control Devices	7
gas	*Vented and Combusted*	Condensate Tanks with Control Devices	7
gas	*Vented and Combusted*	Compressor Exhaust Vented	
gas	*Vented and Combusted*	Gas Engines	4
gas	*Vented and Combusted*	Well Clean Ups	
gas	*Vented and Combusted*	Well Clean Ups (LP Gas Wells) - Vent Using Plungers	6
gas	*Vented and Combusted*	Well Clean Ups (LP Gas Wells) - Vent Without Using Plungers	6
gas	*Vented and Combusted*	Blowdowns	
gas	*Vented and Combusted*	Vessel BD	9
gas	*Vented and Combusted*	Pipeline BD	9
gas	*Vented and Combusted*	Compressor BD	9
gas	*Vented and Combusted*	Compressor Starts	9
gas	*Vented and Combusted*	Upsets	
gas	*Vented and Combusted*	Pressure Relief Valves	9

gas	*Vented and Combusted*	Mishaps	9
gas	*Offshore*	Shallow water Gas Platforms (GoM and Pacific)	8
gas	*Offshore*	Deepwater Gas Platforms (GoM and Pacific)	8
oil	Vented	Oil Tanks	7
oil	Vented	Pneumatic Devices, All	2
oil	Vented	Chemical Injection Pumps	3
oil	Vented	Vessel Blowdowns	9
oil	Vented	Compressor Blowdowns	9
oil	Vented	Compressor Starts	9
oil	Vented	Stripper wells	9
oil	Vented	Well Completion Venting	1
oil	Vented	Well Workovers	1
oil	Vented	Pipeline Pigging	9
oil	Vented	OCS Offshore Platforms, Shallow water oil, fugitive vented, and combusted	8
oil	Vented	OCS Offshore Platforms, Deep water oil, fugitive, vented, and combusted	8
oil	fugitive	Oil Wellheads (heavy crude)	9
oil	fugitive	Oil Wellheads (light crude)	9
oil	fugitive	Separators (heavy crude)	9
oil	fugitive	Separators (light crude)	9
oil	fugitive	Heater/Treaters (light crude)	9
oil	fugitive	Headers (heavy crude)	9
oil	fugitive	Headers (light crude)	9
oil	fugitive	Floating Roof Tanks	9
oil	fugitive	Compressors	5
oil	fugitive	Large Compressors	5
oil	fugitive	Sales Areas	9
oil	fugitive	Pipelines	9
oil	fugitive	Well Drilling	9
oil	fugitive	Battery Pumps	9
oil	combusted	Gas Engines	4
oil	combusted	Heaters	9
oil	combusted	Well Drilling	9
oil	combusted	Flares	9
oil	Upset	Pressure Relief Valves	9
oil	Upset	Well Blowouts Onshore	9

inventory calculated potential	inventory report net	sources without net emissions	estimated net for sources without net	NET (tonnes)	NET (Bcf)	
-		-	-	-		###
18,164		18,164	11,133	11,133	1	
34,481		34,481	21,134	21,134	1	
			-	-	-	
32,137		32,137	19,698	19,698	1	
103,226		103,226	63,271	63,271	3	
31,366		31,366	19,225	19,225	1	
105,611		105,611	64,733	64,733	3	
			-	-	-	
69,846		69,846	42,811	42,811	2	
14,425		14,425	8,841	8,841	0	
978		978	599	599	0	
169,698	169,698		-	169,698	9	
		-	-	-	-	
11		11	7	7	0	
450		450	276	276	0	
61,737	61,737		-	61,737	3	
4,100	4,100		-	4,100	0	
10,229	10,229		-	10,229	1	
10,326	10,326		-	10,326	1	
972		972	596	596	0	
			-	-	-	
12,695		12,695	7,781	7,781	0	
47,139		47,139	28,893	28,893	2	
			-	-	-	
1,159,306	539,120		-	539,120	28	
64,518	61,258		-	61,258	3	
370,599		370,599	227,152	227,152	12	
115,557	78,476		-	78,476	4	
			-	-	-	
312,691	228,981		-	228,981	12	0.73
			-		-	
			-	-	-	
249,362	108,884		-	108,884	6	
			-	-	-	
111,634	111,634		-	111,634	6	
147,056	147,056		-	147,056	8	
			-	-	-	
690		690	423	423	0	
2,703		2,703	1,657	1,657	0	
2,697		2,697	1,653	1,653	0	
6,034	5,522		-	5,522	0	
			-	-	-	
679		679	416	416	0	

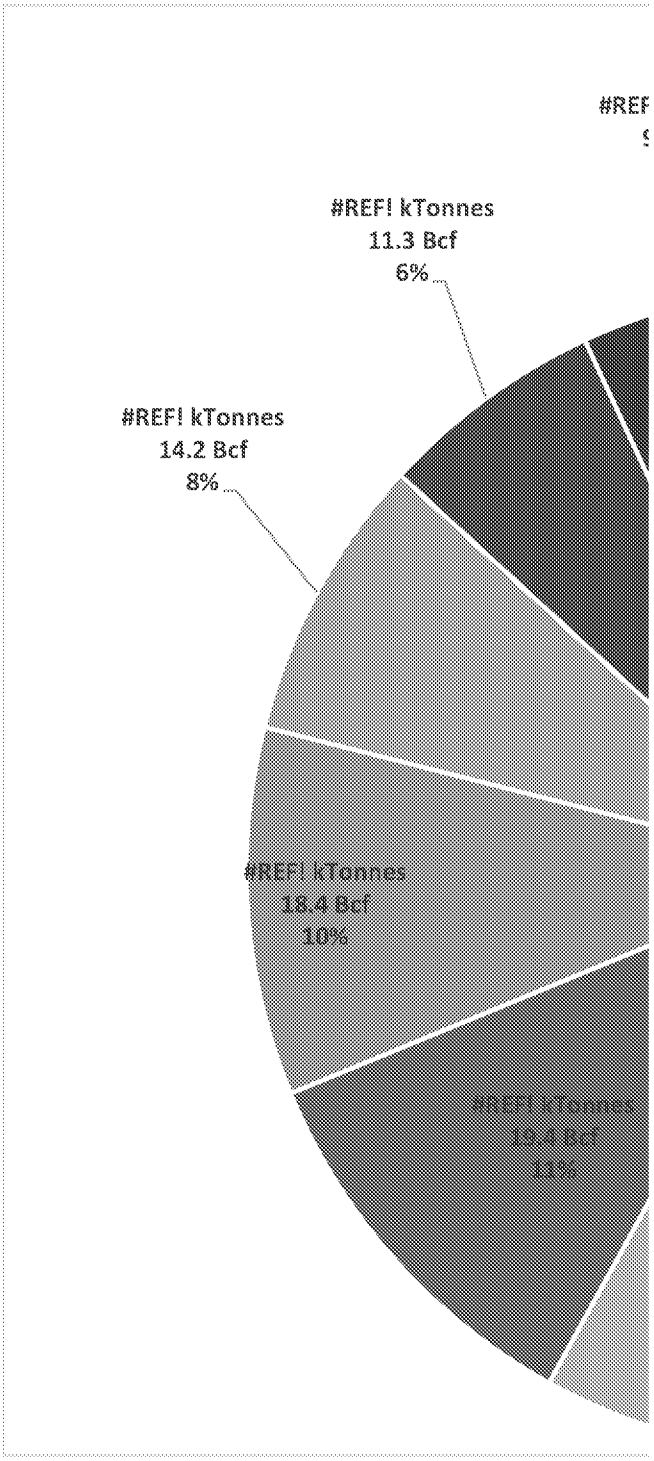
1,463		1,463	897	897	0	
123,460		123,460	75,673	75,673	4	
27,105		27,105	16,614	16,614	1	
317,468		317,468	194,586	194,586	10	0.61
474,305	220,184		-	220,184	11	
54,089		54,089	33,153	33,153	2	
310		310	190	190	0	
205		205	125	125	0	
458		458	281	281	0	
14,215		14,215	8,713	8,713	0	
222		222	136	136	0	
120		120	73	73	0	
-			-	-	-	
168,060		168,060	103,009	103,009	5	
19,259		19,259	11,805	11,805	1	
34		34	21	21	0	
59,533		59,533	36,490	36,490	2	
13		13	8	8	0	
10,744		10,744	6,585	6,585	0	
11,352		11,352	6,958	6,958	0	
12		12	7	7	0	
5,323		5,323	3,263	3,263	0	
159		159	97	97	0	
1,979		1,979	1,213	1,213	0	
-		-	-	-	-	
1,767		1,767	1,083	1,083	0	
-		-	-	-	-	
-		-	-	-	-	
437		437	268	268	0	
81,987		81,987	50,253	50,253	3	
27,254		27,254	16,705	16,705	1	
838		838	514	514	0	
140		140	86	86	0	
152		152	93	93	0	
2,848		2,848	1,746	1,746	0	36.22

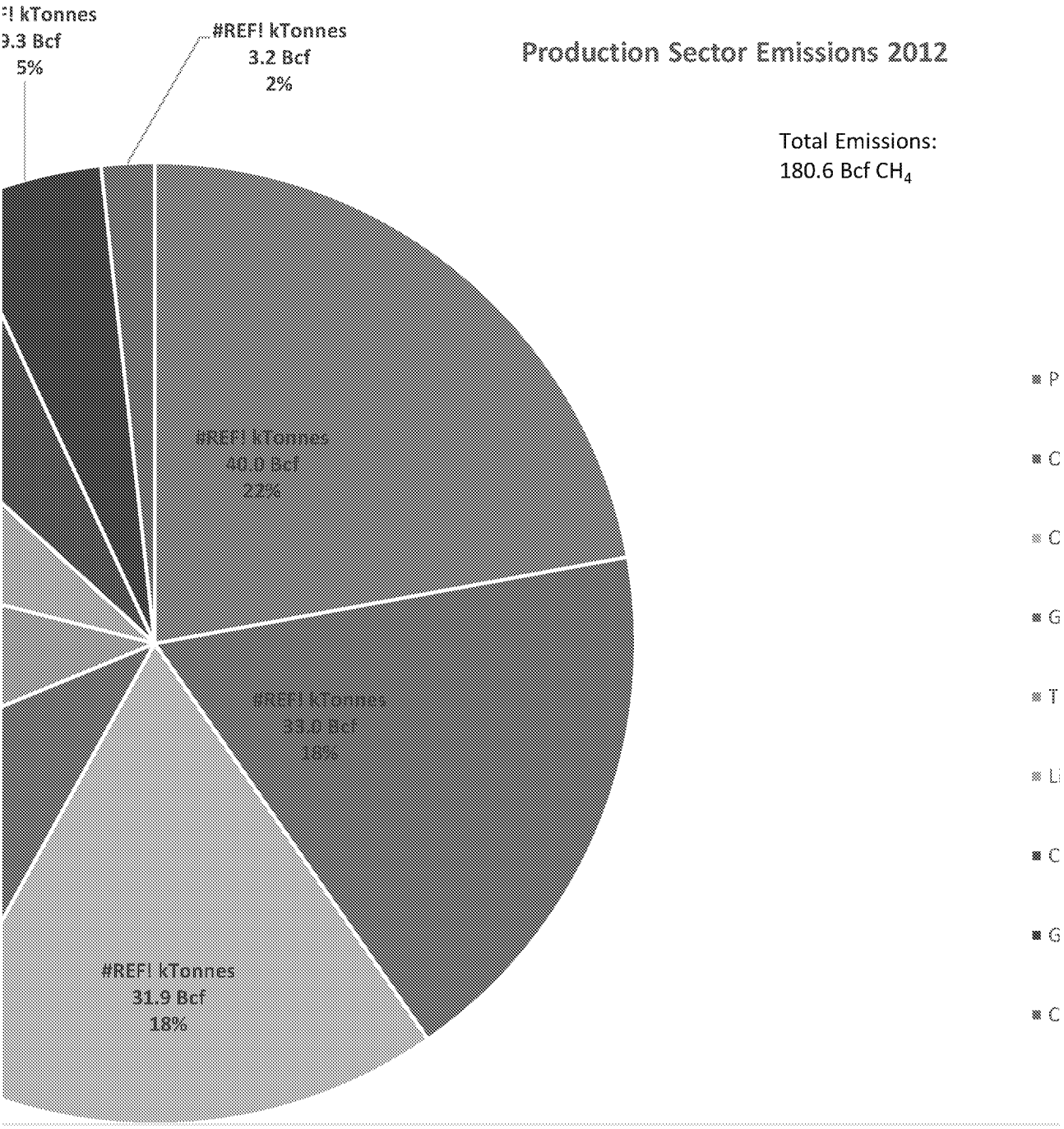
compressor % emissions from seals	compressor seal	compressor leaks
10%	4,902.30	45,162.15
24%	2,565.73	8,314.85

Category No.
2
8
9
3
7
6
1
4
5
10
11
12

0.672158937

Source Category	Emissions (tonnes)	Emissions (Bcf)
Pneumatic Device Vents	769	40.0
Offshore	635	33.0
Other Production	613	31.9
Glycol and Chemical Pumps	374	19.4
Tanks (Condensate and Oil)	354	18.4
Liquids Unloading	274	14.2
Completions/Workovers	218	11.3
Gas Engines	179	9.3
Compressors	62	3.2
	0	0.0
	0	0.0
	0	0.0
	3,478	180.6


#REF
#REF! kTonnes
11.3 Bcf
6%
#REF! kTonnes
14.2 Bcf
8%
#REF! kTonnes
18.4 Bcf
10%
#REF! kTonnes
19.4 Bcf
11%


Production Sector Emissions 2012
Total Emissions:
180.6 Bcf CH_4
#REF! kTonnes
3.2 Bcf
2%
#REF! kTonnes
40.0 Bcf
22%
#REF! kTonnes
31.9 Bcf
18%
P
C
C
G
T
L
C
G
C

neumatic Device Vents

Offshore

Other Production

ilycol and Chemical Pumps

anks (Condensate and Oil)

iquids Unloading

ompletions/Workovers

ias Engines

ompressors

Cell: C4

Comment: Associated Gas wells are used only as drivers in estimating AFs for certain sources in the inventory. The emissions from these wells are accounted for in the Petroleum Methane Emissions Model

Type	Category Desc	Source	NET (tonnes)
gas	10 *Normal Fugitives*	Gathering and Boosting Stations	1,864,870.3
gas	2 *Vented and Combusted*	Pneumatic Devices-gas	1,105,119.0
gas	6 *Vented and Combusted*	Liquids unloading	260,643.9
gas	7 *Vented and Combusted*	Condensate tanks	222,405.0
gas	9 *Normal Fugitives*	Pipeline Leaks	169,701.4
gas	3 *Vented and Combusted*	Chemical Injection Pumps-gas	128,876.5
gas	8 *Vented and Combusted*	Offshore Platforms-gas	114,974.0
gas	4 *Vented and Combusted*	Gas Engines-gas	108,783.2
gas	9 *Normal Fugitives*	Separators-gas	90,558.0
gas	9 *Normal Fugitives*	Meters/Piping	81,839.1
gas	1 *Vented and Combusted*	HF Well Completions-gas	81,664.3
gas	3 *Vented and Combusted*	Kimray Pumps	77,016.1
gas	5 *Normal Fugitives*	Compressors	73,437.3
gas	9 *Vented and Combusted*	Prod Water from CBM - Powder River	36,368.9
gas	9 *Normal Fugitives*	Gas Wells with Hydraulic Fracturing	26,791.5
gas	9 *Vented and Combusted*	Dehydrator Vents	21,357.1
gas	9 *Normal Fugitives*	Heaters	18,291.1
gas	9 *Normal Fugitives*	Non-associated Gas Wells (less fractured wells)	13,557.6
gas	9 *Vented and Combusted*	Prod Water from CBM - Black Warrior	9,767.0
gas	9 *Vented and Combusted*	Compressor Starts	7,795.9
gas	9 *Normal Fugitives*	Dehydrators	6,427.8
gas	9 *Vented and Combusted*	Compressor BD	2,835.9
gas	9 *Vented and Combusted*	Pipeline BD	2,064.0
gas	9 *Vented and Combusted*	Mishaps	1,117.2
gas	9 *Vented and Combusted*	Well Drilling	741.9
gas	9 *Vented and Combusted*	Pressure Relief Valves	534.8
gas	9 *Vented and Combusted*	Vessel BD	510.5
gas	1 *Vented and Combusted*	Gas Well Workovers without Hydraulic Fracturing	340.4
gas	1 *Vented and Combusted*	Gas Well Completions without Hydraulic Fracturing	8.7
oil	7 *Vented*	Oil tanks	302,142.7
oil	3 *Vented*	Chemical Injection Pumps-oil	192,887.9
oil	8 *Vented*	Offshore Platforms-oil	143,039.7
oil	1 *Vented*	HF Well Completions-oil	118,768.7
oil	4 *Combusted*	Gas Engines-oil	65,886.1
oil	9 *Fugitive*	Oil Wellheads (light crude)	47,275.4
oil	9 *Fugitive*	Separators-oil	26,061.7
oil	9 *Combusted*	Heaters	24,328.1
oil	9 *Fugitive*	Heater/Treaters (light crude)	11,693.4
oil	9 *Vented*	Stripper wells	11,283.8
oil	9 *Fugitive*	Headers (light crude)	6,430.2
oil	9 *Upsets*	Well Blowouts Onshore	2,175.0
oil	5 *Fugitive*	Compressors	1,590.5
oil	9 *Fugitive*	Sales Areas	1,577.3
oil	9 *Fugitive*	Well Drilling	640.3
oil	9 *Vented*	Vessel Blowdowns	576.0
oil	9 *Vented*	Compressor Starts	367.9

oil	9 Fugitive	Battery Pumps	346.7
oil	1 Vented	Well Completion Venting	169.6
oil	9 Vented	Compressor Blowdowns	164.5
oil	9 Upsets	Pressure Relief Valves	135.3
oil	9 Combusted	Flares	132.9
oil	9 Fugitive	Floating Roof Tanks	121.5
oil	1 Vented	Well Workovers	95.0
oil	9 Fugitive	Oil Wellheads (heavy crude)	27.4
oil	9 Fugitive	Headers (heavy crude)	14.6
oil	2 Vented	Pneumatic Devices-oil	1,567,089.1

bcf methane	bcf whole gas
96.8	122.9
57.4	72.8
13.5	17.2
11.5	14.7
8.8	11.2
6.7	8.5
6.0	7.6
5.6	7.2
4.7	6.0
4.2	5.4
4.2	5.4
4.0	5.1
3.8	4.8
1.9	2.4
1.4	1.8
1.1	1.4
0.9	1.2
0.7	0.9
0.5	0.6
0.4	0.5
0.3	0.4
0.1	0.2
0.1	0.1
0.1	0.1
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
15.7	19.9
10.0	12.7
7.4	9.4
6.2	7.8
3.4	4.3
2.5	3.1
1.4	1.7
1.3	1.6
0.6	0.8
0.6	0.7
0.3	0.4
0.1	0.1
0.1	0.1
0.1	0.1
0.0	0.0
0.0	0.0
0.0	0.0

0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
81.4	103.3

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 10/4/2017 8:23:32 PM
To: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: Fwd: O&G Follow-up: Inventory Data
Attachments: US Inventory - Natural Gas and Petroleum - Emission Source Breakout _03-25-15.xlsx

Hi all,

Would it be possible to have a the same data pulled from the most recent GHG Inventory?

---------- Forwarded message ----------
From: **Waltzer, Suzanne** <Waltzer.Suzanne@epa.gov>
Date: Thu, Mar 26, 2015 at 9:35 AM
Subject: O&G Follow-up: Inventory Data
To: "Teitz, Alexandra" <ateitz@blm.gov>, James Tichenor <jtichenor@blm.gov>, Timothy Spisak <tspisak@blm.gov>
Cc: "Weitz, Melissa" <Weitz.Melissa@epa.gov>

Hi

To follow-up from our conversation, attached is a spreadsheet that has the oil and natural gas production methane emissions. The first two tabs are summary net emissions data (in Bcf and tonnes of methane) for the sector as a whole and for oil and gas production based on 2012 data (the 2014 GHG Inventory). The subsequent tabs are more detail on the individual source categories including the emission factors and activity data, etc. The data/information is from the inventory but may include some additional internal comments/notes so please do not share broadly.

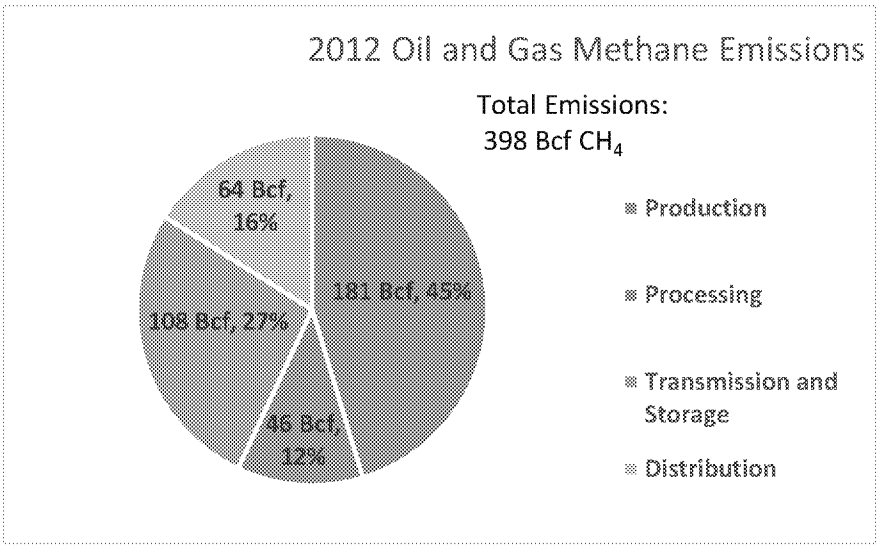
We pulled this together from existing information quickly as a starting point. This may not be exactly what you need or if anything is unclear, just let us know. We will also take a take a closer look at the table you provided. It may be helpful to set up a meeting to talk through the data early next week.

Thanks,

Suzie

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

	Billion Cubic Feet
Production	181
Processing	46
Transmission and Storage	108
Distribution	64



gas	*Normal Fugitives*	Gas Wells
gas	*Normal Fugitives*	Associated Gas Wells
gas	*Normal Fugitives*	Non-associated Gas Wells (less fractured wells)
gas	*Normal Fugitives*	Gas Wells with Hydraulic Fracturing
gas	*Normal Fugitives*	Field Separation Equipment
gas	*Normal Fugitives*	Heaters
gas	*Normal Fugitives*	Separators
gas	*Normal Fugitives*	Dehydrators
gas	*Normal Fugitives*	Meters/Piping
gas	*Normal Fugitives*	Gathering Compressors
gas	*Normal Fugitives*	Small Reciprocating Comp.
gas	*Normal Fugitives*	Large Reciprocating Comp.
gas	*Normal Fugitives*	Large Reciprocating Stations
gas	*Normal Fugitives*	Pipeline Leaks
gas	*Vented and Combusted*	Drilling, Well Completion, and Well Workover
gas	*Vented and Combusted*	Gas Well Completions without Hydraulic Fracturing
gas	*Vented and Combusted*	Gas Well Workovers without Hydraulic Fracturing
gas	*Vented and Combusted*	Hydraulic Fracturing Completions and Workovers that vent
gas	*Vented and Combusted*	Flared Hydraulic Fracturing Completions and Workovers
gas	*Vented and Combusted*	Hydraulic Fracturing Completions and Workovers with RECs
gas	*Vented and Combusted*	Hydraulic Fracturing Completions and Workovers with RECs that flare
gas	*Vented and Combusted*	Well Drilling
gas	*Vented and Combusted*	Produced Water from Coal Bed Methane
gas	*Vented and Combusted*	Powder River
gas	*Vented and Combusted*	Black Warrior
gas	*Vented and Combusted*	Normal Operations
gas	*Vented and Combusted*	Pneumatic Device Vents
gas	*Vented and Combusted*	Chemical Injection Pumps
gas	*Vented and Combusted*	Kimray Pumps
gas	*Vented and Combusted*	Dehydrator Vents
gas	*Vented and Combusted*	Condensate Tank Vents
gas	*Vented and Combusted*	Condensate Tanks without Control Devices
gas	*Vented and Combusted*	Condensate Tanks with Control Devices
gas	*Vented and Combusted*	Compressor Exhaust Vented
gas	*Vented and Combusted*	Gas Engines
gas	*Vented and Combusted*	Well Clean Ups
gas	*Vented and Combusted*	Well Clean Ups (LP Gas Wells) - Vent Using Plungers
gas	*Vented and Combusted*	Well Clean Ups (LP Gas Wells) - Vent Without Using Plungers
gas	*Vented and Combusted*	Blowdowns
gas	*Vented and Combusted*	Vessel BD
gas	*Vented and Combusted*	Pipeline BD
gas	*Vented and Combusted*	Compressor BD
gas	*Vented and Combusted*	Compressor Starts
gas	*Vented and Combusted*	Upsets
gas	*Vented and Combusted*	Pressure Relief Valves
gas	*Vented and Combusted*	Mishaps
gas	*Offshore*	Shallow water Gas Platforms (GoM and Pacific)

gas	*Offshore*	Deepwater Gas Platforms (GoM and Pacific)
oil	Vented	Oil Tanks
oil	Vented	Pneumatic Devices, High Bleed
oil	Vented	Pneumatic Devices, Low Bleed
oil	Vented	Chemical Injection Pumps
oil	Vented	Vessel Blowdowns
oil	Vented	Compressor Blowdowns
oil	Vented	Compressor Starts
oil	Vented	Stripper wells
oil	Vented	Well Completion Venting
oil	Vented	Well Workovers
oil	Vented	Pipeline Pigging
oil	Vented	OCS Offshore Platforms, Shallow water oil, fugitive vented, and combusted
oil	Vented	OCS Offshore Platforms, Deep water oil, fugitive, vented, and combusted
oil	fugitive	Oil Wellheads (heavy crude)
oil	fugitive	Oil Wellheads (light crude)
oil	fugitive	Separators (heavy crude)
oil	fugitive	Separators (light crude)
oil	fugitive	Heater/Treaters (light crude)
oil	fugitive	Headers (heavy crude)
oil	fugitive	Headers (light crude)
oil	fugitive	Floating Roof Tanks
oil	fugitive	Compressors
oil	fugitive	Large Compressors
oil	fugitive	Sales Areas
oil	fugitive	Pipelines
oil	fugitive	Well Drilling
oil	fugitive	Battery Pumps
oil	combusted	Gas Engines
oil	combusted	Heaters
oil	combusted	Well Drilling
oil	combusted	Flares
oil	Upset	Pressure Relief Valves
oil	Upset	Well Blowouts Onshore

Category No.	inventory calculated potential	inventory report net	sources without net emissions	estimated net for sources without net
9	0		0	-
9	18,270		18,270	12,908
9	35,393		35,393	25,006
				-
9	33,275		33,275	23,510
9	106,717		106,717	75,399
9	32,798		32,798	23,173
9	106,213		106,213	75,043
				-
5	70,859		70,859	50,064
5	15,400		15,400	10,881
9	1,044		1,044	738
9	175,503	175,503		-
				-
1	12		12	8
1	533		533	376
1	192,208	192,208		-
1	3,875	3,875		-
1	10,158	10,158		-
1	10,890	10,890		-
9	976		976	690
				-
9	47,244		47,244	33,380
9	12,779		12,779	9,029
				-
2	1,207,519	334,377		-
3	67,341	64,571		-
3	388,378		388,378	274,403
9	121,100	82,241		-
				-
7	187,700	127,401		-
7	37,540	37,540		-
				-
4	265,696	125,783		-
				-
6	118,905	118,905		-
6	154,664	154,664		-
				-
9	722		722	510
9	2,795		2,795	1,975
9	2,736		2,736	1,933
9	6,122	5,609		-
				-
9	728		728	514
9	1,513		1,513	1,069
8	266,066		266,066	187,985

8	22,950		22,950	16,215
7	267,121		267,121	188,731
2	336,692	336,692		-
2	98,411	98,411		-
3	49,973		49,973	35,308
9	285		285	201
9	187		187	132
9	419		419	296
9	14,215		14,215	10,043
1	222		222	157
1	74		74	52
9	0		0	-
8	556,354		556,354	393,084
8	53,419		53,419	37,743
9	14		14	10
9	23,956		23,956	16,926
9	12		12	8
9	9,860		9,860	6,966
9	10,396		10,396	7,345
9	8		8	5
9	3,303		3,303	2,334
9	159		159	112
5	1,812		1,812	1,280
5	0		0	-
9	1,540		1,540	1,088
9	0		0	-
9	0		0	-
9	271		271	191
4	75,063		75,063	53,034
9	23,746		23,746	16,778
9	838		838	592
9	118		118	83
9	132		132	93
9	2,848		2,848	2,012

Leaks total (gas)
seals in leaks total
Leaks real total (gas)

leaks total oil

leaks total
leaks minus pipelines

gathering leaks
compressors and pipelines
leaks total minus pipeline minus gathering

NET (tonnes)	NET (Bcf)	compressor % emissions from seals	compressor seal	compressor leaks
	0.00			
-	0.00			
12,908	0.67			
25,006	1.30			
-	0.00			
23,510	1.22			
75,399	3.91			
23,173	1.20			
75,043	3.90			
-	0.00			
50,064	2.60	10%	4,902.30	45,162.15
10,881	0.56	24%	2,565.73	8,314.85
738	0.04			
175,503	9.11			
-	0.00			
8	0.00			
376	0.02			
192,208	9.98			
3,875	0.20			
10,158	0.53			
10,890	0.57			
690	0.04			
-	0.00			
33,380	1.73			
9,029	0.47			
-	0.00			
334,377	17.36			
64,571	3.35			
274,403	14.25			
82,241	4.27			
-	0.00			
127,401	6.61			
37,540	1.95			
-	0.00			
125,783	6.53			
-	0.00			
118,905	6.17			
154,664	8.03			
-	0.00			
510	0.03			
1,975	0.10			
1,933	0.10			
5,609	0.29			
-	0.00			
514	0.03			
1,069	0.06			
187,985	9.76			

16,215	0.84
188,731	9.80
336,692	17.48
98,411	5.11
35,308	1.83
201	0.01
132	0.01
296	0.02
10,043	0.52
157	0.01
52	0.00
-	0.00
393,084	20.41
37,743	1.96
10	0.00
16,926	0.88
8	0.00
6,966	0.36
7,345	0.38
5	0.00
2,334	0.12
112	0.01
1,280	0.07
-	0.00
1,088	0.06
-	0.00
-	0.00
191	0.01
53,034	2.75
16,778	0.87
592	0.03
83	0.00
93	0.00
2,012	0.10

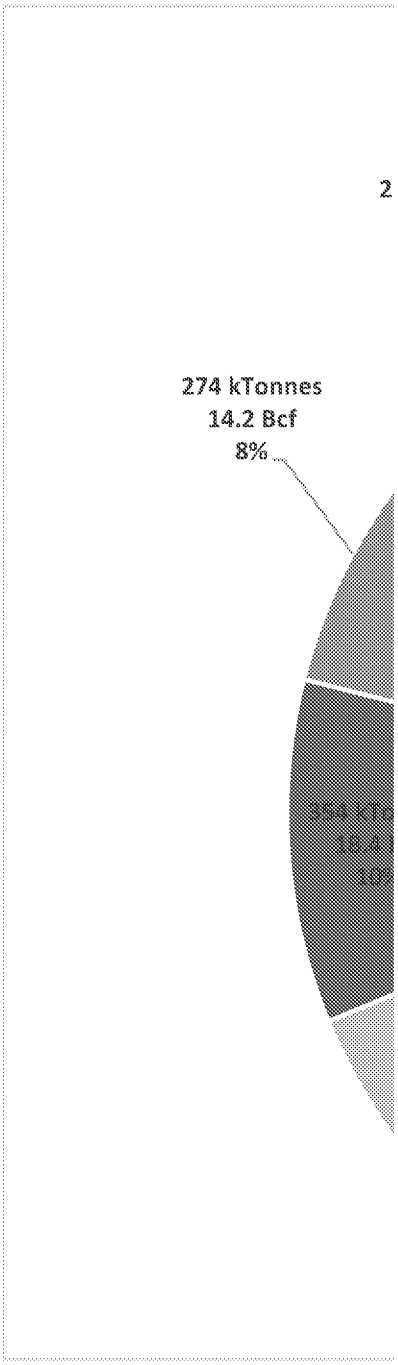
472,225.41
7,468.02
464,757.38

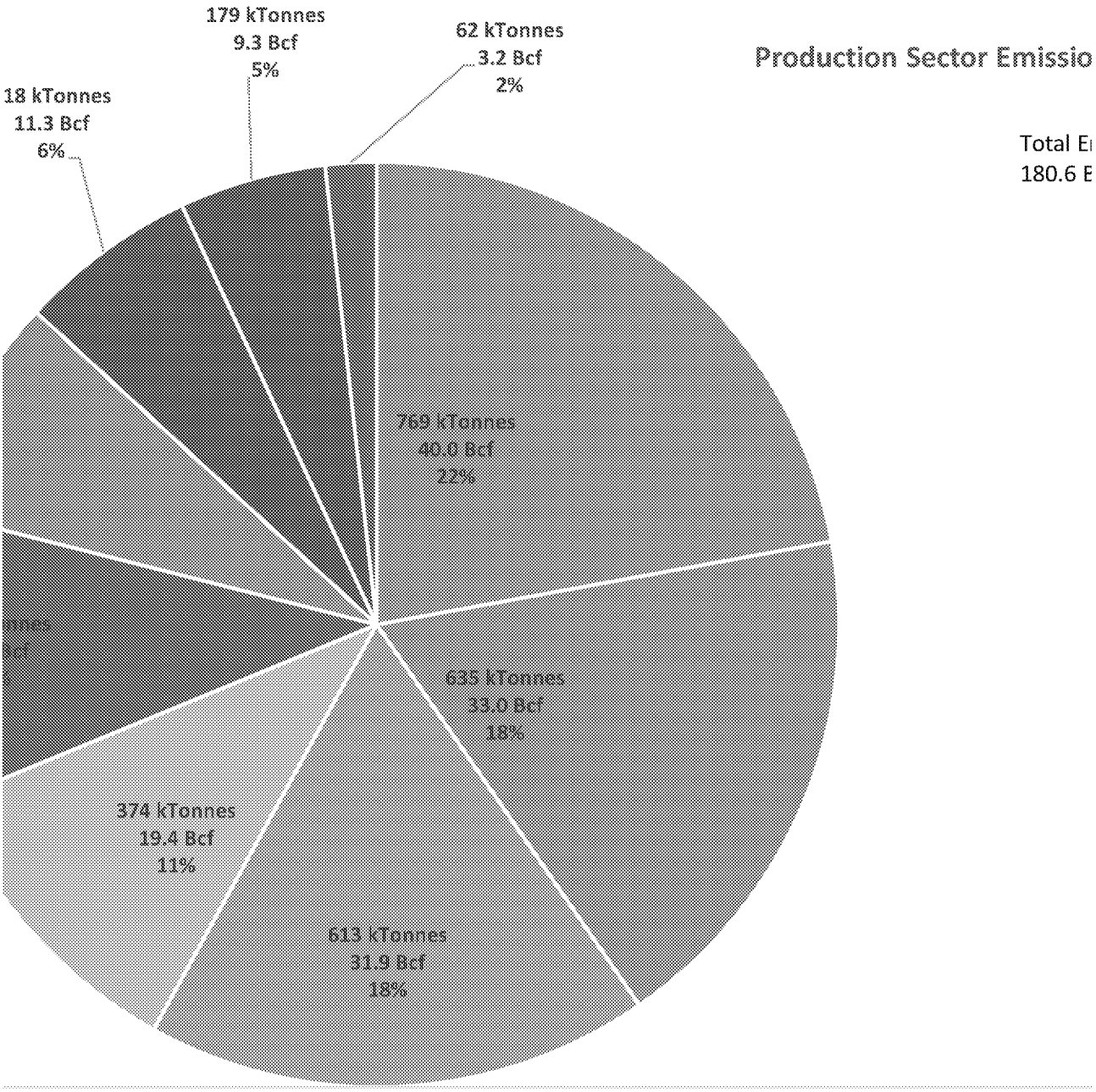
36,266.13

501,023.51
325,520.57

54,214.65
229,717.59
271,305.92

Category No.	Source Category	Emissions (tonnes)	Emissions (Bcf)
2	Pneumatic Device Vents	769	40.0
8	Offshore	635	33.0
9	Other Production	613	31.9
3	Glycol and Chemical Pumps	374	19.4
7	Tanks (Condensate and Oil)	354	18.4
6	Liquids Unloading	274	14.2
1	Completions/Workovers	218	11.3
4	Gas Engines	179	9.3
5	Compressors	62	3.2
10		0	0.0
11		0	0.0
12		0	0.0
		3,478	180.6


2
274 kTonnes
14.2 Bcf
8%


Production Sector Emissio
Total E
180.6 E
769 kTonnes
40.0 Bcf
22%
635 kTonnes
33.0 Bcf
18%
613 kTonnes
31.9 Bcf
18%
374 kTonnes
19.4 Bcf
11%
18 kTonnes
11.3 Bcf
6%
179 kTonnes
9.3 Bcf
5%
62 kTonnes
3.2 Bcf
2%

ns 2012

missions:
3cf CH_4

- Pneumatic Device Vents
- Offshore
- Other Production
- Glycol and Chemical Pumps
- Tanks (Condensate and Oil)
- Liquids Unloading
- Completions/Workovers
- Gas Engines
- Compressors

Cell: C4

Comment: Associated Gas wells are used only as drivers in estimating AFs for certain sources in the inventory. The emissions from these wells are accounted for in the Petroleum Methane Emissions Model

White Paper	Code	Subcategories
Equipment leaks	EL	EL2 denotes sub-categories
Compressors	CO	
Pneumatics	PN	PN2 denotes sub-categories
Associated Gas	AG	
Liquids Unloading	LU	

Data from Year 2012 (*2014 US Inventory*)

DRAFT

Segment	Emission Source	White Paper Category	Source Covered by EPA Inventory?	Emission Source Breakout	Source Breakout %	Inventory AF	North East AF	Midcontinent AF	Rocky Mountain AF	South West AF	West Coast AF	Gulf Coast AF	Inventory AF Units	Inventory AF Reference	North East EF	Midcontinent EF	Rocky Mountain EF	South West EF	West Coast EF	Gulf Coast EF	Inventory EF Units	Inventory EF Reference	Controlled EF?	Inventory Gross Emissions (tonnes)	Inventory Gas STAR Reductions (tonnes)	Inventory Regulatory Reduction (tonnes)	Inventory Net Emissions (tonnes)	Inventory Gross Emission (Bcf)	Inventory Gas STAR Reduction (Bcf)	Inventory Regulatory Reduction (Bcf)	Inventory Net Emission (Bcf)	NSPS Covered	NSPS Recommended Control Technology	NSPS Reduction %
Production	Gas Wells w/o Hydraulic Fracturing	EL	Yes	Gas Wells w/o Hydraulic Fracturing - Total	100%	243,051	112,607	77,896	9,665	13,860	1,999	27,024	wells	DI Desktop	7.67	7.45	35.05	37.24	42.49	7.96	scfd/well	GRI Vol. 8	No	18,270	-		18,270	0.95	-	-	0.95	No	n/a	n/a
Production	Gas Wells w/o Hydraulic Fracturing	EL2	Yes	Valves	62%	2,020,980	900,856	623,168	106,315	152,460	21,989	216,192	wells	DI Desktop	0.50	0.50	2.29	2.29	2.29	0.50	scfd/well	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Gas Wells w/o Hydraulic Fracturing	EL2	Yes	Connections	33%	9,184,890	4,279,066	2,960,048	347,940	498,960	71,964	1,026,912	wells	DI Desktop	0.07	0.07	0.31	0.31	0.31	0.07	scfd/well	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Gas Wells w/o Hydraulic Fracturing	EL2	Yes	OELs	5%	134,288	56,304	38,948	9,665	13,860	1,999	13,512	wells	DI Desktop	1.15	1.15	0.59	0.59	0.59	1.15	scfd/well	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Gas Wells w/ Hydraulic Fracturing	EL	Yes	Gas Wells w/ Hydraulic Fracturing - Total	100%	227,862	46,367	30,156	73,755	27,627	95	49,862	wells	DI Desktop	7.54	8.35	40.72	37.24	42.49	7.96	scfd/well	GRI Vol. 8	No	35,393	-	-	35,393	1.84	-	-	1.84	No	n/a	n/a
Production	Gas Wells w/ Hydraulic Fracturing	EL2	Yes	Valves	62%	2,127,327	370,936	241,248	811,305	303,897	1,045	398,896	wells	DI Desktop	0.50	0.50	2.29	2.29	2.29	0.50	scfd/well	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Gas Wells w/ Hydraulic Fracturing	EL2	Yes	Connections	33%	8,455,802	1,761,946	1,145,928	2,655,180	994,572	3,420	1,894,756	wells	DI Desktop	0.07	0.07	0.31	0.31	0.31	0.07	scfd/well	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Gas Wells w/ Hydraulic Fracturing	EL2	Yes	OELs	5%	164,670	23,184	15,078	73,755	27,627	95	24,931	wells	DI Desktop	1.15	1.15	0.59	0.59	0.59	1.15	scfd/well	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Heaters	EL	Yes	Heaters - Total	100%	112,786	318	43,869	38,040	11,243	2,094	17,222	heaters	GRI Vol. 5	15.38	14.90	56.73	58.97	67.29	64.60	scfd/heater	GRI Vol. 8	No	33,275	-	-	33,275	1.73	-	-	1.73	No	n/a	n/a
Production	Heaters	EL2	Yes	Valves	53%	1,579,004	4,452	614,166	532,560	157,402	29,316	241,108	heaters	GRI Vol. 5	0.50	0.50	2.29	2.29	2.29	2.29	scfd/heater	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Heaters	EL2	Yes	Connections	33%	7,331,090	20,670	2,851,485	2,472,600	730,795	136,110	1,119,430	heaters	GRI Vol. 5	0.07	0.07	0.31	0.31	0.31	0.31	scfd/heater	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Heaters	EL2	Yes	OELs	9%	225,572	636	87,738	76,080	22,486	4,188	34,444	heaters	GRI Vol. 5	1.15	1.15	0.59	0.59	0.59	0.59	scfd/heater	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Heaters	EL2	Yes	PRVs	6%	112,786	318	43,869	38,040	11,243	2,094	17,222	heaters	GRI Vol. 5	0.76	0.76	3.65	3.65	3.65	3.65	scfd/heater	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Separators	EL	Yes	Separators - Total	100%	276,936	112,872	47,003	41,627	23,316	1,529	50,591	separators	GRI Vol. 5	0.97	0.94	119.94	124.68	142.27	135.57	scfd/separator	GRI Vol. 8	No	106,717	-	-	106,717	5.54	-	-	5.54	No	n/a	n/a
Production	Separators	EL2	Yes	Valves	60%	4,140,017	112,872	47,003	1,415,318	792,744	51,986	1,720,094	separators	GRI Vol. 5	0.50	0.50	2.29	2.29	2.29	2.29	scfd/separator	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Separators	EL2	Yes	Connections	36%	13,367,928	677,232	282,018	4,412,462	2,471,496	162,074	5,362,646	separators	GRI Vol. 5	0.07	0.07	0.31	0.31	0.31	0.31	scfd/separator	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Separators	EL2	Yes	OELs	1%	702,378	-	-	349,762	139,896	9,174	303,546	separators	GRI Vol. 5	0	0	0.59	0.59	0.59	0.59	scfd/separator	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Separators	EL2	Yes	PRVs	3%	234,126	-	-	83,254	46,632	3,058	101,182	separators	GRI Vol. 5	0	0	3.65	3.65	3.65	3.65	scfd/separator	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Dehydrators	EI	Yes	Dehydrators - Total	100%	65,654	22,164	15,064	11,630	5,784	292	10,719	dehydrators	GRI Vol. 8	23.53	95.54	89.58	93.11	106.25	102	scfd/dehydrator	GRI Vol. 8	No	32,798	-	-	32,798	1.70	-	-	1.70	No	n/a	n/a
Production	Dehydrators	EL2	Yes	Valves	58%	1,575,672	531,936	361,536	279,120	138,816	7,008	257,256	dehydrators	GRI Vol. 8	0.50	2.29	2.29	2.29	2.29	2.29	scfd/dehydrator	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Dehydrators	EL2	Yes	Connections	29%	5,908,770	1,994,760	1,355,760	1,046,700	520,560	26,280	964,710	dehydrators	GRI Vol. 8	0.07	0.31	0.31	0.31	0.31	0.31	scfd/dehydrator	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Dehydrators	EL2	Yes	OELs	6%	131,306	44,328	30,128	23,260	11,568	584	21,438	dehydrators	GRI Vol. 8	1.15	0.59	0.59	0.59	0.59	0.59	scfd/dehydrator	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Dehydrators	EL2	Yes	PRVs	7%	131,306	44,328	30,128	23,260	11,568	584	21,438	dehydrators	GRI Vol. 8	0.76	3.65	3.65	3.65	3.65	3.65	scfd/dehydrator	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Meters/Piping	EL	Yes	Meters/Piping - Total	100%	398,662	7,910	143,186	97,399	55,885	3,994	90,288	meters	"History Data"	9.75	9.45	52.01	54.06	61.68	59.21	scfd/meter	GRI Vol. 8	No	106,213	-	-	106,213	5.51	-	-	5.51	No	n/a	n/a
Production	Meters/Piping	EL2	Yes	Valves	64%	3,922,380	94,920	361,536	1,363,586	782,390	55,916	1,264,032	meters	"History Data"	0.50	0.50	2.29	2.29	2.29	2.29	scfd/meter	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Meters/Piping	EL2	Yes	Connections	32%	14,337,576	355,950	1,355,760	4,967,349	2,850,135	203,694	4,604,688	meters	"History Data"	0.07	0.07	0.31	0.31	0.31	0.31	scfd/meter	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Meters/Piping	EL2	Yes	OELs	1%	247,566	-	-	97,399	55,885	3,994	90,288	meters	"History Data"	0.00	0.00	0.59	0.59	0.59	0.59	scfd/meter	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Meters/Piping	EL2	Yes	PRVs	3%	247,566	-	-	97,399	55,885	3,994	90,288	meters	"History Data"	0.00	0.00	3.65	3.65	3.65	3.65	scfd/meter	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Small Reciprocating Comp.	EL	Yes	Small Reciprocating Comp. - Total	100%	35,930	159	12,210	9,260	5,642	2,431	6,228	compressors	GRI Vol. 5	289.63	280.71	263.20	273.59	312.19	299.69	scfd/compressor	GRI Vol. 8	No	70,859	-	-	70,859	3.68	-	-	3.68	No	n/a	n/a
Production	Small Reciprocating Comp.	EL2	Yes	Valves	63%	2,622,890	11,607	891,330	675,980	411,866	177,463	454,644	compressors	GRI Vol. 5	2.29	2.29	2.29	2.29	2.29	2.29	scfd/compressor	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Small Reciprocating Comp.	EL2	Yes	Connections	21%	6,431,470	28,461	2,185,590	1,657,540	1,009,918	435,149	1,114,812	compressors	GRI Vol. 5	0.31	0.31	0.31	0.31	0.31	0.31	scfd/compressor	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Small Reciprocating Comp.	EL2	Yes	OELs	1%	107,790	477	36,630	27,780	16,926	7,293	18,684	compressors	GRI Vol. 5	0.59	0.59	0.59	0.59	0.59	0.59	scfd/compressor	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Small Reciprocating Comp.	EL2	Yes	PRVs	6%	143,720	636	48,840	37,040	22,568	9,724	24,912	compressors	GRI Vol. 5	3.65	3.65	3.65	3.65	3.65	3.65	scfd/compressor	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Small Reciprocating Comp.		Yes	Compressor Seal	10%	143,720	636	48,840	37,040	22,568	9,724	24,912	compressors	GRI Vol. 5	6.49	6.49	6.49	6.49	6.49	6.49	scfd/compressor	GRI Vol. 8	No					-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Comp.	EL	Yes	Large Reciprocating Comp. - Total	100%	136	24	24	32	16	8	32	compressors	GRI Vol. 5	16,448	15,941	14,947	15,536	17,728	17,019	scfd/compressor	GRI Final Report	No	15,400	-	-	15,400	0.80	-	-	0.80	No	n/a	n/a
Production	Large Reciprocating Comp.	EL2	Yes	Blowdown OELs	66%	136	24	24	32	16	8	32	compressors	GRI Vol. 5	2.38	2.38	2.38	2.38	2.38	2.38	scfd/compressor	GRI Final Report	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Comp.	EL2	Yes	PRVs	7%	136	34	24	32	16	8	32	compressors	GRI Vol. 5	21.92	21.92	21.92	21.92	21.92	21.92	scfd/compressor	GRI Final Report	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Comp.		Yes	Miscellaneous	3%	136	24	24	32	16	8	32	compressors	GRI Vol. 5	0.40	0.40	0.40	0.40	0.40	0.40	scfd/compressor	GRI Final Report	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Comp.	EL2	Yes	Starter OELs	0%	-	-	-	-	-	-		compressors	GRI Vol. 5	30.68	30.68	30.68	30.68	30.68	30.68	scfd/compressor	GRI Final Report	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Comp.		Yes	Compressor Seal	24%	449	79	79	106	53	26	106	compressors	GRI Vol. 5	16.99	16.99	16.99	16.99	16.99	16.99	scfd/compressor	GRI Final Report	No	-	-	-	-	-	-	-	-	Yes	Rod packing replacement after 26,000 hr operation or prior to 36 months from most recent replacement	Unspecified
Production	Large Reciprocating Stations	EL	Yes	Large Reciprocating Stations - Total	100%	17	3	3	4	2	1	4	stations	GRI Vol. 9	8,920.47	8,645.82	8,106.52	8,426.29	9,615.15	9,230.22	scfd/station	GRI Vol. 8	No	1,044	-	-	1,044	0.05	-	-	0.05	No	n/a	n/a
Production	Large Reciprocating Stations	EL2	Yes	Valves	19%	11,441	2,019	2,019	2,692	1,346	673	2,692	stations	GRI Vol. 9	2.38	2.38	2.38	2.38	2.38	2.38	scfd/station	GRI Vol. 8	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Stations	EL2	Yes	Control Valves	8%	527	93	93	124	62	31	124	stations	GRI Vol. 9	21.92	21.92	21.92	21.92	21.92	21.92	scfd/station	GRI Vol. 8	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Stations	EL2	Yes	Connections	15%	52,156	9,204	9,204	12,272	6,136	3,068	12,272	stations	GRI Vol. 9	0.40	0.40	0.40	0.40	0.40	0.40	scfd/station	GRI Vol. 8	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Stations	EL2	Yes	OELs	18%	867	153	153	204	102	51	204	stations	GRI Vol. 9	30.68	30.68	30.68	30.68	30.68	30.68	scfd/station	GRI Vol. 8	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Stations	EL2	Yes	PRVs	3%	238	42	42	56	28	14	56	stations	GRI Vol. 9	16.99	16.99	16.99	16.99	16.99	16.99	scfd/station	GRI Vol. 8	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Large Reciprocating Stations	EL2	Yes	Site Blowdown OELs	35%	68	12	12	16	8	4	16	stations	GRI Vol. 9	723.29	723.29	723.29	723.29	723.29	723.29	scfd/station	GRI Vol. 8	No	-	-	-	-	-	-	-	-	No	n/a	n/a
Production	Pipeline Leaks(gathering)	EL	Yes	Pipeline Leaks - Total	100%	445,135	77,956	81,359	107,797	60,832	16,712	100,479	miles	"History Data"	57.50	55.72	52.25	54.31	61.97	59.49	scfd/mile	GRI Vol. 9	Partially	175,503	-	-	175,503	9.11	-	-	9.11	No	n/a	n/a
Production	Pipeline Leaks (gathering)	EL2	Yes	Protected Steel	79%	350,772.14	61,430.34	64,111.94	84,945.43	47,936.40	13,169.27	79,178.75	miles	"History Data"	9.38	9.38	9.38	9.38	9.38	9.38	scfd/mile	GRI Vol. 9	Yes					-	-	-	-	No	n/a	n/a
Production	Pipeline Leaks (gathering)	EL2	Yes	Unprotected Steel	12%	54,169.87	9,486.71	9,900.83	13,118.15	7,402.64	2,033.74	12,227.60	miles	"History Data"	331.61	331.61	331.61	331.61	331.61	331.61	scfd/mile	GRI Vol. 9	No					-	-	-	-	No	n/a	n/a
Production	Pipeline Leaks (gathering)	EL2	Yes	Plastic	9%	39,072.96	6,842.80	7,141.51	9,462.18	5,339.70	1,466.94	8,819.82	miles	"History Data"	49.98	49.98	49.98	49.98	49.98	49.98	scfd/mile	GRI Vol. 9	Yes					-	-	-	-	No	n/a	n/a
Production	Pipeline Leaks (gathering)	EL2	Yes	Cast Iron	0%	1,120.03	196.15	204.71	271.24	153.06	42.05	252.82	miles	"History Data"	551.83	551.83	551.83	551.83	551.83	551.83	scfd/mile	GRI Vol. 9	No					-	-	-	-	No	n/a	n/a
Production	Gas Well Completions w/o Hydraulic Fracturing		Yes	Gas Well Completions w/o Hydraulic Fracturing	100%	794	268	182	141	70	4	130	completions/yr	1997 ICF Memo	791	768	705	749	855	820	scf/completion	GRI Vol. 6	No	12	-	-	12	0.00	-	-	0.00	No	n/a	n/a
Production	Gas Well Workovers w/o Hydraulic Fracturing		Yes	Gas Well Workovers w/o Hydraulic Fracturing	100%	10,573	4,898	3,388	420	603	87	1,176	workovers/yr	"History Data"	2,647	2,572	2,360	2,507	2,861	2,746	scf/workover	GRI Vol. 6	No	533	-	-	533	0.03	-	-	0.03	No	n/a	n/a
Production	Hydraulic Fracturing Completions and Workovers with Venting		Yes	Hydraulic Fracturing Completions and Workovers with Venting - Total		4,688	1,480	564	1,146	337	3	1,158	completions and workovers/yr	Hydraulic Frac. Memo	41	41	41	41	41	41	MT/(completion or workover)	Hydraulic Frac. Memo	No	192,208	-	-	192,208	9.98	-	-	9.98	n/a	n/a	n/a
Production	Hydraulic Fracturing Completions and Workovers with Venting		Yes	Hydraulic Fracturing Completions with Venting									completions and workovers/yr	Hydraulic Frac. Memo							MT/(completion or workover)	Hydraulic Frac. Memo	No					-	-	-	-	Yes	1) route recovered gas to flow line (sale) or collection system, re-inject gas, or recover for on-site fuel or other useful purpose, with no direct release to atmosphere2) If (1) is infeasible, route emissions to completion combustion device	Estimated emissions reductions are 95% - using green completions for 3-7 day flowback period
Production	Hydraulic Fracturing Completions and Workovers with Venting		Yes	Hydraulic Fracturing Workovers with Venting									completions and workovers/yr	Hydraulic Frac. Memo							MT/(completion or workover)	Hydraulic Frac. Memo	No					-	-	-	-	Yes		Unspecified
Production	Hydraulic Fracturing Completions and Workovers w/ Flaring		Yes	Hydraulic Fracturing Completions and Workovers w/ Flaring - Total		775	245	93	190	55	-	192	completions and workovers/yr	Hydraulic Frac. Memo	5	5	5	5	5	5	MT/(completion or workover)	Hydraulic Frac. Memo	Yes	3,875	-	-	3,875	0.20	-	-	0.20	n/a	n/a	n/a
Production	Hydraulic Fracturing Completions and Workovers w/ Flaring		Yes	Hydraulic Fracturing Completions w/ Flaring									completions and workovers/yr	Hydraulic Frac. Memo							MT/(completion or workover)	Hydraulic Frac. Memo	Yes					-	-	-	-	Yes	route emissions to completion combustion device	Unspecified
Production	Hydraulic Fracturing Completions and Workovers w/ Flaring		Yes	Hydraulic Fracturing Workovers w/ Flaring									completions and workovers/yr	Hydraulic Frac. Memo							MT/(completion or workover)	Hydraulic Frac. Memo	Yes					-	-	-	-	Yes	route emissions to completion combustion device	Unspecified
Production	Hydraulic Fracturing Completions and Workovers w/ RECs		Yes	Hydraulic Fracturing Completions and Workovers w/ RECs - Total		3,386	1,070	407	829	243	-	837	completions and workovers/yr	Hydraulic Frac. Memo	3	3	3	3	3	3	MT/(completion or workover)	Hydraulic Frac. Memo	Yes	10,158	-	-	10,158	0.53	-	-	0.53	n/a	n/a	n/a
Production	Hydraulic Fracturing Completions and Workovers w/ RECs		Yes	Hydraulic Fracturing Completions w/ RECs									completions and workovers/yr	Hydraulic Frac. Memo							MT/(completion or workover)	Hydraulic Frac. Memo	Yes					-	-	-	-	Yes	route recovered gas to flow line (sale) or collection system, re-inject gas, or recover for on-site fuel or other useful purpose, with no direct release to atmosphere	Unspecified
Production	Hydraulic Fracturing Completions and Workovers w/ RECs		Yes	Hydraulic Fracturing Workovers w/ RECs									completions and workovers/yr	Hydraulic Frac. Memo							MT/(completion or workover)	Hydraulic Frac. Memo	Yes					-	-	-	-	Yes	route recovered gas to flow line (sale) or collection system, re-inject gas, or recover for on-site fuel or other useful purpose, with no direct release to atmosphere	Unspecified
Production	Hydraulic Fracturing Completions and Workovers w/ RECs/Flare		Yes	Hydraulic Fracturing Completions and Workovers w/ RECs/Flare - Total		1,815	574	218	444	130	-	449	completions and workovers/yr	Hydraulic Frac. Memo	6	6	6	6	6	6	MT/(completion or workover)	Hydraulic Frac. Memo	Yes	10,890	-	-	10,890	0.57	-	-	0.57	n/a	n/a	n/a
Production	Hydraulic Fracturing Completions and Workovers w/ RECs/Flare		Yes	Hydraulic Fracturing Completions w/ RECs/Flare									completions and workovers/yr	Hydraulic Frac. Memo							MT/(completion or workover)	Hydraulic Frac. Memo	Yes					-	-	-	-	Yes	1) route recovered gas to flow line (sale) or collection system, re-inject gas, or recover for on-site fuel or other useful purpose, with no direct release to atmosphere 2) If (1) is infeasible, route emissions to completion combustion device	Unspecified
Production	Hydraulic Fracturing Completions and Workovers w/ RECs/Flare		Yes	Hydraulic Fracturing Workovers w/ RECs/Flare									completions and workovers/yr	Hydraulic Frac. Memo							MT/(completion or workover)	Hydraulic Frac. Memo	Yes					-	-	-	-	Yes	1) route recovered gas to flow line (sale) or collection system, re-inject gas, or recover for on-site fuel or other useful purpose, with no direct release to atmosphere 2) If (1) is infeasible, route emissions to completion combustion device	Unspecified
Production	Well Drilling		Yes	Well Drilling	100%	18,837	6,359	4,322	3,337	1,660	84	3,076	wells	DI Desktop	2,751	2,666	2,500	2,598	2,965	2,846	scf/well	1992 Radian	No	976	-	-	976	0.05	-	-	0.05	No	n/a	n/a
Production	Powder River		Yes	Powder River	100%	20,602,022,700	-	-	20,602,022,700	-	-	-	gal produced water	Wyoming O&G			2.30E-09				Gg/gal produced water		No	47,244	-	-	47,244	2.45	-	-	2.45	n/a	n/a	n/a
Production	Black Warrior		Yes	Black Warrior	100%	5,517	-	-	-	-	-	5,517	wells	Alabama O&G						0.00023	Gg/well		No	12,779	-	-	12,779	0.66	-	-	0.66	n/a	n/a	n/a
Production	Pneumatic Devices		Yes	Pneumatic Devices - Total	100%	477,606	77,261	167,589	122,127	55,095	2,098	53,436	controllers	GRI Vol. 5	373	362	339	353	402	386	scfd/device	GRI Vol. 12	No	1,207,519	873,142	-	334,377	62.70	45.33	-	17.36	n/a	n/a	n/a
Production	Pneumatic Devices	PN	Yes	High-Bleed Pneumatics	49%	855,785,271	133,434,776	300,282,756	216,624,816	98,718,164	3,759,156	95,745,600	controllers	GRI Vol. 5	1,792	1,792	1,792	1,792	1,792	1,792	scfd/device	GRI Vol. 12	No	587,814.81	425,041.32	-	162,773	30.52	22.07	-	8.45	Yes (new)	Replace controller or adjust bleed rate to be less than 6 scfh	Unspecified
Production	Pneumatic Devices	PN	Yes	Intermittent-Bleed Pneumatics	51%	422,948,597	68,370,638	148,304,786	108,074,038	48,755,301	1,856,586	47,287,200	controllers	GRI Vol. 5	885	885	885	885	885	885	scfd/device	GRI Vol. 12	No			-		-	-	-	-	No		Unspecified
Production	Pneumatic Devices		Yes	Low-Bleed Pneumatics	0%	-	-	-	-	-	-	-	controllers	GRI Vol. 5	0	0	0	0	0	0	scfd/device	GRI Vol. 12	Yes			-		-	-	-	-	No	n/a	n/a
Production	Chemical Injection Pumps	PN	Yes	Chemical Injection Pumps - Total	100%	37,477	795	15,343	14,849	2,531	1,422	2,537	pumps	GRI Vol. 13	258	250	244	253	289	278	scfd/pump	GRI Vol. 13	No	67,341	2,771	-	64,571	3.50	0.14	-	3.35	No	n/a	n/a
Production	Chemical Injection Pumps	PN2	Yes	Pistons	10%	5,133,836	108,904	2,101,781	2,034,110	346,712	194,795	347,534	pumps	GRI Vol. 13	136.99	136.99	136.99	136.99	136.99	136.99	scfd/pump	GRI Vol. 13	No					-	-	-	-	No	n/a	n/a
Production	Chemical Injection Pumps	PN2	Yes	Diaphragms	90%	45,795,814	971,425	18,747,885	18,144,256	3,092,674	1,737,567	3,100,105	pumps	GRI Vol. 13	1,221.92	1,221.92	1,221.92	1,221.92	1,221.92	1,221.92	scfd/pump	GRI Vol. 13	No					-	-	-	-	No	n/a	n/a
Production	Kimray Pumps	PN	Yes	Kimray Pumps	100%	19,216,515	6,487,241	4,409,271	3,404,114	1,692,957	85,450	3,137,482	MMscf/yr	GRI Vol. 15	1,073	1,040	975	1,014	1,157	1,110	scf/MMscf	GRI Final Report	No	388,378	-	-	388,378	20.16	-	-	20.16	No	n/a	n/a
Production	Dehydrator Vents		Yes	Dehydrator Vents	100%	21,567,356	7,280,854	4,948,676	3,820,555	1,900,064	95,903	3,521,304	MMscf/yr	GRI Vol. 5	298.10	288.90	270.90	281.60	321.30	308.50	scf/MMscf	GRI Vol. 14	No	121,100	-	38,859	82,241	6.29	-	2.02	4.27	No	n/a	n/a
Production	Condensate Tanks w/o Control	NA	Yes	Condensate Tanks w/o Control	100%	86	1	19	5	10	10	43	MMbbl/yr	2004 ICF Memo	21.87	302.75	21.87	302.75	21.87	21.87	scf/bbl	E&P Tank	No	187,700	-	60,299	127,401	9.75	-	3.13	6.61	Yes (new)	Closed vent system (and route vapors to process or control device) or floating roof tank	95%
Production	Condensate Tanks w/ Control		Yes	Condensate Tanks w/ Control	100%	86	1	19	5	10	10	43	MMbbl/yr	2004 ICF Memo	4.37	60.55	4.37	60.55	4.37	4.37	scf/bbl	E&P Tank	Yes	37,540	-	-	37,540	1.95	-	-	1.95	Yes	Cover requirements and closed vent system requirements (route vapors to process or control device)	n/a since controlled (if <6 ton/yr)
Production	Gas Engines		Yes	Gas Engines	100%	54,971	-	19,041	14,701	7,311	369	13,549	MMHPhr	GRI Vol. 11	0.26	0.25	0.24	0.25	0.28	0.27	scf/HPhr	GRI Vol. 11	No	265,696	139,913	-	125,783	13.80	7.26	-	6.53	No	n/a	n/a
Production	Liquids Unloading - w/ Plungers	LU	Yes	Liquids Unloading - w/ Plungers	100%	23,503	6,924	2,516	10,741	1,379	159	1,784	venting wells	2012 API/ANGA	268,185	1,140,052	119,523	2,856	317,292	61,758	scfy/venting well	2012 API/ANGA	Yes	118,905	-	-	118,905	6.17	-	-	6.17	No	n/a	n/a
Production	Liquids Unloading - w/o Plungers	LU	Yes	Liquids Unloading - w/o Plungers	100%	37,307	17,906	4,469	1,267	8,078	142	5,445	venting wells	2012 API/ANGA	141,646	190,179	1,998,082	77,899	279,351	265,120	scfy/venting well	2012 API/ANGA	No	154,664	-	-	154,664	8.03	-	-	8.03	No	n/a	n/a
Production	Vessel Blowdowns		Yes	Vessel Blowdowns	100%	455,376	135,353	105,936	91,296	40,343	3,915	78,533	vessels	GRI Vol. 7	84	82	77	80	91	87	scfy/vessel	GRI Vol. 6	No	722	-	-	722	0.04	-	-	0.04	No	n/a	n/a
Production	Pipeline Blowdowns		Yes	Pipeline Blowdowns	100%	445,135	77,956	81,359	107,797	60,832	16,712	100,479	miles	GRI Vol. 7	334	324	304	316	360	346	scfy/mile	GRI Vol. 6	No	2,795	-	-	2,795	0.15	-	-	0.15	No	n/a	n/a
Production	Compressor Blowdowns		Yes	Compressor Blowdowns	100%	35,930	159	12,210	9,260	5,642	2,431	6,228	compressors	GRI Vol. 7	4,082	3,957	3,710	3,856	4,400	4,224	scfy/compressor	GRI Vol. 6	No	2,736	-	-	2,736	0.14	-	-	0.14	No	n/a	n/a
Production	Compressor Starts		Yes	Compressor Starts	100%	35,930	159	12,210	9,260	5,642	2,431	6,228	compressors	GRI Vol. 7	9,133	8,852	8,300	8,627	9,844	9,450	scfy/compressor	GRI Vol. 6	No	6,122	512	-	5,609	0.32	0.03	-	0.29	No	n/a	n/a
Production	Pressure Relief Valves		Yes	Pressure Relief Valves	100%	1,050,977	354,796	241,149	186,176	92,590	4,673	171,593	PRV	GRI Vol. 6	37	36	33	35	40	38	scfy/PRV	GRI Vol. 6	No	728	-	-	728	0.04	-	-	0.04	No	n/a	n/a
Production	Mishaps		Yes	Mishaps	100%	111,284	19,489	20,340	26,949	15,208	4,178	25,120	miles	"History Data"	724	701	656	684	780	749	scf/mile	GRI Vol. 6	No	1,513	-	-	1,513	0.08	-	-	0.08	No	n/a	n/a
Production	AGR Vents		No																													No	n/a	n/a
Production	Flaring		No																													No	n/a	n/a
Production	Well Testing		No																													No	n/a	n/a
Production	Centrifugal Compressors (wet seals)		No																													Yes	Equip compressor degassing system with a cover connected to closed vent system which routes gas to either a control device or process	95%
Production	Centrifugal Compressors (dry seals)		No																													Yes	N/A	N/A
Production	**All Production Inventory Sources**			**TOTAL**																				**3,437,606**	**1,635,654**	**99,158**	**2,322,110**	**178.48**	**52.77**	**5.15**	**120.57**			

*Values pulled from inventory may not match total due to decimal rounding

Cell: X2
Comment: Indicates whether the EF takes into account control measures

Cell: BS2
Comment: Matt Kelly:
Values listed for large reciprocating compressors based on transmission values since EF reference in inventory is the same

Cell: Z28
Comment: Includes "Other" Reductions

Data from Year 2012 (2014 US Inventory)

DRAFT

Segment	Emission Source	NSPS/White Paper Category	Source Covered by EPA Inventory?	Emission Source Breakout	Source Breakout %	Inventory AF	Inventory AF Units	Inventory EF	Inventory EF Units	Controlled EF?	Inventory Gross Emissions	Inventory Gas STAR Reductions	Inventory Regulatory Reductions	Inventory Net Emissions	Inventory Gross Emissions	Inventory Gas STAR Reductions	Inventory Regulatory Reductions	Inventory Net Emissions	2012 NSPS		
											(tonnes)				(Bcf)				Covered	Recommendend Control Technology	Reduction %
Oil Production	Oil Tank Venting	NA (Tanks)	Yes	Oil Tank Venting	100%	1,878	MMbbl/yr (non stripper wells)	7.39	scf of CH4/bbl crude	No	267,527	-	-	267,527	13.890	-	-	13.890	Yes (new)		
Oil Production	Pneumatic Devices, High Bleed	PN	Yes	Pneumatic Devices, High Bleed	100%	145,179	No. of high-bleed devices	330.40	scfd CH4/device	No	337,204	-	-	337,204	17.508	-	-	17.508	Yes (new)		
Oil Production	Pneumatic Devices, Intermittent Bleed	PN	No	Pneumatic Devices, Intermittent Bleed						No	-	-	-	-	-	-	-	-	No		
Oil Production	Pneumatic Devices, Low Bleed		Yes	Pneumatic Devices, Low Bleed	100%	269,618	No. of low-bleed devices	52.00	scfd CH4/device	Yes	98,560	-	-	98,560	5.117	-	-	5.117	No		
Oil Production	*Chemical Injection Pumps*	*PN*	*Yes*	*Chemical Injection Pumps - Total*	*100%*	*28,702*	*No. of pumps*	*248.05*	*scfd CH4/pump*	*No*	*50,049*	-	-	*50,049*	*2.599*	-	-	*2.599*	No		
Oil Production	Chemical Injection Pumps		Yes	Pistons	50%	14,293	No. of pumps	248.00	scfd CH4/pump	No	24,924	-	-	24,924	1.294	-	-	*1.294*	No		
Oil Production	Chemical Injection Pumps		Yes	Diaphragms	50%	14,408	No. of pumps	248.00	scfd CH4/pump	No	25,125	-	-	25,125	1.304	-	-	*1.304*	No		
Oil Production	Vessel Blowdowns		Yes	Vessel Blowdowns	100%	189,710	No. of vessels	78.01	scfy CH4/vessel	No	285	-	-	285	0.015	-	-	0.015	No		
Oil Production	Compressor Blowdowns		Yes	Compressor Blowdowns	100%	2,582	No. of compressors	3775.00	scf/yr of CH4/compressor	No	188	-	-	188	0.010	-	-	0.010	No		
Oil Production	Compressor Starts		Yes	Compressor Starts	100%	2,582	No. of compressors	8442.63	scf/yr of CH4/compressor	No	420	-	-	420	0.022	-	-	0.022	No		
Oil Production	Stripper Wells Venting	AG	Yes	Stripper Wells Venting	100%	315,213	No. of stripper wells vented	2345.00	scf/yr of CH4/stripper well	No	14,236	-	-	14,236	0.739	-	-	0.739	No		
Oil Production	Well Completion Venting (all well types- 2014 Inventory)		Yes	Well Completion Venting	100%	15,753	Oil well completions (all well types- 2014 Inventory)	733.00	scf/completion	No	222	-	-	222	0.012	-	-	0.012	No		
Oil Production	Well Workovers (all well types- 2014 Inventory)		Yes	Well Workovers	100%	40,200	Oil well workovers (all well types- 2014 Inventory)	96.00	scf CH4/workover	No	74	-	-	74	0.004	-	-	0.004	No		
Oil Production	Pipeline Pigging		Yes	Pipeline Pigging	100%	0	No. of crude pig stations	2.40	scfd of CH4/pig station	No	-	-	-	-	-	-	-	-	No		
Oil Production	*Oil Wellheads (heavy crude)*	*EL*	*Yes*	*Oil Wellheads (heavy crude) - Total*	*100%*	*15,565*	*No. of heavy crude wells*	*0.13*	*scfd/well*	*No*	*14*	-	-	*14*	*0.001*	-	-	*0.000721*	No		
Oil Production	Oil Wellheads (heavy crude)	EL2	Yes	Valves	39%	77,827	No. of valves on heavy crude oil wellheads	0.01	scfd/well	No	*5*	-	-	5	0.000	-	-	*0.000278*	No		
Oil Production	Oil Wellheads (heavy crude)	EL2	Yes	Flanges	4%	155,655	No. of flanges on heavy crude oil wellheads	0.00	scfd/well	No	*1*	-	-	1	0.000	-	-	*0.000027*	No		
Oil Production	Oil Wellheads (heavy crude)	EL2	Yes	Polished Rods	30%	15,565	No. of polished rods on heavy crude oil wellheads	0.04	scfd/well	No	*4*	-	-	4	0.000	-	-	*0.000215*	No		
Oil Production	Oil Wellheads (heavy crude)	EL2	Yes	Connectors	28%	62,262	No. of connectors on heavy crude oil wellheads	0.01	scfd/well	No	*4*	-	-	4	0.000	-	-	*0.000202*	No		
Oil Production	*Oil Wellheads (light crude)*	*EL*	*Yes*	*Oil Wellheads (light crude) - Total*	*100%*	*205,222*	*No. of light crude wells*	*16.63*	*scfd/well*	*No*	*23,992*	-	-	*23,992*	*1.246*	-	-	*1.246*	No		
Oil Production	Oil Wellheads (light crude)	EL2	Yes	Valves	56%	1,026,109	No. of valves on light crude oil wellheads	1.88	scfd/well	No	*13,537*	-	-	13,537	0.703	-	-	*0.703*	No		
Oil Production	Oil Wellheads (light crude)	EL2	Yes	Flanges	5%	2,052,217	No. of flanges on light crude oil wellheads	0.08	scfd/well	No	*1,208*	-	-	1,208	0.063	-	-	*0.063*	No		
Oil Production	Oil Wellheads (light crude)	EL2	Yes	Polished Rods	35%	205,222	No. of polished rods on light crude oil wellheads	5.77	scfd/well	No	*8,331*	-	-	8,331	0.433	-	-	*0.433*	No		
Oil Production	Oil Wellheads (light crude)	EL2	Yes	Connectors	4%	820,887	No. of connectors on light crude oil wellheads	0.16	scfd/well	No	*916*	-	-	916	0.048	-	-	*0.048*	No		
Oil Production	*Separators (heavy crude)*	*EL*	*Yes*	*Separators (heavy crude) - Total*	*100%*	*11,142*	*No. of heavy crude seps.*	*0.15*	*scfd CH4/separator*	*No*	*12*	-	-	*12*	*0.001*	-	-	*0.001*	No		
Oil Production	Separators (heavy crude)	EL2	Yes	Valves	38%	66,851	No. of valves on heavy crude separators	0.01	scfdCH4/separator	No	*4.6*	-	-	4.6	0.000	-	-	*0.0002*	No		
Oil Production	Separators (heavy crude)	EL2	Yes	Flanges	4%	133,702	No. of flanges on heavy crude separators	0.00	scfdCH4/separator	No	*0.4*	-	-	0.4	0.000	-	-	*0.00002*	No		
Oil Production	Separators (heavy crude)	EL2	Yes	Connectors	58%	111,418	No. of connectors on heavy crude separators	0.01	scfdCH4/separator	No	*7.0*	-	-	7.0	0.000	-	-	*0.00036*	No		
Oil Production	*Separators (light crude)*	*EL*	*Yes*	*Separators (light crude) - Total*	*100%*	*101,402*	*No. of light crude seps.*	*13.85*	*scfd CH4/separator*	*No*	*9,875*	-	-	*9,875*	*0.513*	-	-	*0.513*	No		
Oil Production	Separators (light crude)	EL2	Yes	Valves	81%	608,411	No. of valves on light crude separators	1.88	scfdCH4/separator	No	*8,027*	-	-	8,027	0.417	-	-	*0.417*	No		
Oil Production	Separators (light crude)	EL2	Yes	Flanges	7%	1,216,821	No. of flanges on light crude separators	0.08	scfdCH4/separator	No	*716*	-	-	716	0.037	-	-	*0.037*	No		
Oil Production	Separators (light crude)	EL2	Yes	Connectors	11%	1,014,018	No. of connectors on light crude separators	0.16	scfdCH4/separator	No	*1,132*	-	-	1,132	0.059	-	-	*0.059*	No		
Oil Production	*Heater/Treaters (light crude)*	*EL*	*Yes*	*Heater/Treaters (light crude) - Total*	*100%*	*77,166*	*No. of heater-treaters*	*19.19*	*scfd CH4/heater-treater*	*No*	*10,412*	-	-	*10,412*	*0.541*	-	-	*0.541*	No		
Oil Production	Heater/Treaters (light crude)	EL2	Yes	Valves	78%	617,330	No. of valves on light crude heaters/treaters	1.88	scfd CH4/heater-treater	No	*8,144*	-	-	8,144	0.423	-	-	*0.423*	No		
Oil Production	Heater/Treaters (light crude)	EL2	Yes	Flanges	5%	925,995	No. of flanges on light crude heaters/treaters	0.08	scfd CH4/heater-treater	No	*545*	-	-	545	0.028	-	-	*0.028*	No		
Oil Production	Heater/Treaters (light crude)	EL2	Yes	Connectors	17%	1,543,325	No. of connectors on light crude heaters/treaters	0.16	scfd CH4/heater-treater	No	*1,723*	-	-	1,723	0.089	-	-	*0.089*	No		
Oil Production	*Headers (heavy crude)*	*EL*	*Yes*	*Headers (heavy crude) - Total*	*100%*	*13,982*	*No. of heavy crude headers*	*0.08*	*scfd CH4/header*	*No*	*8*	-	-	*8*	*0.000*	-	-	*0.0004*	No		
Oil Production	Headers (heavy crude)	EL2	Yes	Valves	55%	69,908	No. of valves on heavy crude headers	0.01	scfd CH4/header	No	*4.1*	-	-	4.1	0.000	-	-	*0.0002*	No		
Oil Production	Headers (heavy crude)	EL2	Yes	Flanges	5%	139,816	No. of flanges on heavy crude headers	0.00	scfd CH4/header	No	*0.4*	-	-	0.4	0.000	-	-	*0.00002*	No		
Oil Production	Headers (heavy crude)	EL2	Yes	Connectors	40%	55,926	No. of connectors on heavy crude headers	0.01	scfd CH4/header	No	*3.0*	-	-	3.0	0.000	-	-	*0.0002*	No		
Oil Production	*Headers (light crude)*	*EL*	*Yes*	*Headers (light crude) - Total*	*100%*	*43,344*	*No. of light crude headers*	*10.86*	*scfd CH4/header*	*No*	*3,308*	-	-	*3,308*	*0.172*	-	-	*0.172*	No		
Oil Production	Headers (light crude)	EL2	Yes	Valves	86%	216,722	No. of valves on light crude headers	1.88	scfd CH4/header	No	*2,859*	-	-	2,859	0.148	-	-	*0.148*	No		
Oil Production	Headers (light crude)	EL2	Yes	Flanges	8%	433,444	No. of flanges on light crude headers	0.08	scfd CH4/header	No	*255*	-	-	255	0.013	-	-	*0.013*	No		
Oil Production	Headers (light crude)	EL2	Yes	Connectors	6%	173,378	No. of connectors on light crude headers	0.16	scfd CH4/header	No	*194*	-	-	194	0.010	-	-	*0.010*	No		
Oil Production	Floating Roof Tanks	NA (Tanks)	Yes	Floating Roof Tanks	100%	24	No. of floating roof tanks	338306.41	scf CH4/floating roof tank/yr	No	159	-	-	159	0.008	-	-	0.008	No		
Oil Production	Compressors		Yes	Compressors	100%	2,582	No. of compressors	100.00	scfd CH4/compressor	No	1,815	-	-	1,815	0.094	-	-	0.094	Yes		
Oil Production	Large Compressors		Yes	Large Compressors	100%	0	No. of large comps.	16360.00	scfd CH4/compressor	No	-	-	-	-	-	-	-	-	Yes		
Oil Production	Sales Areas		Yes	Sales Areas	100%	1,974,334	Loadings/year	40.55	scfd CH4/loading	No	1,542	-	-	1,542	0.080	-	-	0.080	No		
Oil Production	Pipelines		Yes	Pipelines	100%	14,077	Miles of gathering line	0.00	scfd of CH4/mile of pipeline	No	-	-	-	-	-	-	-	-	No		
Oil Production	Well Drilling		Yes	Well Drilling	100%	17,774	No. of oil wells drilled	0.00	scfd of CH4/oil well drilled	No	-	-	-	-	-	-	-	-	No		
Oil Production	Battery Pumps		Yes	Battery Pumps	100%	160,800	No. of battery pumps	0.24	scfd of CH4/pump	No	271	-	-	271	0.014	-	-	0.014	No		
Oil Production	Gas Engines		Yes	Gas Engines	100%	16,264	MMHP-hr	0.24	scf CH4/HP-hr	No	75,177	-	-	75,177	3.903	-	-	3.903	Yes		
Oil Production	Heaters		Yes	Heaters	100%	2,370	MMbbl/yr	0.52	scf CH4/bbl	No	23,782	-	-	23,782	1.235	-	-	1.235	No		
Oil Production	Well Drilling		Yes	Well Drilling	100%	17,774	Oil wells drilled	2453.15	scf CH4/well drilled	No	840	-	-	840	0.044	-	-	0.044	No		
Oil Production	Flares		Yes	Flares	100%	305,587	Mcf flared/yr	20.00	scf per Mcf flared	No	118	-	-	118	0.006	-	-	0.006	No		
Oil Production	Pressure Relief Valves		Yes	Pressure Relief Valves	100%	197,931	No. of PR valves	34.70	scf/yr/PR valve	No	132	-	-	132	0.007	-	-	0.007	No		
Oil Production	Well Blowouts Onshore		Yes	Well Blowouts Onshore	100%	59	No. of blowouts/yr	2.50	MMscf/blowout	No	2,853	-	-	2,853	0.148	-	-	0.148	No		
Oil Production	Centrifugal Compressors (wet seals)		No	Centrifugal Compressors (wet seals)						n/a									Yes		
Oil Production	Centrifugal Compressors (dry seals)		No	Centrifugal Compressors (dry seals)						n/a									No		
Oil Production	**All Oil Production Inventory Sources**			**TOTAL**							**923,075**	**45,081**	**-**	**877,994**	**47.927**	**2.341**	**-**	**45.586**			

Cell: G2
Comment: Source of AF indicated in comment.

Cell: I2
Comment: Source of EF indicated in comment.

Cell: K2
Comment: Indicates whether the EF takes into account control measures.

Cell: G4
Comment: Throughput is estimated based on:
Total Crude Oil Production in the Lower 48 States minus (80% of Total Stripper Well Production [see below])

This "80% of stripper well production" is taken from ICF "Estimates of Methane Emissions from the U.S. Oil Industry" Oct. 1999.

The source of the value is: ARCO Laboratory, Plano, TX, personal communication. Based on assumed reservoir pressure of 25 to 50 psia.

Earlier Assumption
Consensus of Industry Review Panel - 29% of prod. has emissions flared, to VRUs, or in floating roof tanks; also subtract 80% vented stripper well production; avg. of light and heavy crude emissions from tanks

Cell: I4
Comment: TankCALC

5.28 scf/bbl is the average from API TankCalc Runs for oils with API gravity < 45.
The earlier value 18 scf/bbl was an average for oils of all gravities (API 17 thru API 66). This lighter oils at API 45 and above are listed as condensate tanks and are accoutned for in the Gas model.

This EF was updated on 11/12/10 to account for malfunctioning dump valves in regions of Texas.

Cell: G5
Comment: Consensus of Industry Review Panel
(Use 4 devices per heater/treater + 3 devices per battery without heater/treater) x 35% high-bleed

Cell: I5
Comment: Changed in 2002 Based on new analysis.

Previous comment was: EPA default value of 140 Mcf/device

Cell: G7
Comment: Consensus of Industry Review Panel
(Use 4 devices per heater/treater + 3 devices per battery without heater/treater) x 65% low-bleed

Cell: I7
Comment: Changed in 2002 Based on new analysis.

Previous comment was: EPA default value for high bleed * 0.1.

Cell: G8
Comment: Based on Radian report, Table 5-4, p28:

By calculating the MEAN((# of Total producing oil wells for year N * 125088 [CIP Radian estimates Year 1993]) / (# of Total producing oil wells for year 1993)), Where N=Year

Multiplied the result by 25%

Ron Rayman from Dresser Texsteam: 25% of pumps use methane (1 million CIPs, 80-85% for Pet E&P, 25% on methane)

Cell: I8
Comment: GRI/EPA, Methane Emissions from the Natural Gas Industry, Vol.13,p.16, April 1996 & Radian Table 5-5 ; Radian EF is 248 scfd/pump for gas + oil production.

Cell: G11
Comment: Based on ICF estimates.
The number of vessels = Sum of separators and heater/treaters.

Cell: I11
Comment: GRI/EPA, Methane Emissions from the Natural Gas Industry, Vol.7, 4/96.

Cell: G12
Comment: Number of compressors. (See "Fugitive emissions - Compressors")

Cell: I12
Comment: GRI/EPA, Methane Emissions from the Natural Gas Industry, Vol.7, 4/96.

Cell: G13
Comment: Number of compressors. (See "Fugitive emissions - Compressors")

Cell: I13
Comment: GRI/EPA, Methane Emissions from the Natural Gas Industry, Vol.7, 4/96.

Cell: G14
Comment: IPAA, 80% vented per Jim Collins/Jerry Mulligan
Data found from Survey of Stripper Wells

Cell: I14
Comment: Jim Collins memo,2.1 bbl/d,5scf/bbl, CH4 in light oil is 61.2%.

Cell: G15
Comment: EIA Monthly Energy Review (August 2013)

Table 5.2: Crude Oil and Natural Gas Exploratory and Development Wells

http://www.eia.gov/totalenergy/data/monthly/pdf/sec5_4.pdf

See “Wells & production data” tab

Note: Data for 2011 forward in this table have been removed while EIA evaluates the quality of the data and the esimation methodology.

Cell: I15
Comment: GRI/EPA, Methane Emissions from the Natural Gas Industry, Vol.6, April 1996; EF is for gas wells not oil wells.

Cell: G16
Comment: Radian, p.32 for 7.5%/yr worked over.

Cell: I16
Comment: Radian 1996 Table 6-1; Radian EF not found in ref. PSI report.

Cell: G17
Comment: Consensus of Industry Review Panel.

Cell: I17
Comment: CAPP, A Detailed Invetory of CH4 and VOC Emissions from Upstream Oil & Gas Operations in Alberta 3/92, Vol.II

Cell: G18
Comment: Radian Table 5-2

Assumed that heavy crude wells are 7.05% of Total producing oil wells and 80% of stripper wells are vented.

(7.05% * Total producing oil wells) – (7.05% * Total stripper wells * 80%)

Cell: I18
Comment: Consensus of Industry Review Panel - EFs from API Workbook 4638, 1996; Assume 5 valves, 10 flanges, 1 polished rod & 4 connectors/well

Cell: G23
Comment: Radian Table 5-2

Assumed that light crude wells are 92.95% of Total producing oil wells and 80% of stripper wells are vented.

(92.95% * Total producing oil wells) – (92.95% * Total stripper wells * 80%)

Cell: I23
Comment: Consensus of Industry Review Panel - EFs from API Workbook 4638, 1996; Assume 5 valves, 10 flanges, 1 polished rod & 4 connectors/well.

Cell: G28
Comment: Radian report, Table 5-4, p28

Calculating the mean of:
((# of Total producing oil wells for year N * 217804 [S Radian estimates Year 1993]) / (# of Total producing oil wells for year 1993))

and

((Annual domestic production for year N * 26562 [S Radian estimates Year 1993]) / (Annual domestic production for year 1993))

Multiply the result by .099 (ICF number)
Where N = Current Year

Cell: I28
Comment: Consensus of Industry Review Panel - EFs from API Workbook 4638, 1996; Assume 6 valves, 12 flanges and 10 connector/separator.

Cell: G32
Comment: Radian report, Table 5-4, p28

Calculating the mean of:
((# of Total producing oil wells for year N * 217804 [S Radian estimates Year 1993]) / (# of Total producing oil wells for year 1993))

and

((Annual domestic production for year N * 26562 [S Radian estimates Year 1993]) / (Annual domestic production for year 1993))

Multiply the result by .901 (ICF number)
Where N = Current Year

Cell: I32
Comment: Consensus of Industry Review Panel - EFs from API Workbook 4638, 1996; Assume 6 valves, 12 flanges and 10 connector/separator.

Cell: G36
Comment: Radian report, Table 5-4, p28

Calculating the mean of:
((# of Total producing oil wells for year N * 143491 [H/T Radian estimates Year 1993]) / (# of Total producing oil wells for year 1993))

and

((Annual domestic production for year N * 23873 [H/T Radian estimates Year 1993]) / (Annual domestic production for year 1993))

Where N = Current Year

Cell: I36
Comment: Consensus of Industry Review Panel - EFs from API Workbook 4638, 1996; Assume 8 valves, 12 flanges and 20 connectors/heater treater.

Cell: G40
Comment: Radian report, p.32

# of Total producing oil wells for year N * 7.05% * 0.37

Where N = Current Year

Cell: I40
Comment: Consensus of Industry Review Panel - EFs from API Workbook 4638, 1996; Assume 5 valves, 10 flanges and 4 connectors/header.

Cell: G44
Comment: Radian report, p.32

# of Total producing oil wells for year N * 92.95% * 0.087

Where N = Current Year

Cell: I44
Comment: Consensus of Industry Review Panel - EFs from API Workbook 4638, 1996; Assume 5 valves, 10 flanges and 4 connectors/header.

Cell: G48
Comment: Assumed to be same as 1995 value. Industry panel & Entropy tank survey. Est 5% of large tanks are floaters.

Cell: I48
Comment: EF AP-42 chapter on emissions from floating roof tanks & API Workbook#4638, 1996 for % CH4.

Cell: G49
Comment: Radian report, Table 5-4, p28

Calculating the mean of:
((# of Total producing oil wells for year N * 12523 [H/T Radian estimates Year 1993]) / (# of Total producing oil wells for year 1993))

and

((Annual domestic production for year N * 2162 [C Radian estimates Year 1993]) / (Annual domestic production for year 1993))

Multiply the result by 0.381215 (correction factor)
Where N = Current Year

Cell: I49
Comment: Consensus of Industry Review Panel.

Cell: G50
Comment: Assumed to be same as 1995 value.

Cell: I50
Comment: Consensus of Industry Review Panel.

Cell: G51
Comment: Assume number of loadings is proportional to Annual Domestic Production based on the given 1995 value.

Cell: I51
Comment: Consensus of Industry Review Panel that sales area fugitives mostly from truck loading and 25% of crude transported on trucks.

Cell: G52
Comment: Oil & Gas Journal. "US pipeline operators sink revenue growth into expansion." Volume 111, Issue 9. September 2, 2013.

Oil Pipeline Companies Data:

http://www.ogj.com/content/dam/ogj/print-articles/Volume%20111/sept-02/Oil-Pipeline-Companies.pdf

"Total Miles of Gathering Pipeline" (1st Column)

Cell: I52
Comment: Assumed to be 0 until further data becomes available.

Cell: G53
Comment: EIA Monthly Energy Review (August 2013)

Table 5.2: Crude Oil and Natural Gas Exploratory and Development Wells
http://www.eia.gov/totalenergy/data/monthly/pdf/sec5_4.pdf

To calculate the Total Number of Crude Oil Wells Drilled:
TCO = Total Crude Oil wells (including Exploratory & Development)
TNG = Total Natural Gas wells (including Exploratory & Development)
DRY = Total Dry wells (including Exploratory & Development)

Crude Oil Wells Drilled = TCO + ([TCO/(TCO+TNG)]*DRY)

See “Wells & production data” tab

Note: Data for 2011 forward in this table have been removed while EIA evaluates the quality of the data and the esimation methodology.

Cell: I53
Comment: Currently: Assumed to be 0 until new data becomes available.

Previously: CAPP, A Detailed Invetory of CH4 and VOC Emissions from Upstream Oil & Gas Operations in Alberta 3/92, Vol.II

Cell: G54
Comment: Consensus of Industry Review Panel:
1 pump/battery w/LACT unit
75% batteries have LACT unit
2.5 wells per battery

Cell: I54
Comment: API Pub.4615.

Cell: G55

Comment: Based on Radian P.25-31.
(Number of compressors [see “Fugitive Emissions – Compressors”] * 6.3 MMhp/hr/compressor) – (Total engine consumption by the number of engines)

Where N is the Year (1990-2000)

Cell: I55
Comment: GRI/EPA, Methane Emissions from the Natural Gas Industry, Vol.11, April 1996;

Cell: G56
Comment: Emissions calculated from Annual Domestic Oil Production

Cell: I56
Comment: EPA, AP-42, Table 1.3-2.

Cell: G57
Comment: EIA Monthly Energy Review (August 2013)

Table 5.2: Crude Oil and Natural Gas Exploratory and Development Wells
http://www.eia.gov/totalenergy/data/monthly/pdf/sec5_4.pdf

To calculate the Total Number of Crude Oil Wells Drilled:
TCO = Total Crude Oil wells (including Exploratory & Development)
TNG = Total Natural Gas wells (including Exploratory & Development)
DRY = Total Dry wells (including Exploratory & Development)

Crude Oil Wells Drilled = TCO + ([TCO/(TCO+TNG)]*DRY)

See “Wells & production data” tab

Note: Data for 2011 forward in this table have been removed while EIA evaluates the quality of the data and the esimation methodology.

Cell: I57
Comment: API, Global Ems. of Methane from Pet.Sources, 1992, p.5-2.

Cell: G58
Comment: Only 2.2% of production emissions is flared per well

Cell: I58
Comment: CAPP, A Detailed Invetory of CH4 and VOC Emissions from Upstream Oil & Gas Operations in Alberta 3/92, Vol.II

Cell: G59
Comment: No. of PR Valves assumed to be proportional to production based on the 1995 value from the Industry Review Panel.

Cell: I59
Comment: GRI/EPA, Methane Emissions from the Natural Gas Industry, Vol.7,Table 5-9, 4/96.

Cell: G60
Comment: Consensus of Industry Review Panel - 1 blowout per 300 wells drilled

Cell: I60
Comment: Assumes avg. onshore blowout EF is 50% of offshore

Cell: Q63
Comment: Includes "Other" reductions

Data from Year 2012 (*2014 US Inventory*) **DRAFT**

Segment	Emission Source	Source Covered by EPA Inventory?	Emission Source Breakout	Source Breakout %	Inventory AF	Inventory AF Units	Inventory AF Reference	Inventory EF	Inventory EF Units	Inventory EF Reference	Controlled EF?	Inventory Gross Emissions (tonnes)	Inventory Gas STAR Reductions (tonnes)	Inventory Regulatory Reductions (tonnes)	Inventory Net Emissions (tonnes)	Inventory Gross Emissions (Bcf)	Inventory Gas STAR Reductions (Bcf)	Inventory Regulatory Reductions (Bcf)	Inventory Net Emissions (Bcf)	NSPS Applicable?	NSPS Recommendend Control Technology	NSPS Reduction %	NESHAP	Subpart W	Notes on Potential New Data Sources
Distribution	Mains - Cast Iron	Yes	Mains - Cast Iron	100%	32,418	miles	PHMSA	238.7	Mscf/mile-yr	GRI Vol. 9	No	149,037	51	-	148,986	*7.74*	*0.00*	-	*7.74*	No	n/a	n/a	No	Yes	
Distribution	Mains - Unprotected steel	Yes	Mains - Unprotected steel	100%	63,727	miles	PHMSA	110.19	Mscf/mile-yr	GRI Vol. 9	No	135,245	-	-	135,245	*7.02*	-	-	*7.02*	No	n/a	n/a	No	Yes	
Distribution	Mains - Protected steel	Yes	Mains - Protected steel	100%	487,225	miles	PHMSA	3.07	Mscf/mile-yr	GRI Vol. 9	Yes	28,780	-	-	28,780	*1.49*	-	-	*1.49*	No	n/a	n/a	No	Yes	
Distribution	Mains - Plastic	Yes	Mains - Plastic	100%	661,100	miles	PHMSA	9.91	Mscf/mile-yr	2005 ICF Memo	Yes	126,182	-	-	126,182	*6.55*	-	-	*6.55*	No	n/a	n/a	No	Yes	
Distribution	Services - Unprotected steel	Yes	Services - Unprotected steel	100%	3,916,353	services	PHMSA	1.70	Mscf/service	GRI Vol. 9	No	128,287	-	-	128,287	*6.66*	-	-	*6.66*	No	n/a	n/a	No	Yes	
Distribution	Services Protected steel	Yes	Services Protected steel	100%	14,951,473	services	PHMSA	0.18	Mscf/service	GRI Vol. 9	Yes	50,825	-	-	50,825	*2.64*	-	-	*2.64*	No	n/a	n/a	No	Yes	
Distribution	Services - Plastic	Yes	Services - Plastic	100%	45,147,410	services	PHMSA	0.01	Mscf/service	GRI Vol. 9	Yes	8,085	-	-	8,085	*0.42*	-	-	*0.42*	No	n/a	n/a	No	Yes	
Distribution	Services - Copper	Yes	Services - Copper	100%	1,009,255	services	PHMSA	0.25	Mscf/service	GRI Vol. 9	No	4,944	-	-	4,944	*0.26*	-	-	*0.26*	No	n/a	n/a	No	Yes	
Distribution	M&R >300	Yes	M&R >300	100%	3,465	stations	2008 ICF Memo	179.8	scfh/station	GRI Vol. 10	No	105,101	-	-	105,101	*5.46*	-	-	*5.46*	No	n/a	n/a	Yes	Yes	
Distribution	M&R 100-300	Yes	M&R 100-300	100%	12,644	stations	2008 ICF Memo	95.6	scfh/station	GRI Vol. 10	No	203,935	-	-	203,935	*10.59*	-	-	*10.59*	No	n/a	n/a	Yes	Yes	
Distribution	M&R <100	Yes	M&R <100	100%	6,758	stations	2008 ICF Memo	4.31	scfh/station	GRI Vol. 10	No	4,914	-	-	4,914	*0.26*	-	-	*0.26*	No	n/a	n/a	Yes	Yes	
Distribution	Reg >300	Yes	Reg >300	100%	3,788	stations	2008 ICF Memo	161.9	scfh/station	GRI Vol. 10	No	103,468	-	-	103,468	*5.37*	-	-	*5.37*	No	n/a	n/a	Yes	Yes	
Distribution	R-Vault >300	Yes	R-Vault >300	100%	2,225	stations	2008 ICF Memo	1.3	scfh/station	GRI Vol. 10	No	488	-	-	488	*0.03*	-	-	*0.03*	No	n/a	n/a	Yes	Yes	
Distribution	Reg 100-300	Yes	Reg 100-300	100%	11,459	stations	2008 ICF Memo	40.5	scfh/station	GRI Vol. 10	No	78,301	-	-	78,301	*4.07*	-	-	*4.07*	No	n/a	n/a	Yes	Yes	
Distribution	R-Vault 100-300	Yes	R-Vault 100-300	100%	5,148	stations	2008 ICF Memo	0.18	scfh/station	GRI Vol. 10	No	156	-	-	156	*0.01*	-	-	*0.01*	No	n/a	n/a	Yes	Yes	
Distribution	Reg 40-100	Yes	Reg 40-100	100%	34,387	stations	2008 ICF Memo	1.04	scfh/station	GRI Vol. 10	No	6,034	-	-	6,034	*0.31*	-	-	*0.31*	No	n/a	n/a	Yes	Yes	
Distribution	R-Vault 40-100	Yes	R-Vault 40-100	100%	30,494	stations	2008 ICF Memo	0.087	scfh/station	GRI Vol. 10	No	445	-	-	445	*0.02*	-	-	*0.02*	No	n/a	n/a	Yes	Yes	
Distribution	Reg <40	Yes	Reg <40	100%	14,581	stations	2008 ICF Memo	0.133	scfh/station	GRI Vol. 10	No	327	-	-	327	*0.02*	-	-	*0.02*	No	n/a	n/a	Yes	Yes	
Distribution	Residential Meters	Yes	Residential Meters	100%	35,693,769	outdoor meters	GRI Vol. 8	143.27	scfy/meter	GRI Vol. 8	No	98,493	-	-	98,493	*5.11*	-	-	*5.11*	No	n/a	n/a	No	No	
Distribution	Commercial/Industry Meters	Yes	Commercial/Industry Meters		4,481,003	meters	GRI Vol. 8	47.9	scfy/meter	GRI Vol. 8	No	4,134	-	-	4,134	*0.21*	-	-	*0.21*	n/a	n/a	n/a	n/a	n/a	
Distribution	Commercial/Industry Meters	Yes	Commercial Meters												-	-	-	-	-	No	n/a	n/a	No	No	
Distribution	Commercial/Industry Meters	Yes	Industrial Meters												-	-	-	-	-	No	n/a	n/a	No	No	
Distribution	Pressure Relief Valve Releases	Yes	Pressure Relief Valve Releases	100%	1,244,470	miles of mains	"History Data"	0.05	Mscf/mile	GRI Vol. 6	No	1,198	-	-	1,198	*0.06*	-	-	*0.06*	No	n/a	n/a	No	Yes	
Distribution	Pipeline Blowdowns	Yes	Pipeline Blowdowns	100%	1,156,453	miles	GRI Vol. 5	0.102	Mscfy/mile	GRI Vol. 6	No	2,272	-	-	2,272	*0.12*	-	-	*0.12*	No	n/a	n/a	No	No	
Distribution	Mishaps (Dig-ins)	Yes	Mishaps (Dig-ins)	100%	1,156,453	miles	GRI Vol. 5	1.59	Mscfy/mile	GRI Vol. 6	No	35,415	711	-	34,704	*1.84*	*0.04*	-	*1.80*	No	n/a	n/a	No	No	
Distribution	**All Distribution Inventory Sources**		**TOTAL**									**1,276,067**	**44,783**	**-**	**1,231,284**	**66.25**	**2.33**	**-**	**63.93**						

Unresolved issues

Cell: L2
Comment: Indicates whether the EF takes into account control measures.

Cell: N29
Comment: Includes "Other" Reductions

Gas Processing

Gas Plants

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Valve	1.305	1,392	1,817	63%
Connection	0.117	4,392	514	18%
Open-Ended Line	0.346	134	46	2%
Pressure Relief Valve	0.859	29	25	1%
Blowdown Open-Ended Line	230	2	460	16%
			2,862 Mcf/yr	
			7,840 scf/day	

Reciprocating Compressors

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Open-Ended Line	1341	0.25	335	8%
Pressure Relief Valve	349	1	349	9%
Blowdown Open-Ended Line	2035	1	2,035	50%
Compressor Seal	450	2.5	1,125	28%
Miscellaneous	189	1	189	5%
			4,033 Mcf/yr	
			11,050 scf/day	

Centrifugal Compressors - Dry Seals

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Compressor Blowdown Open-Ended Line	6,447	1	6,447	70%
Compressor Starter Open-ended Line	1,341	1	1,341	15%
Compressor Seal (dry)	687	2	1,374	15%
Miscellaneous	31	1	31	0%
			9,193	
			25,186 scf/day	

Centrifugal Compressors - Wet Seals

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Compressor Blowdown Open-Ended Line	6,447	1	6,447	34%
Compressor Starter Open-ended Line	1,341	1	1,341	7%
Compressor Seal (wet)	10,931	1	10,931	58%
Miscellaneous	31	1	31	0%
TOTAL			**18,750**	
			51,370 scf/day	

Pneumatic Devices

Site	Device Type	Number of Devices	Operations/Year	Displacement /Device, scf
1	**Continuous** Bleed	2	**Continuous**	497,584
2	**Isolation** (Fisher)	3	12	214,675
3	**Air**			
4	**Isolation**	25	1	780
5	**Isolation Piston Type** (Rotary Vane)	7	12	48
		18	1	
6	**Isolation** (Turbine & Pneumatic/ Hydraulic type	1	1	660
		16	12	2,716
7	**Air**			
8	**Air**			
9	**Air**			

Total
Average (for gas sites)

High
Intermittient
Low

Gas Transmission and Storage

Pipeline Leaks

Pipeline Material	EF (scf/leak-yr)	AF (equivalent leaks)	Methane Emissions (Bcf)	Pipeline Miles
Protected Steel	20,270	5,077	0.10	287,155
Unprotected Steel	51,802	659	0.03	5,233
Plastic	99,845	14	0.00	2,621
Cast Iron	238,736	96	0.02	96
			0.16	295,105
				1.55
				284,500

Compressor Stations

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Valves	0.867	673	583	19%
Control Valves	8	31	248	8%
Connections	0.147	3,068	451	15%
OELs	11.2	51	571	19%
PRVs	6.2	14	87	3%
Blowdown OELs	264	4	1,056	35%

			2,996	Mcf/yr
			8,210	scf/day
		Adjusted national value	**3,200**	Mcf/yr

Reciprocating Compressors

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Blowdown OELs	3,683	1	3,683	66%
PRVs	372	1	372	7%
Miscellaneous	180	1	180	3%
Starter OELs	0	0	0	0%
Compressor Seal	396	3.3	1,307	24%
			5,542	Mcf/yr
			15,183	scf/day

Centrifugal Compressors - Wet Seals

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Compressor Blowdown Open-Ended Line	9,352	1	9,352	51%
Compressor Starter Open-ended Line	1,440	1	1,440	8%
Compressor Seal (wet)	7,521	1	7,521	41%
Miscellaneous	18	1	18	0%
			18,331	
			50,222	scf/day

Centrifugal Compressors - Dry Seals

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Compressor Blowdown Open-Ended Line	9,352	1	9,352	80%
Compressor Starter Open-ended Line	1,440	1	1,440	12%
Compressor Seal (dry)	473	2	946	8%
Miscellaneous	18	1	18	0%
TOTAL			**11,756**	
	687		**32,208**	scf/day

Storage

Compressor Stations

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Valves	0.867	1,868	1,620	21%
Connections	0.147	5,571	819	10%
OELs	11.2	353	3,954	50%
Blowdown OELs	264	4	1,056	13%
PRVs	6.2	66	409	5%
			7,857	Mcf/yr
			21,527	scf/day

Reciprocating Compressors

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Blowdown OELs	5,024	1	5,024	65%
PRVs	317	1	317	4%
Miscellaneous	153	1	153	2%
Starter OELs	1,440	1	864	11%
Compressor Seal	300	4.5	1,350	18%
			7,708 Mcf/yr	
			21,118 scf/day	

Centrifugal Compressors - Wet Seals

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Compressor Blowdown Open-Ended Line	10,233	1	10,233	62%
Compressor Starter Open-ended Line	1,440	0.5	720	4%
Compressor Seal (dry)	5,616	1	5,616	34%
Miscellaneous	17	1	17	0%
			16,586	
			45,441 scf/day	

Centrifugal Compressors - Dry Seals

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Compressor Blowdown Open-Ended Line	10,233	1	10,233	88%
Compressor Starter Open-ended Line	1,440	0.5	720	6%
Compressor Seal (wet)	353	2	706	6%
Miscellaneous	17	1	17	0%
TOTAL			**11,676**	
			31,989 scf/day	

Wells

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Valve	0.918	30	28	66%
Connection	0.125	89	11	27%
Open-Ended Line	0.237	7	2	4%
Pressure Relief Valve	1.464	1	1	4%
TOTAL			**42**	
			114 scf/day	

Station Venting

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Valve			0	#DIV/0!
Connection			0	#DIV/0!

Open-Ended Line	0	#DIV/0!
Pressure Relief Valve	0	#DIV/0!
TOTAL	**0**	
	0 scf/day	

LNG Storage & LNG Imports

LNG Storage

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Valves	0.867	1,868	1,620	21%
Connections	0.147	5,571	819	10%
OELs	11.2	353	3,954	50%
Blowdown OELs	264	4	1,056	13%
PRVs	6.2	66	409	5%
			7,857 Mcf/yr	
			21,527 scf/day	

Reciprocating Compressors

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Blowdown OELs	3,683	1	3,683	66%
PRVs	372	1	372	7%
Miscellaneous	180	1	180	3%
Starter OELs	0	0	0	0%
Compressor Seal	396	3.3	1,307	24%
			5,542 Mcf/yr	
			15,183 scf/day	

Centrifugal Compressors

Component	EF (Mcf/component)	Component Count	Emissions (Mcf)	
Compressor Blowdown Open-Ended Line	10,233	1	10,233	92%
Compressor Starter Open-ended Line	17	1	17	0%
Compressor Seal	1,440	0.5	720	6%
Miscellaneous	126	1.5	189	2%
			11,159	
			30,573 scf/day	

scfd/component
3.58
0.32
0.95
2.35
630.14

scfd/component
3673.97
956.16
5575.34
1232.88
517.81

17,663
3,674
1,882
85

17,663
3,674
29,948
85

Annual Natural Gas Emissions (scf/Site)	Hourly Bleed Rate (scf/hr)	
995,168	56.8	High
644,025	24.5	Intermittient
19,500	0.1	Intermittient
1,206	0.0	Intermittient
	0.0	Intermittient
44,115	0.1	Intermittient
	0.3	Intermittient

1,704 Mcf
341 Mscf/gas site

			scfy/device	devices/plant
995	Mcf	58%	497,584	0.2
709	Mcf	42%	10,126	7.8
0	Mcf	0%	0	0

[redacted]

EF (scfd/mile)	AF Breakout % (scaled)	EF Breakout %
1.02	97%	64%
18.54	2%	21%
1.52	1%	1%
678.45	0%	14%
1.50		

scfd/mile
mile

scfd/component	Adjusted scfd/component
2.38	2.54
21.92	23.41
0.40	0.43
30.68	32.77
16.99	18.14
723.29	772.41

scfd/component
10090.41
1019.18
493.15
0.00
1084.93

25,622
3,945
20,605
49

25,622
3,945
1,296
49

scfd/component
2.38
0.40
30.68
723.29
16.99

scfd/component
13764.38
868.49
419.18
3945.21
821.92
28,036
3,945
15,386
47
28,036
3,945
967
47
3
0
1
4
0
0

0
0

scfd/component
2.38
0.40
30.68
723.29
16.99

scfd/component
10090.41
1019.18
493.15
0.00
1084.93

28,036

47

3,945
345

Cell: F77
Comment: From GRI Vol. 10, Table 6-3

Gas Production

Gas Wells with and without Hydraulic Fracturing (NE, MC, GC)

Component

Valves
Connections
OELs

Gas Wells with and without Hydraulic Fracturing (RM, SW, WC)

Component

Valves
Connections
OELs

Heaters (NE, MC)

Component

Valves
Connections
OELs
PRVs

Heaters (RM, SW, WC, GC)

Component

Valves
Connections
OELs
PRVs

Separators (NE, MC)

Component

Valves
Connections

Separators (RM, SW, WC, GC)

Component

Valves
Connections
OELs
PRVs

Dehydrators (NE)

Component

Valves
Connections
OELs
PRVs

Dehydrators (MC, RM, SW, WC, GC)

Component

Valves
Connections
OELs
PRVs

Meters / Piping (NE, MC)

Component

Valves
Connections

Meters / Piping (RM, SW, WC, GC)

Component

Valves
Connections
OELs
PRVs

Small Reciprocating Compressors

Component

Valves
Connections
OELs
PRVs
Compressor Seal

Large Reciprocating Compressors

Component

Blowdown OELs
PRVs
Miscellaneous
Starter OELs
Compressor Seal

Large Reciprocating Compressor Stations

Component

Valves
Control Valves
Connections
OELs
PRVs
Site Blowdown OELs

Pipeline Leaks

Pipeline Material

Protected Steel
Unprotected Steel
Plastic
Cast Iron

Pneumatic Device Vents

Component

High-Bleed Pneumatics
Intermittent-Bleed Pneumatics
Low-Bleed Pneumatics

Chemical Injection Pumps

Component

Pistons
Diaphragms

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.184	8	1	57%	0.50
0.024	38	1	35%	0.07
0.42	1	0	8%	1.15
		3 Mcf/yr		
		7 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.835	11	9	68%	2.29
0.114	36	4	30%	0.31
0.215	1	0	2%	0.59
		14 Mcf/yr		
		37 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.184	14	3	49%	1
0.024	65	2	30%	0
0.42	2	1	16%	1
0.279	1	0	5%	1
		5		
		14 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.835	14	12	56%	2
0.114	65	7	36%	0
0.215	2	0	2%	1
1.332	1	1	6%	4
		21		
		57 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.184	1	0	56%	1
0.024	6	0	44%	0
		0		
		1 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.835	34	28	64%	2
0.114	106	12	27%	0
0.215	6	1	3%	1
1.332	2	3	6%	4
		44		
		122 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.184	24	4	55%	1
0.024	90	2	27%	0
0.42	2	1	11%	1
0.279	2	1	7%	1
		8		
		22 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.835	24	20	60%	2
0.114	90	10	31%	0
0.215	2	0	1%	1
1.332	2	3	8%	4
		33		
		91 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.184	12	2	67%	1
0.024	45	1	33%	0
		3		
		9 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.835	14	12	61%	2
0.114	51	6	31%	0
0.215	1	0	1%	1
1.332	1	1	7%	4
		19		

52 scf/day

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.835	73	61	63%	2
0.114	179	20	21%	0
0.215	3	1	1%	1
1.332	4	5	6%	4
2.37	4	9	10%	6
		97		
		265 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
3,683	1	3,683	66%	10,090
372	1	372	7%	1,019
180	1	180	3%	493
0	0	0	0%	0
396	3.3	1,307	24%	1,085
		5,542		
		15,183 scf/day		

EF (Mcf/component)	Component Count	Emissions (Mcf)		scfd/component
0.867	673	583	19%	2
8.000	31	248	8%	22
0.147	3068	451	15%	0
11.2	51	571	19%	31
6.2	14	87	3%	17
264	4	1,056	35%	723
		2,996		
		8,210 scf/day		

EF (scf/leak-yr)	AF (equivalent leaks)	Methane Emissions (Bcf)	Pipeline Miles	EF (scfd/mile)	AF Breakout % (scaled)	EF Breakout %
17,102	53,657	0.92	268,082	9.38	79%	14%
43,705	114,655	5.01	41,400	331.61	12%	75%
84,237	6,467	0.54	29,862	49.98	9%	8%
201,418	856	0.17	856	551.83	0%	3%
		6.65	340,200	53.52		

53.52 scfd/mile
340,200 mile

EF (scf/component)	Component Count	Emissions (Mcf)		scfd/component
654	520	340	49%	1,792
323	1110	359	51%	885
0	0	0	0%	0
		699		
		1,914 scf/day		

EF (scf/component)	Component Count	Emissions (Mcf)		scfd/component
50	327	16	10%	137
446	329	147	90%	1,222
		163		
		447 scf/day		

Cell: F139
Comment: From GRI Vol. 9, Table 8-9

Citation
1992 Radian
1997 ICF Memo
2004 ICF Memo
2008 ICF Memo
2010 ICF Memo
2012 API/ANGA
Alabama O&G
DI Desktop
E&P Tank
GRI Vol. 5
GRI Vol. 6
GRI Vol. 7
GRI Vol. 8
GRI Vol. 9
GRI Vol. 10
GRI Vol. 11
GRI Vol. 12
GRI Vol. 13
GRI Vol. 14
GRI Vol. 15
Hydraulic Frac. Memo
OGJ
PHMSA
Wyoming O&G
"History Data"

Full Source
Radian - 1992 - "Global Emissions of Methane for Petroleum Sources"
ICF Memo - Sep 18, 1997 - "Additional Changes to Activity Factors for Portions of the Gas Industry"
ICF Memo - Feb 24, 2004 - "Methane Emissions from Condensate Tanks in the Oil and Natural Gas Industry"
ICF Memo - Jan 07, 2008 - "Natural Gas Model Activity Factor Basis Change"
ICF Memo - Dec 2010 - "Emissions from Centrifgual Compressors"
API/ANGA - Sep 21, 2012 - "Characterizing Pivotal Sources of Methane Emissions from Natural Gas Production"
Geological Survey of Alabama State Oil and Gas Board - "Monthly field summaries"
DrillingInfo - DI Desktop - "Well Counts"
API - Publ 4697: Production Tank Emissions Model (E&P Tank)
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 5
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 6
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 7
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 8
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 9
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 10
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 11
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 12
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 13
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 14
GRI - 94 - Methane Emissions from the Natural Gas Industry, Volume 15
EPA Memo - Nov 2013 - "Updating GHG Inventory Estimate for Hydraulically Fractured Gas Well Completions and Work
Oil and Gas Journal - 2013 - "Worldwide Gas Processing Survey"
DOT - PHMSA - "Pipeline Miles"
Wyoming Oil and Gas Conservation Commission - "Coal Bed Production"
Legacy Data from original US Inventory from Radian Report that has been modified. See Inventory spreadsheet.

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 7/25/2018 3:04:32 PM
To: 'James Tichenor' [jtichenor@blm.gov]
Subject: fyi

https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201804&RIN=2060-AT90

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 7/24/2018 8:54:42 PM
To: Tichenor, James [jtichenor@blm.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: meeting tomorrow?

Hi James- I just want to check that we have a meeting tomorrow to check in? I see two invites on my calendar and I want to make sure which one is the "real " one. Thanks! I look forward to talking Wednesday.

Amy

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 7/9/2018 2:53:25 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
CC: Marsh, Karen [Marsh.Karen@epa.gov]; Miller, Elizabeth [Miller.Elizabeth@epa.gov]; Hoffmann, Jucilene [hoffmann.jucilene@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Re: [EXTERNAL] check in Ex. 6 Personal Privacy

Hi Amy,

I have a conflict from 10am-noon. Wondering if we can schedule our call either before of after.

On Mon, Jul 9, 2018 at 6:32 AM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

> EPA/BLM monthly check in

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 5/7/2018 3:32:05 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Re: [EXTERNAL] EPA technical proposal went to OMB last Friday 4/27

Hi Lisa,
So we're having a bit of trouble tracking it down and aren't sure if we are even on the distribution for the interagency comments.
Would you mind sending the RIA and the rule to me? I'm requesting for the purpose of our understanding of how you treated SCC/CH4 and not for the purpose of providing comment.

On Wed, May 2, 2018 at 5:47 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

> Hi James,
>
> We wanted to send a quick note that our proposal is at OMB – please keep your eyes out for an interagency version. Look forward to talking tomorrow!
>
> Thanks,
>
> Lisa
>
> Lisa Thompson
>
> Fuels and Incineration Group
>
> Office of Air Quality Planning and Standards
>
> U.S. Environmental Protection Agency
>
> 919-541-9775

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 5/7/2018 4:28:28 PM
To: Tichenor, James [jtichenor@blm.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: RE: [EXTERNAL] EPA technical proposal went to OMB last Friday 4/27

Hi James,

Thanks for letting us know you are having a hard time tracking it down. We'll do what we can on our end.

Amy

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, May 07, 2018 11:32 AM
To: Thompson, Lisa
Cc: Hambrick, Amy ; Waltzer, Suzanne ; Weitz, Melissa
Subject: Re: [EXTERNAL] EPA technical proposal went to OMB last Friday 4/27

Hi Lisa,
So we're having a bit of trouble tracking it down and aren't sure if we are even on the distribution for the interagency comments.
Would you mind sending the RIA and the rule to me? I'm requesting for the purpose of our understanding of how you treated SCC/CH4 and not for the purpose of providing comment.

On Wed, May 2, 2018 at 5:47 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

> Hi James,
>
> We wanted to send a quick note that our proposal is at OMB – please keep your eyes out for an interagency version. Look forward to talking tomorrow!
>
> Thanks,
>
> Lisa
>
> Lisa Thompson
>
> Fuels and Incineration Group

Office of Air Quality Planning and Standards

U.S. Environmental Protection Agency

919-541-9775

--

James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: James Tichenor [jtichenor@blm.gov]
Sent: 7/24/2018 9:05:16 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Re: [EXTERNAL] meeting tomorrow?

Hi Amy,
I have one on my calendar for 10:30am et. We can still have it if you want. I don't have much of an update, other than some info on some of the comments we've received during our 12866 listening sessions which are relevant for your effort as well.

Sent from my iPhone

On Jul 24, 2018, at 1:54 PM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

> Hi James- I just want to check that we have a meeting tomorrow to check in? I see two invites on my calendar and I want to make sure which one is the "real " one. Thanks! I look forward to talking Wednesday.
> Amy
> Amy Hambrick
> U.S. Environmental Protection Agency
> (919)541-0964

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 7/25/2018 12:48:00 PM
To: James Tichenor [jtichenor@blm.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: RE: [EXTERNAL] meeting tomorrow?

James- ok great me too. For some reason I see two meeting invites from you at that time and I got confused. I am available and I'll plan to call in. I think Suzie and Melissa may have a conflict but I can follow up with them after and if need be we can always set up another check in. Talk soon.

Amy

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

From: James Tichenor [mailto:jtichenor@blm.gov]
Sent: Tuesday, July 24, 2018 5:05 PM
To: Hambrick, Amy
Cc: Waltzer, Suzanne ; Weitz, Melissa
Subject: Re: [EXTERNAL] meeting tomorrow?

Hi Amy,
I have one on my calendar for 10:30am et. We can still have it if you want. I don't have much of an update, other than some info on some of the comments we've received during our 12866 listening sessions which are relevant for your effort as well.

Sent from my iPhone

On Jul 24, 2018, at 1:54 PM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

> Hi James- I just want to check that we have a meeting tomorrow to check in? I see two invites on my calendar and I want to make sure which one is the "real " one. Thanks! I look forward to talking Wednesday.
>
> Amy
>
> Amy Hambrick
> U.S. Environmental Protection Agency
> (919)541-0964

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 9/11/2018 5:39:05 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
Subject: Re: [EXTERNAL] RE: Do you have time for a quick chat?

Great, thanks. Anytime before 2pm or after 3pm. I just wanted to get a sense of your timing, when it's going to the FR, etc.

On Tue, Sep 11, 2018 at 10:36 AM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

> I'll call you.
>
> Fyi -
>
> Please see EPA's updated website as of noon today:
>
> https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/actions-and-notices-about-oil-and-natural-gas#regactions
>
> "On September 11, 2018, EPA proposed targeted improvements to the 2016 New Source Performance Standards for the oil and gas industry that streamline implementation, reduce duplicative EPA and state requirements, and significantly decrease unnecessary burdens on domestic energy producers. This oil and gas targeted improvements package is expected to save up to approximately $484 million in regulatory costs from 2019 – 2025 or $75 million annually."
>
> Pre-publication version: https://www.epa.gov/sites/production/files/2018-09/documents/frnoilgasreconsideration2060-at54nprm20180910.pdf
>
> Amy Hambrick
>
> U.S. Environmental Protection Agency
>
> (919)541-0964

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Tuesday, September 11, 2018 1:33 PM
To: Hambrick, Amy <Hambrick.Amy@epa.gov>
Subject: Do you have time for a quick chat?

I would call but I can't locate your number...

--

James Tichenor
Economist

Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management

jtichenor@blm.gov

202-573-0536

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 8/23/2018 5:08:23 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
Subject: Re: [EXTERNAL] RE: EPA/BLM Call re Regs; 877-958-3461; 4768908#

Ok, I'll just shift to the Friday, same time

On Thu, Aug 23, 2018 at 10:05 AM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

Works for me, thanks

Amy Hambrick

U.S. Environmental Protection Agency

(919)541-0964

From: Google Calendar [mailto:calendar-notification@google.com] **On Behalf Of** jtichenor@blm.gov
Sent: Thursday, August 23, 2018 12:47 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>; christopher.rhymes@sol.doi.gov; Hambrick, Amy <Hambrick.Amy@epa.gov>; jtichenor@blm.gov; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi Amy, All:
Looking at the calendar, I'll need to move our September call (wed, 9/26) to either that Monday or Friday. Is there a time that works for you?

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Sep 26, 2018 7:30am – 8:30am Pacific Time - Los Angeles

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov
- christopher.rhymes@sol.doi.gov

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 6/26/2018 7:28:09 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Re: [EXTERNAL] RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Ok thanks, I set it up for July 3rd.
If it needs to change again, I'm fine with any of the alternate times.

On Tue, Jun 26, 2018 at 12:20 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

We have a few key folks out this week and would like to reschedule.

Would any of these times work for you?

July 3 11:30

July 5 anytime after 11:30

July 6 anytime

Thank you!

Melissa

From: Google Calendar [mailto:calendar-notification@google.com] **On Behalf Of** jtichenor@blm.gov
Sent: Tuesday, June 26, 2018 12:02 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>; Hambrick, Amy <Hambrick.Amy@epa.gov>; jtichenor@blm.gov; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi -
Just checking to make sure we're still on for tomorrow. I think we'll have a bunch to talk about. Let me know if you need to reschedule.

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Jun 27, 2018 7:30am – 8:30am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov

- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 9/28/2018 1:50:21 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
Subject: Re: [EXTERNAL] Saw your FR

Sorry, that was to the FR. Here is the correct link: https://www.regulations.gov/docket?D=BLM-2018-0001

On Fri, Sep 28, 2018 at 6:49 AM Tichenor, James <jtichenor@blm.gov> wrote:

Hi Amy,

We can discuss but we didn't really do a track changes version, because it ended up being a complete mess. My suggestion would be to look at the final RIA in Section 2.3.

Here is the link to the docket on regs.gov https://www.govinfo.gov/content/pkg/FR-2018-09-28/pdf/2018-20689.pdf

On Fri, Sep 28, 2018 at 6:32 AM Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

HI James- Saw your FR today…. you guys got published so fast! Any chance you have a fact sheet or summary table of what's changed that I can share with interested EPA folks?

Thanks,

Amy

Amy Hambrick

U.S. Environmental Protection Agency

(919)541-0964

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov

202-573-0536

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 9/28/2018 1:49:30 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
Subject: Re: [EXTERNAL] Saw your FR

Hi Amy,

We can discuss but we didn't really do a track changes version, because it ended up being a complete mess. My suggestion would be to look at the final RIA in Section 2.3.

Here is the link to the docket on regs.gov https://www.govinfo.gov/content/pkg/FR-2018-09-28/pdf/2018-20689.pdf

On Fri, Sep 28, 2018 at 6:32 AM Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

> HI James- Saw your FR today.... you guys got published so fast! Any chance you have a fact sheet or summary table of what's changed that I can share with interested EPA folks?
>
> Thanks,
>
> Amy
>
> Amy Hambrick
>
> U.S. Environmental Protection Agency
>
> (919)541-0964

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 5/15/2018 8:28:00 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Adam Stern [adam_stern@ios.doi.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]
Subject: Re: [EXTERNAL] using the same social cost language as the NODA

Hi Lisa and Amy,

Congrats on both of those developments. The BLM provided some comments to DOI to pass along, though I'm not sure what their status is. Hopefully we'll be able to go through those with you Amy when the time comes.

James

On Mon, May 14, 2018 at 10:55 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

Hi James,

I apologize for the long delay! Please see our response below.

Also, I wanted to let you know that I'm starting a detail through the end of the year working on the power sector rules at EPA. Amy will continue to lead the Oil and Gas work at EPA, so please reach out to her with any additional questions.

Thanks,

Lisa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Tuesday, May 1, 2018 3:53 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>
Cc: Adam Stern <adam_stern@ios.doi.gov>
Subject: Re: [EXTERNAL] using the same social cost language as the NODA

Hi Lisa,

Wondering if you can quickly clarify a couple questions. Sorry if you've addressed these before.

1. Under the current NSPS OOOOa requirements, how would an existing site become covered under the LDAR requirements? I seem to recall that you would consider it a new, modified, or reconstructed source if there were modifications made to the well that increased production, e.g., a recompletion, well-stimulation, or workover?

40 CFR 60.5365a(i) [Note, this is the rule as it stands today, please see the interagency package for proposed changes]

(3) For purposes of §60.5397a, a "modification" to a well site occurs when:

(i) A new well is drilled at an existing well site;

(ii) A well at an existing well site is hydraulically fractured; or

(iii) A well at an existing well site is hydraulically refractured.

2. In clarifying that you are using the same social cost language as in the NODA, does that include the calculation of net benefits using the global SCC? I believe you had that in the appendix and listed as a sensitivity analysis.

We use the domestic SCC, but include the global SCC in an appendix.

On Wed, Apr 25, 2018 at 11:06 AM, Tichenor, James <jtichenor@blm.gov> wrote:

Hi Lisa,

Just as an FYI. We're receiving (still going through them) a large number of comments regarding SCCO2 and SCCH4. I'm attaching one comment from a joint env group submission. And I believe I sent you the RFF counter analysis to our rule (which we found online, but not yet in our comment docket) as an FYI.

On Wed, Apr 18, 2018 at 7:58 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

Lisa Thompson

Fuels and Incineration Group

Office of Air Quality Planning and Standards

U.S. Environmental Protection Agency

919-541-9775

--

James Tichenor
Economist

Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management

jtichenor@blm.gov

202-573-0536

--

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Economist

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--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 5/16/2018 1:05:34 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]; Adam Stern [adam_stern@ios.doi.gov]
Subject: Re: [EXTERNAL] using the same social cost language as the NODA

Let me know if you'd like to have a short 5-10 minute call to discuss. I really don't know what made it out of BLM/DOI, as the DOI was compiling and sending to OIRA.

I think we cancelled the next BLM/EPA call on May 23 (I'll be on leave) and the next is the end of June. DO you want to try to reschedule the May call for 5/30?

On Wed, May 16, 2018 at 5:25 AM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

> James, we look forward to seeing BLM comments. thanks much!
>
> Amy
>
> Amy Hambrick
>
> U.S. Environmental Protection Agency
>
> (919)541-0964
>
> **From:** Tichenor, James [mailto:jtichenor@blm.gov]
> **Sent:** Tuesday, May 15, 2018 4:28 PM
> **To:** Thompson, Lisa <Thompson.Lisa@epa.gov>
> **Cc:** Adam Stern <adam_stern@ios.doi.gov>; Hambrick, Amy <Hambrick.Amy@epa.gov>
>
> **Subject:** Re: [EXTERNAL] using the same social cost language as the NODA
>
> Hi Lisa and Amy,
>
> Congrats on both of those developments. The BLM provided some comments to DOI to pass along, though I'm not sure what their status is. Hopefully we'll be able to go through those with you Amy when the time comes.
>
> James
>
> On Mon, May 14, 2018 at 10:55 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:
>
>> Hi James,
>>
>> I apologize for the long delay! Please see our response below.
>>
>> Also, I wanted to let you know that I'm starting a detail through the end of the year working on the power sector rules at EPA. Amy will continue to lead the Oil and Gas work at EPA, so please reach out to her with any additional questions.

Thanks,

Lisa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Tuesday, May 1, 2018 3:53 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>
Cc: Adam Stern <adam_stern@ios.doi.gov>
Subject: Re: [EXTERNAL] using the same social cost language as the NODA

Hi Lisa,

Wondering if you can quickly clarify a couple questions. Sorry if you've addressed these before.

1. Under the current NSPS OOOOa requirements, how would an existing site become covered under the LDAR requirements? I seem to recall that you would consider it a new, modified, or reconstructed source if there were modifications made to the well that increased production, e.g., a recompletion, well-stimulation, or workover?

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2. In clarifying that you are using the same social cost language as in the NODA, does that include the calculation of net benefits using the global SCC? I believe you had that in the appendix and listed as a sensitivity analysis.

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On Wed, Apr 25, 2018 at 11:06 AM, Tichenor, James <jtichenor@blm.gov> wrote:

> Hi Lisa,
>
> Just as an FYI. We're receiving (still going through them) a large number of comments regarding SCCO2 and SCCH4. I'm attaching one comment from a joint env group submission. And I believe I sent you the RFF counter analysis to our rule (which we found online, but not yet in our comment docket) as an FYI.
>
> On Wed, Apr 18, 2018 at 7:58 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:
>
> > Lisa Thompson
> >
> > Fuels and Incineration Group
> >
> > Office of Air Quality Planning and Standards

U.S. Environmental Protection Agency

919-541-9775

--

James Tichenor
Economist

Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management

jtichenor@blm.gov

202-573-0536

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James Tichenor
Economist
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Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 5/16/2018 4:35:30 PM
To: Tichenor, James [jtichenor@blm.gov]
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]; Adam Stern [adam_stern@ios.doi.gov]
Subject: RE: [EXTERNAL] using the same social cost language as the NODA

HI James, Yes, Let's reschedule for May 30. Thanks.

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Wednesday, May 16, 2018 9:06 AM
To: Hambrick, Amy
Cc: Thompson, Lisa ; Adam Stern
Subject: Re: [EXTERNAL] using the same social cost language as the NODA

Let me know if you'd like to have a short 5-10 minute call to discuss. I really don't know what made it out of BLM/DOI, as the DOI was compiling and sending to OIRA.

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> James, we look forward to seeing BLM comments. thanks much!
>
> Amy
>
> Amy Hambrick
>
> U.S. Environmental Protection Agency
>
> (919)541-0964
>
> **From:** Tichenor, James [mailto:jtichenor@blm.gov]
> **Sent:** Tuesday, May 15, 2018 4:28 PM
> **To:** Thompson, Lisa <Thompson.Lisa@epa.gov>
> **Cc:** Adam Stern <adam_stern@ios.doi.gov>; Hambrick, Amy <Hambrick.Amy@epa.gov>

Subject: Re: [EXTERNAL] using the same social cost language as the NODA

Hi Lisa and Amy,

Congrats on both of those developments. The BLM provided some comments to DOI to pass along, though I'm not sure what their status is. Hopefully we'll be able to go through those with you Amy when the time comes.

James

On Mon, May 14, 2018 at 10:55 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

Hi James,

I apologize for the long delay! Please see our response below.

Also, I wanted to let you know that I'm starting a detail through the end of the year working on the power sector rules at EPA. Amy will continue to lead the Oil and Gas work at EPA, so please reach out to her with any additional questions.

Thanks,

Lisa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Tuesday, May 1, 2018 3:53 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>
Cc: Adam Stern <adam_stern@ios.doi.gov>
Subject: Re: [EXTERNAL] using the same social cost language as the NODA

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On Wed, Apr 18, 2018 at 7:58 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

Lisa Thompson

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jtichenor@blm.gov
202-573-0536

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 5/16/2018 12:25:56 PM
To: Tichenor, James [jtichenor@blm.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Adam Stern [adam_stern@ios.doi.gov]
Subject: RE: [EXTERNAL] using the same social cost language as the NODA

James, we look forward to seeing BLM comments. thanks much!

Amy

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Tuesday, May 15, 2018 4:28 PM
To: Thompson, Lisa
Cc: Adam Stern ; Hambrick, Amy
Subject: Re: [EXTERNAL] using the same social cost language as the NODA

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>
> Lisa

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Sent: Tuesday, May 1, 2018 3:53 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>
Cc: Adam Stern <adam_stern@ios.doi.gov>
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Lisa Thompson

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James Tichenor
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Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 10/17/2017 4:02:41 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: Re: check in call 10/25

Same with me. How about 10/26?

On Tue, Oct 17, 2017 at 8:54 AM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

> Hi James,
>
> It looks like we have our next check in call on 10/25. We have an all-day meeting conflict. Any chance we can reschedule for just that day- either moving up a day or pushing back a day?
>
> Thanks for considering,
>
> Amy
>
> Amy Hambrick
>
> U.S. Environmental Protection Agency
>
> (919)541-0964

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 10/17/2017 4:05:43 PM
To: Tichenor, James [jtichenor@blm.gov]
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: RE: check in call 10/25

Yep.

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Tuesday, October 17, 2017 12:03 PM
To: Hambrick, Amy
Cc: Thompson, Lisa
Subject: Re: check in call 10/25

Same with me. How about 10/26?

On Tue, Oct 17, 2017 at 8:54 AM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

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--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 11/6/2017 9:14:10 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Hambrick, Amy [Hambrick.Amy@epa.gov]; Pionke, Erica [epionke@blm.gov]
Subject: Re: Clarification

Thanks Lisa

On Mon, Nov 6, 2017 at 12:31 PM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

Minor edits below. Thanks James!

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, November 6, 2017 2:33 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>; Hambrick, Amy <Hambrick.Amy@epa.gov>
Cc: Pionke, Erica <epionke@blm.gov>
Subject: Clarification

Hi Lisa and Amy,

I know we discusses this on our last call, but can you please verify this statement, and/or provide language that would make it more accurate? Thanks!

"However, the EPA recently proposed to stay ~~delay~~ the fugitive emissions, pneumatic pumps at well sites, and professional engineer certification for closed vent system requirements for two years. The EPA has not yet finalized this proposal."

--

James Tichenor
Economist

Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management

jtichenor@blm.gov

202-573-0536

--
James Tichenor
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Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management

jtichenor@blm.gov
202-573-0536

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 9/11/2018 5:36:49 PM
To: Tichenor, James [jtichenor@blm.gov]
Subject: RE: Do you have time for a quick chat?

I'll call you.

Fyi -
Please see EPA's updated website as of noon today:

https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/actions-and-notices-about-oil-and-natural-gas#regactions
"On September 11, 2018, EPA proposed targeted improvements to the 2016 New Source Performance Standards for the oil and gas industry that streamline implementation, reduce duplicative EPA and state requirements, and significantly decrease unnecessary burdens on domestic energy producers. This oil and gas targeted improvements package is expected to save up to approximately $484 million in regulatory costs from 2019 – 2025 or $75 million annually."

Pre-publication version: https://www.epa.gov/sites/production/files/2018-09/documents/frnoilgasreconsideration2060-at54nprm20180910.pdf

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Tuesday, September 11, 2018 1:33 PM
To: Hambrick, Amy <Hambrick.Amy@epa.gov>
Subject: Do you have time for a quick chat?

I would call but I can't locate your number...

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 4/20/2018 6:03:56 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Justin Abernathy [jabernathy@blm.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; James Tichenor [jtichenor@blm.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Re: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

FYI http://www.rff.org/files/document/file/RFF-Rpt-Oil%26GasRegs-BLM%20methane%20rule.pdf

On Wed, Apr 18, 2018 at 7:25 AM, <jtichenor@blm.gov> wrote:

https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/methane-and-waste-prevention-rule

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Apr 18, 2018 7:15am – 8am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- hambrick.amy@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 8/23/2018 5:05:03 PM
To: jtichenor@blm.gov
Subject: RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Works for me, thanks

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

From: Google Calendar [mailto:calendar-notification@google.com] **On Behalf Of** jtichenor@blm.gov
Sent: Thursday, August 23, 2018 12:47 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>; christopher.rhymes@sol.doi.gov; Hambrick, Amy <Hambrick.Amy@epa.gov>; jtichenor@blm.gov; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi Amy, All:
Looking at the calendar, I'll need to move our September call (wed, 9/26) to either that Monday or Friday. Is there a time that works for you?

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Sep 26, 2018 7:30am – 8:30am Pacific Time - Los Angeles

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov
- christopher.rhymes@sol.doi.gov

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 8/21/2018 6:24:19 PM
To: jtichenor@blm.gov; christopher.rhymes@sol.doi.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Thanks- yep I see it on my calendar too.

Amy

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

From: Google Calendar [mailto:calendar-notification@google.com] **On Behalf Of** jtichenor@blm.gov
Sent: Tuesday, August 21, 2018 1:09 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>; christopher.rhymes@sol.doi.gov; Hambrick, Amy <Hambrick.Amy@epa.gov>; jtichenor@blm.gov; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi All,
I have this on my calendar, just wanted to make sure that we are all on the same page. Let me know if we need to reschedule.

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Aug 22, 2018 7:30am – 8:30am Pacific Time - Los Angeles

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov
- christopher.rhymes@sol.doi.gov

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 11/16/2017 4:22:11 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
CC: Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Re: FW: O&G Follow-up: Inventory Data

All,

FYI, OIRA distributed our final delay rule for interagency review. Quick turnaround, comments by COB Monday. In case you want to track it down.

On Tue, Oct 24, 2017 at 12:59 PM, Tichenor, James <jtichenor@blm.gov> wrote:
Thank you Melissa.
I'll be working with the file over the next couple of days and will contact you if any questions arise.

On Tue, Oct 10, 2017 at 9:34 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

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Cc: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>

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Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Hambrick, Amy [Hambrick.Amy@epa.gov]
Sent: 9/28/2018 1:32:21 PM
To: Tichenor, James [jtichenor@blm.gov]
Subject: Saw your FR

HI James- Saw your FR today.... you guys got published so fast! Any chance you have a fact sheet or summary table of what's changed that I can share with interested EPA folks?

Thanks,

Amy

Amy Hambrick
U.S. Environmental Protection Agency
(919)541-0964

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 2/22/2018 8:33:40 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Update: Waste Prevention Proposed Rule is Officially Published

Colleagues:

The FR Notice is available through this link:
https://www.federalregister.gov/documents/2018/02/22/2018-03144/waste-prevention-production-subject-to-royalties-and-resource-conservation-rescission-or-revision-of

Also, here is the link to the regulations.gov<http://regulations.gov/> docket with the rule, supporting materials, and vehicle for public comment.
https://www.regulations.gov/document?D=BLM-2018-0001-0001

Happy reading!

--

James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov<mailto:jtichenor@blm.gov>
202-573-0536

Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 11/2/2018 6:10:35 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: FOIA email 1
Attachments: [Update] Call re Regs; Ex. 6 Personal Privacy EPA/BLM Call re Regs; Ex. 6 Personal Privacy Re: [EXTERNAL] meeting tomorrow?; Re: [EXTERNAL] Fw: US engagement in WB flaring initiatives; Re: [EXTERNAL] check in Ex. 6 Personal Privacy Ex. 6 Personal Privacy Re: [EXTERNAL] RE: EPA/BLM Call re Regs; Ex. 6 Personal Privacy EPA/BLM Call re Regs Ex. 6 Personal Privacy Ex. 6 Personal Privacy Re: [EXTERNAL] EPA technical proposal went to OMB last Friday 4/27; Re: [EXTERNAL] RE: FW: O&G Follow-up: Inventory Data; Re: [EXTERNAL] RE: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov); Re: FW: O&G Follow-up: Inventory Data; Re: EPA/BLM Call re Regs; Ex. 6 Personal Privacy EPA/BLM Call re Regs; Ex. 6 Personal Privacy Ex. 6 Personal Privacy EPA/BLM Call re Regs; Ex. 6 Personal Privacy Re: Call on Wednesday Feb 28th?; Update: Waste Prevention Proposed Rule is Officially Published; Re: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov); Re: FW: O&G Follow-up: Inventory Data; Complaints against the Waste Prevention Delay Rule; Canceled event: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Wed Nov 22, 2017 7:30am - 8:30am (PST) (weitz.melissa@epa.gov); Re: FW: O&G Follow-up: Inventory Data; Re: FW: O&G Follow-up: Inventory Data; Re: FW: O&G Follow-up: Inventory Data; Fwd: FW: O&G Follow-up: Inventory Data; Fwd: O&G Follow-up: Inventory Data; Updated invitation: Call re Regs; Ex. 6 Personal Privacy @ Wed Sep 27, 2017 8am - 9am (PDT) (weitz.melissa@epa.gov)

My email is being weird, but here are my emails from BLM and in a separate file I'll send email to BLM.

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 9/27/2017 2:27:37 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: [Update] Call re Regs; Ex. 6 Personal Privacy

I just received a last minute thing that I need to take care of here. Can we postpone this call until 11am?

Call re Regs; Ex. 6 Personal Privacy

When Wed Sep 27, 2017 7:30am – 8:30am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- thompson.lisa@epa.gov
- hambrick.amy@epa.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Appointment

From: jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 11/20/2017 4:37:30 PM
To: epionke@blm.gov; jabernathy@blm.gov; Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]

Subject: Canceled event: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Wed Nov 22, 2017 7:30am - 8:30am (PST) (weitz.melissa@epa.gov)
Attachments: invite.ics

Start: 11/22/2017 3:30:00 PM
End: 11/22/2017 4:30:00 PM
Show Time As: Busy

Recurrence: (none)

This event has been canceled and removed from your calendar.

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Nov 22, 2017 7:30am – 8:30am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Calendar weitz.melissa@epa.gov

Who
- jtichenor@blm.gov - organizer
- epionke@blm.gov
- jabernathy@blm.gov
- hambrick.amy@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Invitation from Google Calendar

You are receiving this courtesy email at the account weitz.melissa@epa.gov because you are an attendee of this event.

To stop receiving future updates for this event, decline this event. Alternatively you can sign up for a Google account at https://www.google.com/calendar/ and control your notification settings for your entire calendar.

Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More.

Appointment

From: jtichenor@blm.gov [jtichenor@blm.gov]
To: jtichenor@blm.gov; epionke@blm.gov; jabernathy@blm.gov; hambrick.amy@epa.gov; jtichenor@blm.gov; thompson.lisa@epa.gov
CC: waltzer.suzanne@epa.gov; weitz.melissa@epa.gov

Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Start: 11/22/2017 3:30:00 PM
End: 11/22/2017 4:30:00 PM
Show Time As: Busy

Recurrence: (none)

-::~:~::~::~:~::-
Please do not edit this section of the description.

Ex. 6 Personal Privacy

-::~:~::~::~:~::-

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 1/10/2018 5:24:04 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Complaints against the Waste Prevention Delay Rule
Attachments: document_gw_14.pdf; document_gw_15.pdf

All,

Please see the 2 complaints attached.

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 8/21/2018 5:09:00 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; christopher.rhymes@sol.doi.gov; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi All,
I have this on my calendar, just wanted to make sure that we are all on the same page. Let me know if we need to reschedule.

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Aug 22, 2018 7:30am – 8:30am Pacific Time - Los Angeles

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov
- christopher.rhymes@sol.doi.gov

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 6/26/2018 4:02:04 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi -
Just checking to make sure we're still on for tomorrow. I think we'll have a bunch to talk about. Let me know if you need to reschedule.

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Jun 27, 2018 7:30am – 8:30am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 4/18/2018 2:25:37 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; jabernathy@blm.gov; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/methane-and-waste-prevention-rule

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Apr 18, 2018 7:15am – 8am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- hambrick.amy@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov

Message

From: Google Calendar [calendar-notification@google.com]
on behalf of jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 4/17/2018 8:53:45 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; jabernathy@blm.gov; Hambrick, Amy [Hambrick.Amy@epa.gov]; jtichenor@blm.gov; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

Hi Melissa, Suzie, Lisa, and Amy:
Justin and I can join tomorrow but only for the first 30 minutes. If you are able to start 15-30 minutes earlier, please let us know.

Thanks, James

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Apr 18, 2018 7:30am – 8:30am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- hambrick.amy@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 10/4/2017 8:26:17 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Fwd: FW: O&G Follow-up: Inventory Data
Attachments: EPA Inventory Emissions 13-14.xlsx

Or this file, if possible. I think this one might be less involved and, at the same time, what were are looking for.

---------- Forwarded message ----------
From: **Tichenor, James** <jtichenor@blm.gov>
Date: Thu, Jul 14, 2016 at 7:37 AM
Subject: Re: FW: O&G Follow-up: Inventory Data
To: "Weitz, Melissa" <Weitz.Melissa@epa.gov>
Cc: "Waltzer, Suzanne" <Waltzer.Suzanne@epa.gov>, Eric C Jones <ejones@blm.gov>

Hi Melissa,

Another quick question about the data (I've attached what you sent this year and last year). 'Gathering and Boosting Stations' appears to be a new source category this year (or maybe a new label). Would the correct crosswalk to 2013 be to consider it as 'Gathering Compressors'? Would it be category 5 or 9 or a new one?

Thanks again for your help!

On Tue, Jul 12, 2016 at 11:41 AM, Tichenor, James <jtichenor@blm.gov> wrote:
Thanks so much for your help!

On Tue, Jul 12, 2016 at 8:16 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I've separated oil and gas in the attached.

We made major updates this year to pneumatic controllers, gathering and other sources, so a lot of the numbers have moved around.

For pneumatics, short story is, the GHGRP data showed more pneumatic controllers per well than our previous data source (the 1990's GRI study), and updating the inventory to use the latest GHGRP data resulted in much higher emissions from that category.

For gathering and boosting, we used one of the EDF-Industry studies to update the activity data (total number of gathering stations nationally) and emissions data. This also resulted in higher emissions.

For more information on the updates, please see the Recalculations Discussion of the GHG Inventory—page 63-65 for oil and pages 74-81 for gas, https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Chapter-3-Energy.pdf, and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_to_Production_Segment%20_Emissions_2016-04-14.pdf and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_GB_Station%20Emissions_2016-04-14.pdf for additional information.

Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, July 11, 2016 4:17 PM

To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

Thanks for the data. A couple questions.

For the few rows where the the oil and gas sectors are combined, would it be possible to have them separated? (e.g. rows 3, 4, 6, 8-11) We would like to try to match up as closely as possible to the format that you provided us before, with oil or gas sector and category number.

Second, are the emissions for the pneumatic devices correct? The table you provided shows 139 Bcf of CH4 for 2014, and we had 39 Bcf of CH4 for 2013... Gathering and boosting statiosn also appear to be MUCH higher, 97 Bcf of CH4 in 2014 versus 9 Bcf in 2013?

On Mon, Jul 11, 2016 at 12:53 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Sorry for the delay—here are the numbers. Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, July 07, 2016 10:52 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa,

Yes, so as I understand, this was 2013 emissions for the 1990-2015 GHG Inventory, and would be hoping to get 2014 data for the 1990-2016 Inventory. We we're using it to scale down the emissions per Fed/Ind share of all US production.

So with these categories, though, are you able to provide the volumes in CH4 and raw natural gas? I forget where we landed on this last time.

On Thu, Jul 7, 2016 at 7:45 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Just wanted to confirm that this is that attachment you meant in your email yesterday? I can send you an updated version with the 2014 numbers soon (hopefully tomorrow).

Melissa

From: Weitz, Melissa
Sent: Tuesday, April 21, 2015 1:25 PM
To: Tichenor, James <jtichenor@blm.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: RE: O&G Follow-up: Inventory Data

Hi James,

The net numbers for 2013 are in the attachment. Please let me know if you'd like to discuss.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 20, 2015 4:25 PM
To: Weitz, Melissa
Subject: Re: O&G Follow-up: Inventory Data

On Thu, Mar 26, 2015 at 9:35 AM, Waltzer, Suzanne <Waltzer.Suzanne@epa.gov> wrote:

Hi

To follow-up from our conversation, attached is a spreadsheet that has the oil and natural gas production methane emissions. The first two tabs are summary net emissions data (in Bcf and tonnes of methane) for the sector as a whole and for oil and gas production based on 2012 data (the 2014 GHG Inventory). The subsequent tabs are more detail on the individual source categories including the emission factors and activity data, etc. The data/information is from the inventory but may include some additional internal comments/notes so please do not share broadly.

We pulled this together from existing information quickly as a starting point. This may not be exactly what you need or if anything is unclear, just let us know. We will also take a take a closer look at the table you provided. It may be helpful to set up a meeting to talk through the data early next week.

Thanks,

Suzie

--

James Tichenor
Economist

Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management

jtichenor@blm.gov

202-573-0536

--

James Tichenor
Economist

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--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 10/4/2017 8:23:32 PM
To: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: Fwd: O&G Follow-up: Inventory Data
Attachments: US Inventory - Natural Gas and Petroleum - Emission Source Breakout _03-25-15.xlsx

Hi all,

Would it be possible to have a the same data pulled from the most recent GHG Inventory?

---------- Forwarded message ----------
From: **Waltzer, Suzanne** <Waltzer.Suzanne@epa.gov>
Date: Thu, Mar 26, 2015 at 9:35 AM
Subject: O&G Follow-up: Inventory Data
To: "Teitz, Alexandra" <ateitz@blm.gov>, James Tichenor <jtichenor@blm.gov>, Timothy Spisak <tspisak@blm.gov>
Cc: "Weitz, Melissa" <Weitz.Melissa@epa.gov>

Hi

To follow-up from our conversation, attached is a spreadsheet that has the oil and natural gas production methane emissions. The first two tabs are summary net emissions data (in Bcf and tonnes of methane) for the sector as a whole and for oil and gas production based on 2012 data (the 2014 GHG Inventory). The subsequent tabs are more detail on the individual source categories including the emission factors and activity data, etc. The data/information is from the inventory but may include some additional internal comments/notes so please do not share broadly.

We pulled this together from existing information quickly as a starting point. This may not be exactly what you need or if anything is unclear, just let us know. We will also take a take a closer look at the table you provided. It may be helpful to set up a meeting to talk through the data early next week.

Thanks,

Suzie

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 7/9/2018 2:53:25 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
CC: Marsh, Karen [Marsh.Karen@epa.gov]; Miller, Elizabeth [Miller.Elizabeth@epa.gov]; Hoffmann, Jucilene [hoffmann.jucilene@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Re: [EXTERNAL] check in Ex. 6 Personal Privacy

Hi Amy,

I have a conflict from 10am-noon. Wondering if we can schedule our call either before of after.

On Mon, Jul 9, 2018 at 6:32 AM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

> EPA/BLM monthly check in

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 5/7/2018 3:32:05 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Re: [EXTERNAL] EPA technical proposal went to OMB last Friday 4/27

Hi Lisa,
So we're having a bit of trouble tracking it down and aren't sure if we are even on the distribution for the interagency comments.
Would you mind sending the RIA and the rule to me? I'm requesting for the purpose of our understanding of how you treated SCC/CH4 and not for the purpose of providing comment.

On Wed, May 2, 2018 at 5:47 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

> Hi James,
>
> We wanted to send a quick note that our proposal is at OMB – please keep your eyes out for an interagency version. Look forward to talking tomorrow!
>
> Thanks,
>
> Lisa
>
> Lisa Thompson
>
> Fuels and Incineration Group
>
> Office of Air Quality Planning and Standards
>
> U.S. Environmental Protection Agency
>
> 919-541-9775

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 7/11/2018 7:59:18 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Re: [EXTERNAL] Fw: US engagement in WB flaring initiatives

Hi Melissa,

Our recollection at BLM was that the State Department was running this. I'll forward on any contacts over there if we can track them down.

On Wed, Jul 11, 2018 at 11:51 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

> Hi James,
>
> Following up on our conversation, the specific request is: to see if there has been any official / public change in policy position at BLM (or within the USG) with respect to the US signing / endorsing the Zero routine flaring by 2030 initiative (which the US signed with the understanding that it would apply only to federal /tribal lands and offshore), or the World Bank Global Gas Flaring Reduction.
>
> Thanks for any info you can provide.
>
> Melissa

--

James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: James Tichenor [jtichenor@blm.gov]
Sent: 7/24/2018 9:05:16 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Re: [EXTERNAL] meeting tomorrow?

Hi Amy,
I have one on my calendar for 10:30am et. We can still have it if you want. I don't have much of an update, other than some info on some of the comments we've received during our 12866 listening sessions which are relevant for your effort as well.

Sent from my iPhone

On Jul 24, 2018, at 1:54 PM, Hambrick, Amy <Hambrick.Amy@epa.gov> wrote:

> Hi James- I just want to check that we have a meeting tomorrow to check in? I see two invites on my calendar and I want to make sure which one is the "real " one. Thanks! I look forward to talking Wednesday.
>
> Amy
>
> Amy Hambrick
> U.S. Environmental Protection Agency
> (919)541-0964

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 6/26/2018 7:28:09 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Re: [EXTERNAL] RE: EPA/BLM Call re Regs; **Ex. 6 Personal Privacy**

Ok thanks, I set it up for July 3rd.
If it needs to change again, I'm fine with any of the alternate times.

On Tue, Jun 26, 2018 at 12:20 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

We have a few key folks out this week and would like to reschedule.

Would any of these times work for you?

July 3 11:30

July 5 anytime after 11:30

July 6 anytime

Thank you!

Melissa

From: Google Calendar [mailto:calendar-notification@google.com] **On Behalf Of** jtichenor@blm.gov
Sent: Tuesday, June 26, 2018 12:02 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>; Hambrick, Amy <Hambrick.Amy@epa.gov>; jtichenor@blm.gov; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: EPA/BLM Call re Regs; **Ex. 6 Personal Privacy**

Hi -
Just checking to make sure we're still on for tomorrow. I think we'll have a bunch to talk about. Let me know if you need to reschedule.

EPA/BLM Call re Regs Ex. 6 Personal Privacy

When Wed Jun 27, 2018 7:30am – 8:30am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epamail.epa.gov
- hambrick.amy@epa.gov

--

James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 4/27/2018 2:36:56 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
CC: Adam Stern [adam_stern@ios.doi.gov]
Subject: Re: [EXTERNAL] RE: FW: O&G Follow-up: Inventory Data

Thanks Melissa!

On Fri, Apr 27, 2018 at 7:33 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I've attached the latest GHG Inventory data (for year 2016, from GHG inventory published 2 weeks ago).

I've highlighted in orange some categories that weren't included in the previous spreadsheet from last year's inventory.

--Miscellaneous production flaring (both oil and gas): this source is new to the GHG Inventory (added using GHG reporting program data)

--Non-completion well testing (both oil and gas): this source is new to the GHG Inventory (added using GHG reporting program data)

Let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 23, 2018 6:56 PM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Adam Stern <adam_stern@ios.doi.gov>

Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

Would you be able to pull the same data for 2016, since the 2018 Inventory was just published? We would like to be able to include 2016 venting estimates in our final rule.

Thanks, James

On Thu, Feb 1, 2018 at 2:31 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Oddly (I think), when I added the bcf methane values in (dividing tonnes by 19,260), the bcf whole gas values were automatically calculated, apparently by pulling from a mysterious second spreadsheet. I don't understand, but here you go.

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, February 01, 2018 1:46 PM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>

Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

I had saved this file to our system, and then I opened it again just now, and I got a lot of #ref in the columns. Then I tracked back to this email and I still get it when I download. Are you seeing those in the file too? Would it be possible to resend? Also, would you have preliminary estimates for FY16?

Our director is being ask for this as a QFR, and I'd like to be able to provide an overall number for FY16, even if it is a preliminary draft estimate.

Thanks, James

On Tue, Oct 10, 2017 at 9:34 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I've updated the numbers using 2015 estimates (the latest) from the GHG inventory released in April 2017.

The data used here can be found in the two GHG Inventory annexes available at https://www.epa.gov/ghgemissions/natural-gas-and-petroleum-systems-ghg-inventory-additional-information-1990-2015-ghg.

For petroleum systems, data is from tab 3.5-2. There are no Gas STAR reductions applied to petroleum production, so the data from 3.5-2 were used as-is.

For natural gas systems, adjustments were made to take into account Gas STAR reductions, and also regulatory reductions that are separately accounted (for dehydrator vents). Other regulatory reductions are directly included in the calculations. In the attached, I've color-coded the rows for natural gas systems to indicate how the data were developed. Yellow is for sources that are directly calculated as net (i.e., we have recent data that already take into account technologies/practices). For those, you can find the data on tab 3.6-1. Green is for sources that have source-specific Gas STAR reductions, and orange is for sources with separately applied regulatory reductions. For both green and orange sources, the net emissions are those in tab 3.6-1, minus the reductions on tab 3.6-9. For all other sources, a proportional adjustment was made to reduce calculated potential emissions to take into account unassigned gas star reductions.

This was the same method as used last year for the data we provided to you.

Let me know if you have any questions.

Thanks,

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, October 05, 2017 9:16 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>

Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa!

That would be great. Would it be possible to have by mid-next week?

On Thu, Oct 5, 2017 at 6:13 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I can get you the updated information. When do you need this by?

Thanks,

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To: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Fwd: FW: O&G Follow-up: Inventory Data

Or this file, if possible. I think this one might be less involved and, at the same time, what were are looking for.

---------- Forwarded message ----------
From: **Tichenor, James** <jtichenor@blm.gov>
Date: Thu, Jul 14, 2016 at 7:37 AM
Subject: Re: FW: O&G Follow-up: Inventory Data
To: "Weitz, Melissa" <Weitz.Melissa@epa.gov>
Cc: "Waltzer, Suzanne" <Waltzer.Suzanne@epa.gov>, Eric C Jones <ejones@blm.gov>

Hi Melissa,

Another quick question about the data (I've attached what you sent this year and last year). 'Gathering and Boosting Stations' appears to be a new source category this year (or maybe a new label). Would the correct crosswalk to 2013 be to consider it as 'Gathering Compressors'? Would it be category 5 or 9 or a new one?

Thanks again for your help!

On Tue, Jul 12, 2016 at 11:41 AM, Tichenor, James <jtichenor@blm.gov> wrote:

Thanks so much for your help!

On Tue, Jul 12, 2016 at 8:16 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I've separated oil and gas in the attached.

We made major updates this year to pneumatic controllers, gathering and other sources, so a lot of the numbers have moved around.

For pneumatics, short story is, the GHGRP data showed more pneumatic controllers per well than our previous data source (the 1990's GRI study), and updating the inventory to use the latest GHGRP data resulted in much higher emissions from that category.

For gathering and boosting, we used one of the EDF-Industry studies to update the activity data (total number of gathering stations nationally) and emissions data. This also resulted in higher emissions.

For more information on the updates, please see the Recalculations Discussion of the GHG Inventory—page 63-65 for oil and pages 74-81 for gas, https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Chapter-3-Energy.pdf, and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_to_Production_Segment%20_Emissions_2016-04-14.pdf and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_GB_Station%20Emissions_2016-04-14.pdf for additional information.

Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, July 11, 2016 4:17 PM

To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

Thanks for the data. A couple questions.

For the few rows where the the oil and gas sectors are combined, would it be possible to have them separated? (e.g. rows 3, 4, 6, 8-11) We would like to try to match up as closely as possible to the format that you provided us before, with oil or gas sector and category number.

Second, are the emissions for the pneumatic devices correct? The table you provided shows 139 Bcf of CH4 for 2014, and we had 39 Bcf of CH4 for 2013... Gathering and boosting statiosn also appear to be MUCH higher, 97 Bcf of CH4 in 2014 versus 9 Bcf in 2013?

On Mon, Jul 11, 2016 at 12:53 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Sorry for the delay—here are the numbers. Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, July 07, 2016 10:52 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>

Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa,

Yes, so as I understand, this was 2013 emissions for the 1990-2015 GHG Inventory, and would be hoping to get 2014 data for the 1990-2016 Inventory. We we're using it to scale down the emissions per Fed/Ind share of all US production.

So with these categories, though, are you able to provide the volumes in CH4 and raw natural gas? I forget where we landed on this last time.

On Thu, Jul 7, 2016 at 7:45 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Just wanted to confirm that this is that attachment you meant in your email yesterday? I can send you an updated version with the 2014 numbers soon (hopefully tomorrow).

Melissa

From: Weitz, Melissa
Sent: Tuesday, April 21, 2015 1:25 PM
To: Tichenor, James <jtichenor@blm.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: RE: O&G Follow-up: Inventory Data

Hi James,

The net numbers for 2013 are in the attachment. Please let me know if you'd like to discuss.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 20, 2015 4:25 PM
To: Weitz, Melissa
Subject: Re: O&G Follow-up: Inventory Data

On Thu, Mar 26, 2015 at 9:35 AM, Waltzer, Suzanne <Waltzer.Suzanne@epa.gov> wrote:

Hi

To follow-up from our conversation, attached is a spreadsheet that has the oil and natural gas production methane emissions. The first two tabs are summary net emissions data (in Bcf and tonnes of methane) for the sector as a whole and for oil and gas production based on 2012 data (the 2014 GHG Inventory). The subsequent tabs are more detail on the individual source categories including the emission factors and activity data, etc. The data/information is from the inventory but may include some additional internal comments/notes so please do not share broadly.

We pulled this together from existing information quickly as a starting point. This may not be exactly what you need or if anything is unclear, just let us know. We will also take a take a closer look at the table you provided. It may be helpful to set up a meeting to talk through the data early next week.

Thanks,

Suzie

--

James Tichenor
Economist

Energy, Minerals, and Realty Management Directorate WO-300

Bureau of Land Management

jtichenor@blm.gov

202-573-0536

--

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jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 4/25/2018 1:50:05 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Re: [EXTERNAL] RE: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov)

Yes, we cancelled this. I think you need to delete he invite from your end.

Thanks in advance for those numbers.

On Wed, Apr 25, 2018 at 6:47 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

We think this meeting is canceled but we just wanted to check to make sure?

I saw your email the other day on the updated GHGI and I can get you those tables soon (probably by the end of this week).

Melissa

-----Original Appointment-----
From: jtichenor@blm.gov [mailto:jtichenor@blm.gov]
Sent: Tuesday, August 22, 2017 9:13 PM
To: jtichenor@blm.gov; Thompson, Lisa; Hambrick, Amy
Cc: Waltzer, Suzanne; Weitz, Melissa
Subject: Updated Invitation: Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the fourth Wednesday (PDT) (weitz.melissa@epa.gov)
When: Wednesday, April 25, 2018 7:30 AM-8:30 AM America/Los_Angeles.
Where:

This event has been changed.

more details »

Call re Regs; Ex. 6 Personal Privacy

When Changed: Monthly from 7:30am to 8:30am on the fourth Wednesday Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Calendar weitz.melissa@epa.gov

Who

- jtichenor@blm.gov - organizer
- thompson.lisa@epa.gov
- hambrick.amy@epa.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Your attendance is **optional**.

Going? All events in this series: **Yes** - **Maybe** - **No** more options »

Invitation from Google Calendar

You are receiving this courtesy email at the account weitz.melissa@epa.gov because you are an attendee of this event.

To stop receiving future updates for this event, decline this event. Alternatively you can sign up for a Google account at https://www.google.com/calendar/ and control your notification settings for your entire calendar.

Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More.

--

James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 2/28/2018 3:06:43 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Re: Call on Wednesday Feb 28th?

Hi Melissa,\

I think we decided to keep this call on the books, even though we just had one. The calendar was a little confusing with the meetings being shifted around, but I think we are on track again with this call. With the conflict in your schedule be an ongoing on and should we change the dte/time moving forward?

On Mon, Feb 26, 2018 at 8:02 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

> Hi James,
>
> I know I had the wrong dates for the check in calls on my calendar before and wanted to confirm that we have a call on Wednesday. I won't be able to participate, but Suzie or someone else from our group can.
>
> Thanks!
> Melissa

--

James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 4/20/2018 6:03:56 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Justin Abernathy [jabernathy@blm.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; James Tichenor [jtichenor@blm.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Re: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

FYI http://www.rff.org/files/document/file/RFF-Rpt-Oil%26GasRegs-BLM%20methane%20rule.pdf

On Wed, Apr 18, 2018 at 7:25 AM, <jtichenor@blm.gov> wrote:

https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/methane-and-waste-prevention-rule

EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Wed Apr 18, 2018 7:15am – 8am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Who
- jtichenor@blm.gov - organizer
- jabernathy@blm.gov
- weitz.melissa@epa.gov
- hambrick.amy@epa.gov
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James Tichenor
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Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 4/23/2018 10:55:33 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
CC: Adam Stern [adam_stern@ios.doi.gov]
Subject: Re: FW: O&G Follow-up: Inventory Data
Attachments: EPA Inventory Emissions 10.6 James 2.1.2018.xlsx

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To: Weitz, Melissa <Weitz.Melissa@epa.gov>

Cc: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>

Subject: Re: FW: O&G Follow-up: Inventory Data

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Cc: "Waltzer, Suzanne" <Waltzer.Suzanne@epa.gov>, Eric C Jones <ejones@blm.gov>

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https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_GB_Station%20Emissions_2016-04-14.pdf for additional information.

Please let me know if you have any questions.

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Sent: Monday, July 11, 2016 4:17 PM

To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
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To: Weitz, Melissa
Subject: Re: O&G Follow-up: Inventory Data

On Thu, Mar 26, 2015 at 9:35 AM, Waltzer, Suzanne <Waltzer.Suzanne@epa.gov> wrote:

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Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 2/1/2018 6:45:42 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

I had saved this file to our system, and then I opened it again just now, and I got a lot of #ref in the columns. Then I tracked back to this email and I still get it when I download. Are you seeing those in the file too? Would it be possible to resend? Also, would you have preliminary estimates for FY16?

Our director is being ask for this as a QFR, and I'd like to be able to provide an overall number for FY16, even if it is a preliminary draft estimate.

Thanks, James

On Tue, Oct 10, 2017 at 9:34 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

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Sent: Thursday, October 05, 2017 9:16 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>

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Date: Thu, Jul 14, 2016 at 7:37 AM
Subject: Re: FW: O&G Follow-up: Inventory Data
To: "Weitz, Melissa" <Weitz.Melissa@epa.gov>
Cc: "Waltzer, Suzanne" <Waltzer.Suzanne@epa.gov>, Eric C Jones <ejones@blm.gov>

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From: Tichenor, James [jtichenor@blm.gov]
Sent: 11/16/2017 4:22:11 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
CC: Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Re: FW: O&G Follow-up: Inventory Data

All,

FYI, OIRA distributed our final delay rule for interagency review. Quick turnaround, comments by COB Monday. In case you want to track it down.

On Tue, Oct 24, 2017 at 12:59 PM, Tichenor, James <jtichenor@blm.gov> wrote:
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For gathering and boosting, we used one of the EDF-Industry studies to update the activity data (total number of gathering stations nationally) and emissions data. This also resulted in higher emissions.

For more information on the updates, please see the Recalculations Discussion of the GHG Inventory—page 63-65 for oil and pages 74-81 for gas, https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Chapter-3-Energy.pdf, and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_to_Production_Segment%20_Emissions_2016-04-14.pdf and https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/Final_Revision_GB_Station%20Emissions_2016-04-14.pdf for additional information.

Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, July 11, 2016 4:17 PM

To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Hi Melissa,

Thanks for the data. A couple questions.

For the few rows where the the oil and gas sectors are combined, would it be possible to have them separated? (e.g. rows 3, 4, 6, 8-11) We would like to try to match up as closely as possible to the format that you provided us before, with oil or gas sector and category number.

Second, are the emissions for the pneumatic devices correct? The table you provided shows 139 Bcf of CH4 for 2014, and we had 39 Bcf of CH4 for 2013... Gathering and boosting statiosn also appear to be MUCH higher, 97 Bcf of CH4 in 2014 versus 9 Bcf in 2013?

On Mon, Jul 11, 2016 at 12:53 PM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Sorry for the delay—here are the numbers. Please let me know if you have any questions.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, July 07, 2016 10:52 AM
To: Weitz, Melissa <Weitz.Melissa@epa.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa,

Yes, so as I understand, this was 2013 emissions for the 1990-2015 GHG Inventory, and would be hoping to get 2014 data for the 1990-2016 Inventory. We we're using it to scale down the emissions per Fed/Ind share of all US production.

So with these categories, though, are you able to provide the volumes in CH4 and raw natural gas? I forget where we landed on this last time.

On Thu, Jul 7, 2016 at 7:45 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Just wanted to confirm that this is that attachment you meant in your email yesterday? I can send you an updated version with the 2014 numbers soon (hopefully tomorrow).

Melissa

From: Weitz, Melissa
Sent: Tuesday, April 21, 2015 1:25 PM
To: Tichenor, James <jtichenor@blm.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: RE: O&G Follow-up: Inventory Data

Hi James,

The net numbers for 2013 are in the attachment. Please let me know if you'd like to discuss.

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 20, 2015 4:25 PM
To: Weitz, Melissa
Subject: Re: O&G Follow-up: Inventory Data

On Thu, Mar 26, 2015 at 9:35 AM, Waltzer, Suzanne <Waltzer.Suzanne@epa.gov> wrote:

Hi

To follow-up from our conversation, attached is a spreadsheet that has the oil and natural gas production methane emissions. The first two tabs are summary net emissions data (in Bcf and tonnes of methane) for the sector as a whole and for oil and gas production based on 2012 data (the 2014 GHG Inventory). The subsequent tabs are more detail on the individual source categories including the emission factors and activity data, etc. The data/information is from the inventory but may include some additional internal comments/notes so please do not share broadly.

We pulled this together from existing information quickly as a starting point. This may not be exactly what you need or if anything is unclear, just let us know. We will also take a take a closer look at the table you provided. It may be helpful to set up a meeting to talk through the data early next week.

Thanks,

Suzie

--

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Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 10/5/2017 1:15:33 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
CC: Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Re: FW: O&G Follow-up: Inventory Data

Thanks Melissa!
That would be great. Would it be possible to have by mid-next week?

On Thu, Oct 5, 2017 at 6:13 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I can get you the updated information. When do you need this by?

Thanks,

Melissa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Wednesday, October 04, 2017 4:26 PM
To: Hambrick, Amy <Hambrick.Amy@epa.gov>; Thompson, Lisa <Thompson.Lisa@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: Fwd: FW: O&G Follow-up: Inventory Data

Or this file, if possible. I think this one might be less involved and, at the same time, what were are looking for.

---------- Forwarded message ----------
From: **Tichenor, James** <jtichenor@blm.gov>
Date: Thu, Jul 14, 2016 at 7:37 AM
Subject: Re: FW: O&G Follow-up: Inventory Data
To: "Weitz, Melissa" <Weitz.Melissa@epa.gov>
Cc: "Waltzer, Suzanne" <Waltzer.Suzanne@epa.gov>, Eric C Jones <ejones@blm.gov>

Hi Melissa,

Another quick question about the data (I've attached what you sent this year and last year). 'Gathering and Boosting Stations' appears to be a new source category this year (or maybe a new label). Would the correct crosswalk to 2013 be to consider it as 'Gathering Compressors'? Would it be category 5 or 9 or a new one?

Thanks again for your help!

On Tue, Jul 12, 2016 at 11:41 AM, Tichenor, James <jtichenor@blm.gov> wrote:

Thanks so much for your help!

On Tue, Jul 12, 2016 at 8:16 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James,

I've separated oil and gas in the attached.

We made major updates this year to pneumatic controllers, gathering and other sources, so a lot of the numbers have moved around.

For pneumatics, short story is, the GHGRP data showed more pneumatic controllers per well than our previous data source (the 1990's GRI study), and updating the inventory to use the latest GHGRP data resulted in much higher emissions from that category.

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Please let me know if you have any questions.

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Subject: Re: FW: O&G Follow-up: Inventory Data

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Melissa

From: Weitz, Melissa
Sent: Tuesday, April 21, 2015 1:25 PM
To: Tichenor, James <jtichenor@blm.gov>
Cc: Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>
Subject: RE: O&G Follow-up: Inventory Data

Hi James,

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From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Monday, April 20, 2015 4:25 PM
To: Weitz, Melissa
Subject: Re: O&G Follow-up: Inventory Data

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Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 2/14/2018 3:42:16 PM
To: Weitz, Melissa [Weitz.Melissa@epa.gov]
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: Re: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)

Hi sorry, it's not on my calendar. Let's call in and have a quick call and we can at least get on the same page about scheduling. I'll call in now and sit tight.

On Wed, Feb 14, 2018 at 7:37 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James--

Lisa and I were on the line earlier but we think this meeting may have been cancelled? Let us know if we should call back in.

Thanks!
Melissa

From: jtichenor@blm.gov
Sent: Monday, November 20, 2017 10:50 AM
To: jtichenor@blm.gov; Thompson, Lisa; Hambrick, Amy; jabernathy@blm.gov; epionke@blm.gov
Cc: Waltzer, Suzanne; Weitz, Melissa
Subject: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)
When: Wednesday, February 14, 2018 10:30 AM-11:30 AM.
Where:

This event has been changed.

more details »

Changed: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When Changed: Monthly from 7:30am to 8:30am on the second Wednesday Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Calendar weitz.melissa@epa.gov

Who
- jtichenor@blm.gov - organizer
- thompson.lisa@epa.gov
- hambrick.amy@epa.gov
- jabernathy@blm.gov
- epionke@blm.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Your attendance is **optional**.
Going? All events in this series: **Yes** - **Maybe** - **No** more options »

Invitation from Google Calendar

You are receiving this courtesy email at the account weitz.melissa@epa.gov because you are an attendee of this event.

To stop receiving future updates for this event, decline this event. Alternatively you can sign up for a Google account at https://www.google.com/calendar/ and control your notification settings for your entire calendar.

Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More.

--

James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 2/22/2018 8:33:40 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Update: Waste Prevention Proposed Rule is Officially Published

Colleagues:

The FR Notice is available through this link:
https://www.federalregister.gov/documents/2018/02/22/2018-03144/waste-prevention-production-subject-to-royalties-and-resource-conservation-rescission-or-revision-of

Also, here is the link to the regulations.gov docket with the rule, supporting materials, and vehicle for public comment.
https://www.regulations.gov/document?D=BLM-2018-0001-0001

Happy reading!

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Appointment

From: jtichenor@blm.gov [jtichenor@blm.gov]
Sent: 9/27/2017 2:27:46 PM
To: Hambrick, Amy [Hambrick.Amy@epa.gov]; Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]

Subject: Updated invitation: Call re Regs; **Ex. 6 Personal Privacy** @ Wed Sep 27, 2017 8am - 9am (PDT) (weitz.melissa@epa.gov)
Attachments: invite.ics

Start: 9/27/2017 3:00:00 PM
End: 9/27/2017 4:00:00 PM
Show Time As: Tentative

Recurrence: (none)

This event has been changed.

more details »

Call re Regs; Ex. 6 Personal Privacy

When **Changed:** Wed Sep 27, 2017 8am – 9am Pacific Time

Video call https://plus.google.com/hangouts/_/doi.gov/jtichenor

Calendar weitz.melissa@epa.gov

Who
- jtichenor@blm.gov - organizer
- hambrick.amy@epa.gov
- thompson.lisa@epa.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Your attendance is **optional**.
Going? **Yes** - **Maybe** - **No** more options »

Invitation from Google Calendar

You are receiving this courtesy email at the account weitz.melissa@epa.gov because you are an attendee of this event.

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Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 1/10/2018 5:24:04 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]
Subject: Complaints against the Waste Prevention Delay Rule
Attachments: document_gw_14.pdf; document_gw_15.pdf

All,

Please see the 2 complaints attached.

--
James Tichenor
Economist
Energy, Minerals, and Realty Management Directorate WO-300
Bureau of Land Management
jtichenor@blm.gov
202-573-0536

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 4/25/2018 6:06:07 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: Re: [EXTERNAL] using the same social cost language as the NODA
Attachments: BLM-2018-0001-132387_Environmental Groups Social Cost of Methane.pdf; RFF-Rpt-Oil&GasRegs-BLM methane rule.pdf

Hi Lisa,

Just as an FYI. We're receiving (still going through them) a large number of comments regarding SCCO2 and SCCH4. I'm attaching one comment from a joint env group submission. And I believe I sent you the RFF counter analysis to our rule (which we found online, but not yet in our comment docket) as an FYI.

On Wed, Apr 18, 2018 at 7:58 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

> Lisa Thompson
>
> Fuels and Incineration Group
>
> Office of Air Quality Planning and Standards
>
> U.S. Environmental Protection Agency
>
> 919-541-9775

--
James Tichenor
Economist
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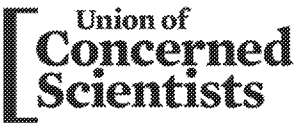

April 23, 2018

To: Catherine Cook, Acting Division Chief, Fluid Minerals Division, BLM

Docket: RIN 1004-AE53

Subject: Comments on Proposed Rule, Regulatory Impact Analysis, and Environmental Assessment on the Rescission or Revision of Certain Requirements for Waster Prevention and Resource Conservation

Submitted by: Environmental Defense Fund, Montana Environmental Information Center, Institute for Policy Integrity at New York University School of Law, Natural Resources Defense Council, Sierra Club, Union of Concerned Scientists, Western Environmental Law Center[1]

BLM proposes to rescind or revise crucial sections of the 2016 Waste Prevention Rule, which was designed to prevent private industry from wasting natural gas resources owned by the public and to prevent significant methane emissions and the associated costs to public health and the climate. To justify its proposal, BLM manipulates the calculation of forgone benefits from delay—particularly, the calculation of the social cost of methane—in ways completely inconsistent with the best available science, the best practices for economic analysis, and the legal standards for rational decisionmaking. In reality, the rescission rule flunks cost-benefit analysis, and the proposal should not move forward.

BLM now argues, less than two years after the Waste Prevention Rule was finalized in November 2016, that its previous analysis had underestimated costs and overestimated benefits, and that the 2016 rule imposes substantial burdens inconsistent with section 1 of Executive Order 13,783.[2] BLM is wrong. As these comments explain, if anything, the 2016 rule underestimated the net climate benefits it would provide, because the social cost of methane omits the valuation of crucial climate damages and so is widely regarded as a lower-bound estimate of the full climate benefits of reducing methane emissions. Moreover, Executive Order 13,783 in fact instructs agencies to avoid only unnecessary regulations, but to keep necessary and appropriate regulations for which the benefits justify the costs.[3] The 2016 Waste Prevention Rule's benefits exceed its costs by as much as $200 million per year,[4] and so it is precisely the kind of necessary and appropriate rule that agencies are instructed to preserve. By contrast, the proposed rescission rule only appears to be justified on cost-benefit grounds because BLM has manipulated the economics.

These comments make the following main arguments about how BLM failed to appropriately value the social cost of methane and other forgone benefits:

- BLM's arbitrarily crabbed 10-year timespan for analysis undercounts significant forgone benefits. The 2016 rule would continue to generate net benefits, increasing each year, even after 2028.

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[1] Our organizations may separately submit other comments regarding other aspects of the proposed suspension.
[2] 83 Fed. Reg. 7924, 7925 (Feb. 22, 2018).
[3] Exec. Order. 13,783 § 1(a) & (e), 82 Fed. Reg. 16,093 (Mar. 31, 2017).
[4] BLM, *Regulatory Impact Analysis for Waste Prevention and Resource Conservation* 111 (2016) [hereinafter 2016 RIA].

- BLM arbitrarily attempts to limit its valuation of the social cost of methane to domestic-only effects. Not only is a global perspective required under principles of rational decisionmaking, but the methodology and models that BLM uses cannot calculate an accurate domestic-only value.
- BLM arbitrarily discounts future climate effects at a 7% discount rate in addition to a 3% rate. Applying a 7% discount rate to inter-generational effects is inconsistent with Circular A-4's requirements to distinguish social discount rates from rates based on private returns to capital; to make plausible assumptions; to adequately address uncertainty, especially over long time horizons; and to rely on the best available economic data and literature.
- BLM arbitrarily fails to follow prescribed practices for dealing with uncertainty. Specifically, BLM failed to address uncertainty over the discount rate (by, for example, presenting an estimate at a 2.5% or lower discount rate, or a declining rate) or to address uncertainty over catastrophic damages, tipping points, option value, and risk aversion (by, for example, giving appropriate weight to an estimate at the 95th percentile). By failing to run such sensitivity analyses, BLM overlooks how different (and more plausible) assumptions would change its cost-benefit calculation.
- BLM hides behind the label of "interim values" to cherry-pick only those methodological revisions that advance its predetermined goal of a lower social cost of methane. Any update to the Interagency Working Group's 2016 estimates must fully engage with all the most up-to-date literature and with all the recommendations issued by the National Academies of Sciences.
- BLM fails to appropriately value unquantified benefits to climate and public health.
- BLM's environmental assessment misleadingly reports forgone methane reductions in short tons of methane, rather than in carbon dioxide-equivalent metric tons, and fails to provide necessary context by monetizing the methane emissions.

These critical failings completely undercut the justification for the proposed rescission, and it should not move forward. Nevertheless, BLM does make a few appropriate methodological choices that it should continue applying in any future applications of the social cost of methane. Specifically, BLM "relies upon the inputs and modeling developed by the now-disbanded Interagency Working Group for the purposes of providing discrete alternative scenarios that reflect the best available Federal agency estimates of social costs."[5] Indeed, because the Interagency Working Group used the best available data and methodology, it is appropriate for agencies to continue to rely on its methodology and its 2016 estimates. In fact, BLM should have relied more consistently on the Interagency Working Group's inputs and assumptions, and so focused on a global valuation calculation at a 3% or lower discount rate. BLM also explains the virtues of equally weighting the results of the three most peer-reviewed integrated assessment models, to balance out the limitations and omissions of any one model.[6] In any future applications of the social cost of methane, BLM should continue to rely on the Interagency Working Group's methodology and use multiple peer-reviewed models. That said, BLM has failed to use the most up-to-date versions of those models, and should use the updated models in future calculations, including in any revised analysis of its proposed rescission.

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[5] BLM, *Regulatory Impact Analysis for the Proposed Rule to Rescind or Revise Certain Requirements of the 2016 Waste Prevention Rule* 73 (2018) [hereinafter 2018 RIA].

[6] 2018 RIA at 74.

ED_002246_00000116-00002

1. BLM's Short Timespan Undercounts the Proposal's Net Costs

BLM's timespan for its regulatory impact analysis is too short and fails to capture all important costs and benefits.[7] OMB's Circular A-4 requires agencies' regulatory analyses to "cover a period long enough to encompass all the important benefits and costs likely to result from the rule."[8] Ten years is too short a timespan to cover all the important effects likely to result from a rule on methane emissions, especially since some of the requirements of the rule are not scheduled for full implementation until the end of that ten-year period. In the 2016 rule's analysis, while BLM did anticipate that aggregate effects might lessen somewhat after ten years, the agency explained that the methane capture requirements would continue to limit flaring far beyond the first ten years.[9] In fact, BLM's 2016 analysis showed methane reductions slightly but steadily increasing year after year, with no sign of slowing down—let alone stopping—after ten years.[10] Indeed, the final capture requirement was only scheduled to go fully into effect starting in 2026.[11]

Tellingly, BLM's estimates of compliance cost savings for the proposed rescission flatten out or even start dropping by year 2028.[12] By comparison, estimates of forgone emission reductions show emissions still rising in year 2028,[13] and the annual value of associated climate damages would continue to rise further still after 2028, since as atmospheric concentrations of greenhouse gases increase, each subsequent year's emissions are marginally more damaging than the last.[14] Consequently, by ignoring Circular A-4's requirement that agencies choose a sufficiently long period for analysis, BLM has overlooked important and increasingly large net costs associated with the proposed rescission. As such, the proposed rescission's economic analysis is misleading and arbitrary.

2. Executive Order 13,783 Does Not Bar Agencies from Following the IWG's Best Practices

President Trump's Executive Order 13,783, issued March 28, 2017, officially disbanded the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) and withdrew the technical support documents that underpinned their range of estimates.[15] Nevertheless, Executive Order 13,783 assumes that federal agencies will continue to "monetiz[e] the value of changes in greenhouse gas emissions" and instructs agencies to ensure such estimates are "consistent with the guidance contained in OMB Circular A-4."[16] Consequently, while BLM and other federal agencies no longer have technical guidance

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[7] The 2016 rule's analysis also used a short, ten-year timespan, but in that case extending the timespan further would have only increased net benefits and strengthened the justification for the already justified rule. Here, by contrast, a proper comparison of appropriately long timespans would reveal that the proposed rescission's cost savings do not justify its forgone benefits.

[8] OMB, Circular A-4, at 15 (2003).

[9] 2016 RIA at 38.

[10] 2016 RIA at 110, tbl. 8-2b.

[11] 43 C.F.R. § 3179.7.

[12] 2018 RIA at Table 4.1b (the 2016 rule's estimated annual compliance costs are the same in year 2028 as in year 2027 under the low estimate, and drop from $296 million to $295 million under the high estimate).

[13] 2018 RIA at Table 4.2b.

[14] 2018 RIA at 72 ("SC-CH4 increases over time because future emissions are expected to produce larger incremental damages as physical and economic systems become more stressed in response to greater climatic change, and because GDP is growing over time and many damage categories are modeled as proportional to gross GDP.").

[15] Exec. Order. No. 13,783 § 5(b), 82 Fed. Reg. 16,093 (Mar. 28, 2017).

[16] *Id.* § 5(c).

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directing them to exclusively rely on the IWG's estimates to monetize climate effects, by no means does the new Executive Order imply that agencies should not monetize important effects in their regulatory analyses or environmental impact statements. In fact, Circular A-4 instructs agencies to monetize costs and benefits whenever feasible.[17] The Executive Order does not prohibit agencies from relying on the same choice of models as the IWG, the same inputs and assumptions as the IWG, the same statistical methodologies as the IWG, or the same ultimate values as derived by the IWG. To the contrary, because the Executive Order requires consistency with Circular A-4, as agencies follow the Circular's standards for using the best available data and methodologies, they will necessarily choose similar data, methodologies, and estimates as the IWG, since the IWG's work continues to represent the best available estimates.[18] The new Executive Order does not preclude agencies from using the same range of estimates as developed by the IWG, so long as the agency explains that the data and methodology that produced those estimates are consistent with Circular A-4 and, more broadly, with standards for rational decisionmaking.

As explained throughout these comments, the IWG's estimates of the social cost of greenhouse gases are, in fact, already consistent with the Circular A-4 and represent the best existing estimates of the lower bound of the range for the social cost of greenhouse gases. Therefore, the IWG estimates or those of a similar or higher value[19] should be used in regulatory analyses and environmental impact statements.

3. BLM Must Rely on a Global Estimate of the Social Cost of Greenhouse Gases

BLM attempts to calculate and bases its proposal's justification on a domestic-only value of the social cost of methane. Not only is it inconsistent with Circular A-4 and best economic practices to fail to estimate the global damages of U.S. greenhouse gas emissions in regulatory analyses, but existing methods for estimating a "domestic-only" value—including BLM's approach—are unreliable, incomplete, and inconsistent with Circular A-4. BLM's domestic-only estimate fails to use models built for the purpose of calculating regional damages, ignores recent literature on significant U.S. climate damages, and fails to reflect international spillovers to the United States, U.S. benefits from foreign reciprocal actions, and the extraterritorial interests of U.S. citizens including financial interests and altruism.

Circular A-4 Requires "Different Emphases . . . Depending on the Nature" of the Regulatory Issue

Since 2010, and including some recent agency actions under the Trump administration,[20] federal agencies routinely based their regulatory decision and NEPA reviews on global estimates of the social

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[17] OMB, Circular A-4 at 27 (2003) ("You should monetize quantitative estimates whenever possible.").

[18] Richard L. Revesz et al., *Best Cost Estimate of Greenhouse Gases*, 357 SCIENCE 6352 (2017) (explaining that, even after Trump's Executive Order, the social cost of greenhouse gas estimate of around $50 per ton of carbon dioxide is still the best estimate).

[19] *See, e.g.*, Richard L. Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, 508 NATURE 173 (2014) (explaining that current estimates omit key damage categories and, therefore, are very likely underestimates).

[20] E.g., Dep't of Energy, Energy Conservation Program: Energy Conservation Standards for Walk-In Cooler and Freezer Refrigeration Systems, 82 Fed. Reg. 31,808, 31,812 (July 10, 2017) ("DOE maintains that consideration of global benefits is appropriate because of the global nature of the climate change problem."); U.S. Dep't of Interior, Bureau of Ocean Energy Mgmt., Draft Envtl. Impact Statement: Liberty Development Project at 3-129, 4-246 (Aug. 2017) (BOEM, Liberty Development Project), *available at* https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId= 236901 (calling the global social

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cost of greenhouse gases. Though agencies often also disclosed a "highly speculative" range that tried to capture exclusively U.S. climate costs, emphasis on a global value has been recognized as more accurate given the science and economics of climate change, as more consistent with best economic practices, and as crucial to advancing U.S. strategic goals.[21]

Opponents of climate regulation have long challenged the global number in court and other forums, and often attempted to use Circular A-4 as support.[22] Specifically, opponents have seized on Circular A-4's instructions to "focus" on effects to "citizens and residents of the United States," while any significant effects occurring "beyond the borders of the United States . . . should be reported separately."[23] Importantly, despite this language and such challenges, the U.S. Court of Appeals for the Seventh Circuit had no trouble concluding that a global focus for the social cost of greenhouse gases was reasonable:

> AHRI and Zero Zone [the industry petitioners] next contend that DOE [the Department of Energy] arbitrarily considered the global benefits to the environment but only considered the national costs. They emphasize that the [statute] only concerns "national energy and water conservation." In the New Standards Rule, DOE did not let this submission go unanswered. It explained that climate change "involves a global externality," meaning that carbon released in the United States affects the climate of the entire world. According to DOE, national energy conservation has global effects, and, therefore, those global effects are an appropriate consideration when looking at a national policy. Further, AHRI and Zero Zone point to no global costs that should have been considered alongside these benefits. Therefore, DOE acted reasonably when it compared global benefits to national costs.[24]

Circular A-4's reference to effects "beyond the borders" confirms that it is appropriate for agencies to consider the global effects of U.S. greenhouse gas emissions. While Circular A-4 may suggest that most typical decisions should focus on U.S. effects, the Circular cautions agencies that special cases call for different emphases:

> [Y]ou cannot conduct a good regulatory analysis according to a formula. Conducting high-quality analysis requires competent professional judgment. ***Different regulations may call for different emphases*** in the analysis, ***depending on the nature and complexity*** of the regulatory issues and the sensitivity of the benefit and cost estimates to the key assumptions.[25]

In fact, Circular A-4 elsewhere assumes that agencies' analyses will not always be conducted from purely the perspective of the United States, as one of its instructions only applies "as long as the analysis is conducted from the United States perspective,"[26] suggesting that in some circumstances it is

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cost of carbon estimates developed in 2016 by the Interagency Working Group "a useful measure" and applying them to analyze the consequences of offshore oil and gas drilling).

[21] *See generally* Peter Howard & Jason Schwartz, *Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon*, 42 Columbia J. Envtl. L. 203 (2017).

[22] Ted Gayer & W. Kip Viscusi, *Determining the Proper Scope of Climate Change Policy Benefits in U.S. Regulatory Analyses: Domestic versus Global Approaches*, 10 Rev. Envtl. Econ. & Pol'y 245 (2016) (citing Circular A-4 to argue against a global perspective on the social cost of carbon); *see also, e.g.*, Petitioners Brief on Procedural and Record-Based Issues at 70, in *West Virginia v. EPA*, case 15-1363, D.C. Cir. (filed February 19, 2016) (challenging EPA's use of the global social cost of carbon).

[23] Circular A-4 at 15. Note that A-4 slightly conflates "accrue to citizens" with "borders of the United States": U.S. citizens have financial and other interests tied to effects beyond the borders of the United States, as discussed further below.

[24] Zero Zone v. Dept. of Energy, 832 F.3d 654, 679 (7th Cir., 2016).

[25] Circular A-4 at 3.

[26] *Id.* at 38 (counting international transfers as costs and benefits "as long as the analysis is conducted from the United States perspective").

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appropriate for the analysis to be global. For example, EPA and the Department of Transportation have adopted a global perspective on the analysis of potential monopsony benefits to U.S. consumers resulting from the reduced price of foreign oil imports following energy efficiency increases.[27]

Perhaps more than any other issue, the nature of the issue of climate change requires precisely such a "different emphasis" from the default domestic-only assumption. To avoid a global "tragedy of the commons" that could irreparably damage all countries, including the United States, every nation should ideally set policy according to the global social cost of greenhouse gases.[28] Climate and clean air are global common resources, meaning they are freely available to all countries, but any one country's use—i.e., pollution—imposes harms on the polluting country as well as the rest of the world. Because greenhouse pollution does not stay within geographic borders but rather mixes in the atmosphere and affects climate worldwide, each ton emitted by the United States not only creates domestic harms, but also imposes large externalities on the rest of the world. Conversely, each ton of greenhouse gases abated in another country benefits the United States along with the rest of the world.

If all countries set their greenhouse emission levels based on only domestic costs and benefits, ignoring the large global externalities, the aggregate result would be substantially sub-optimal climate protections and significantly increased risks of severe harms to all nations, including the United States. Thus, basic economic principles demonstrate that the United States stands to benefit greatly if all countries apply global social cost of greenhouse gas values in their regulatory decisions and project reviews. Indeed, the United States stands to gain hundreds of billions or even trillions of dollars in direct benefits from efficient foreign action on climate change.[29] Moreover, if all countries reverted to a domestic-only SCC, U.S. industry would be placed at a competitive disadvantage internationally, since a GDP-based SCC would be higher in the U.S. than in other countries; only a global SCC puts U.S. industry on a level playing field with the rest of the world.[30]

In order to ensure that other nations continue to use global social cost of greenhouse gas values, it is important that the United States itself continue to do so.[31] The United States is engaged in a repeated strategic dynamic with several significant players—including the United Kingdom, Germany, Sweden, and others—that have already adopted a global framework for valuing the social cost of greenhouse gases.[32] For example, Canada and Mexico have explicitly borrowed the U.S. estimates of a global social cost of carbon to set their own fuel efficiency standards.[33] For the United States to now depart from this collaborative dynamic by reverting to a domestic-only estimate would undermine the country's long-

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[27] *See* Howard & Schwartz, *supra* note 21, at 268-69.

[28] *See* Garrett Hardin, *The Tragedy of the Commons*, 162 Science 1243 (1968) ("[E]ach pursuing [only its] own best interest . . . in a commons brings ruin to all.").

[29] Policy Integrity, *Foreign Action, Domestic Windfall: The U.S. Economy Stands to Gain Trillions from Foreign Climate Action* (2015), http://policyintegrity.org/files/publications/ForeignActionDomesticWindfall.pdf

[30] Other flawed methods for calculating domestic-only SCCs, like proportion of worldwide shoreline, would also result in a higher domestic SCC for the U.S. than for most other countries.

[31] *See* Robert Axelrod, *The Evolution of Cooperation* 10-11 (1984) (on repeated prisoner's dilemma games).

[32] *See* Howard & Schwartz, *supra* note 21, at Appendix B.

[33] *See* Heavy-Duty Vehicle and Engine Greenhouse Gas Emission Regulations, SOR/2013-24, 147 Can. Gazette pt. II, 450, 544 (Can.), *available at* http://canadagazette.gc.ca/rp-pr/p2/2013/2013-03-13/html/sor-dors24-eng.html ("The values used by Environment Canada are based on the extensive work of the U.S. Interagency Working Group on the Social Cost of Carbon."); Jason Furman & Brian Deese, *The Economic Benefits of a 50 Percent Target for Clean Energy Generation by 2025*, White House Blog, June 29, 2016 (summarizing the North American Leader's Summit announcement that U.S., Canada, and Mexico would "align" their SCC estimates).

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term interests and could jeopardize emissions reductions underway in other countries, which are already benefiting the United States.

For these and other reasons, reliance on a domestic-only valuation is inappropriate. In the past, some agencies have, in addition to the global estimate, also disclosed a "highly speculative" estimate of the domestic-only effects of climate change. In particular, the Department of Energy always includes a chapter on a domestic-only value of carbon emissions in the economic analyses supporting its energy efficiency standards; EPA has also often disclosed similar estimates.[34] Such an approach is consistent with Circular A-4's suggestion that agencies should usually disclose domestic effects separately from global effects. However, as we have discussed, reliance on a domestic-only methodology would be inconsistent with both the inherent nature of climate change and the standards of Circular A-4. Consequently, under Circular A-4, BLM should have estimated, and used in its primary analysis, the global social cost of methane.

Benefits and Costs that "Accrue to U.S. Citizens" Are Much Broader Than Effects "within U.S. Borders"

To follow Circular A-4's instruction to analyze all significant effects that "accrue[s] to U.S. citizens," agencies must look beyond "U.S. borders" to a much broader range of climate effects. Circular A-4 instructs to estimate *all* important "opportunity costs," meaning "what individuals are willing to forgo to enjoy a particular benefit."[35] U.S. individuals are willing to forgo money to enjoy benefits or avoid costs from climate effects that occur beyond U.S. borders, and all such significant effects must be captured.[36]

International Spillovers: First, agencies may not ignore significant, indirect costs to trade, human health, and security likely to "spill over" to the United States as other regions experience climate change damages.[37] Due to its unique place among countries—both as the largest economy with trade- and investment-dependent links throughout the world, and as a military superpower—the United States is particularly vulnerable to effects that will spill over from other regions of the world. Spillover scenarios could entail a variety of serious costs to the United States as unchecked climate change devastates other countries. Correspondingly, mitigation or adaptation efforts that avoid climate damages to foreign countries will radiate benefits back to the United States as well.[38] While the current IAMs provide reliable but conservative estimates of global damages, they currently cannot calculate reliable region-specific estimates, in part because they do not model such spillovers.

As climate change disrupts the economies of other countries, decreased availability of imported inputs, intermediary goods, and consumption goods may cause supply shocks to the U.S. economy. Shocks to the supply of energy, technological, and agricultural goods could be especially damaging. For example, when Thailand—the world's second-largest producer of hard-drives—experienced flooding in 2011, U.S. consumers faced higher prices for many electronic goods, from computers to cameras.[39] A recent

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[34] Howard & Schwartz, *supra* note 21, at 220-21.

[35] Circular A-4 at 18.

[36] This section draws heavily from Howard & Schwartz (2017), *supra* note 21, and includes passages taken directly from that article (which was written by co-authors of these comments).

[37] Indeed, the integrated assessment models used to develop the global SCC estimates largely ignore inter-regional costs entirely. *See* Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon* (Cost of Carbon Project Report, 2014). Though some positive spillover effects are also possible, such as technology spillovers that reduce the cost of mitigation or adaptation, *see* S. Rao et al., *Importance of Technological Change and Spillovers in Long-Term Climate Policy*, 27 ENERGY J. 123-39 (2006), overall spillovers likely mean that the U.S. share of the global SCC is underestimated, *see* Jody Freeman & Andrew Guzman, *Climate Change and U.S. Interests*, 109 COLUMBIA L. REV. 1531 (2009).

[38] *See* Freeman & Guzman, *supra* note 37, at 1563-93.

[39] *See* Charles Arthur, *Thailand's Devastating Floods Are Hitting PC Hard Drive Supplies*, THE GUARDIAN, Oct. 25, 2011.

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economic study explored how heat stress-induced reductions in productivity worldwide will ripple through the interconnected global supply network.[40] Similarly, the U.S. economy could experience demand shocks as climate-affected countries decrease their demand for U.S. goods. Financial markets may also suffer as foreign countries become less able to loan money to the United States and as the value of U.S. firms declines with shrinking foreign profits. As seen historically, economic disruptions in one country can cause financial crises that reverberate globally at a breakneck pace.[41]

The human dimension of climate spillovers includes migration and health effects. Water and food scarcity, flooding or extreme weather events, violent conflicts, economic collapses, and a number of other climate damages could precipitate mass migration to the United States from regions worldwide, especially, perhaps, from Latin America. For example, a 10% decline in crop yields could trigger the emigration of 2% of the entire Mexican population to other regions, mostly to the United States.[42] Such an influx could strain the U.S. economy and will likely lead to increased U.S. expenditures on migration prevention. Infectious disease could also spill across the U.S. borders, exacerbated by ecological collapses, the breakdown of public infrastructure in poorer nations, declining resources available for prevention, shifting habitats for disease vectors, and mass migration.

Finally, climate change is predicted to exacerbate existing security threats—and possibly catalyze new security threats—to the United States.[43] Besides threats to U.S. military installations and operations at home and abroad from flooding, storms, extreme heat, and wildfires,[44] Secretary of Defense Mattis has explained that "Climate change is impacting stability in areas of the world where our troops are operating today."[45] The National Defense Authorization Act for Fiscal Year 2018, signed by President Trump several months before BLM issued its proposed rule, found that "climate change is a direct threat to the national security of the United States" and that "[a]s global temperature rise, droughts and famines can lead to more failed states, which are breeding grounds of extremist and terrorist organizations."[46] The Department of Defense's 2014 Defense Review declared that climate effects "are threat multipliers that will aggravate stressors abroad such as poverty, environmental degradation, political instability, and social tensions—conditions that can enable terrorist activity and other forms of violence," and as a result "climate change may increase the frequency, scale, and complexity of future missions, including defense support to civil authorities, while at the same time undermining the capacity of our domestic installations to support training activities."[47] As an example of the climate-security-

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[40] Leonie Wenz & Anders Levermann, *Enhanced Economic Connectivity to Foster Heat Stress-Related Losses*, SCIENCE ADVANCES (June 10, 2016).

[41] *See* Steven L. Schwarcz, *Systemic Risk*, 97 GEO. L.J. 193, 249 (2008) (observing that financial collapse in one country is inevitably felt beyond that country's borders).

[42] Shuaizhang Feng, Alan B. Krueger & Michael Oppenheimer, *Linkages Among Climate Change, Crop Yields and Mexico-U.S. Cross-Border Migration*, 107 PROC. NAT'L ACAD. SCI. 14,257 (2010).

[43] *See* CNA Military Advisory Board, *National Security and the Accelerating Risks of Climate Change* (2014).

[44] U.S. Gov't Accountability Office, GAO-14-446 *Climate Change Adaptation: DOD Can Improve Infrastructure Planning and Processes to Better Account for Potential Impacts* (2014); Union of Concerned Scientists, *The U.S. Military on the Front Lines of Rising Seas* (2016).

[45] Andrew Revkin, *Trump's Defense Secretary Cites Climate Change as National Security Challenge*, ProPublica, Mar. 14, 2017.

[46] H.R. 2810-75, § 335(a)(9), (b)(1).

[47] U.S. Dep't of Defense, *Quadrennial Defense Review 2014* vi, 8 (2014).; see also U.S. Dep't of Defense, *Report to Congress: National Security Implications of Climate-Related Risks and a Changing Climate* (2015), *available at* http://archive.defense.gov/pubs/150724-congressional-report-on-national-implications-of-climate-change.pdf?source=govdelivery ("Global climate change will have wide-ranging implications for U.S. national security interests over the foreseeable future because it will aggravate existing problems—such as poverty, social tensions, environmental degradation, ineffectual leadership, and weak political institutions—that threaten domestic stability in a number of countries.")

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migration nexus, prolonged drought in Syria likely exacerbated the social and political tensions that erupted into an ongoing civil war,[48] which has triggered an international migration and humanitarian crisis.[49]

Because of these interconnections, attempts to artificially segregate a U.S.-only portion of climate damages will inevitably result in misleading underestimates. Some experts on the social cost of carbon have concluded that, given that integrated assessment models currently do not capture many of these key inter-regional costs, use of the global SCC may be further justified as a proxy to capturing all spillover effects.[50] Though surely not all climate damages will spill back to affect the United States, many will, and together with other justifications, the likelihood of significant spillovers makes a global valuation the better, more transparent accounting of the full range of costs and benefits that matter to U.S. policymakers and the public.

Reciprocal Foreign Actions: Second, an indirect consequence of the United States using a global social cost of greenhouse gas to justify actions that protect against climate damages is that foreign countries take reciprocal actions that benefit the United States. Circular A-4 requires that the "same standards of information and analysis quality that apply to direct benefits and costs should be applied to ancillary benefits and countervailing risks."[51] Consequently, any attempt to estimate a domestic-only value of the social cost of greenhouse gas must include indirect effects from reciprocal foreign actions.

As detailed more in Howard & Schwartz (2017), because the world's climate is a single interconnected system, the United States benefits greatly when foreign countries consider the global externalities of their greenhouse gas pollution and cut emissions accordingly. Game theory predicts that one viable strategy for the United States to encourage other countries to think globally in setting their climate policies is for the United States to do the same, in a tit-for-tat, lead-by-example, or coalition-building dynamic. In fact, most other countries with climate policies already use a global social cost of carbon or set their carbon taxes or allowances at prices above their domestic-only costs, consistent with the global perspective used to date by U.S. agencies to value the cost of greenhouse gases. Both Republican and Democratic administrations have recognized that the analytical and regulatory choices of U.S. agencies can affect the actions of foreign countries, which in turn affect U.S. citizens.[52]

According to one study, over the next fifteen years, direct U.S. benefits from global climate policies already in effect could reach over $2 trillion.[53] Any attempt to estimate a domestic-only value of the social cost of greenhouse gases must include such indirect effects from reciprocal foreign actions.[54]

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[48] *See* Center for American Progress et al., *The Arab Spring and Climate Change: A Climate and Security Correlations Series* (2013); Colin P. Kelley et al., *Climate Change in the Fertile Crescent and Implications of the Recent Syrian Drought*, 112 PROC. NAT'L ACAD. SCI. 3241 (2014); Peter H. Gleick, *Water, Drought, Climate Change, and Conflict in Syria*, 6 WEATHER, CLIMATE & SOCIETY, 331 (2014).

[49] *See, e.g.*, *Ending Syria War Key to Migrant Crisis, Says U.S. General*, BBC.COM (Sept. 14, 2015).

[50] *See* Robert E. Kopp & Bryan K. Mignone, Circumspection, Reciprocity, and Optimal Carbon Prices, 120 CLIMATE CHANGE 831, 833 (2013).

[51] Circular A-4 at 26.

[52] Howard & Schwartz, *supra* note 21, at 232-37 (citing acknowledgement of this phenomenon by both the Bush administration and the Obama administration).

[53] Policy Integrity, *Foreign Action, Domestic Windfall: The U.S. Economy Stands to Gain Trillions from Foreign Climate Action* 11 (2015), http://policyintegrity.org/files/publications/ForeignActionDomesticWindfall.pdf

[54] Kotchen shows that the optimally strategic social cost of greenhouse gas value will be strictly higher than the domestic value for all countries. Matthew J. Kotchen, *Which Social Cost of Carbon? A Theoretical Perspective* (NBER Working Paper, 2016).

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Accounting for U.S. benefits from global reciprocal action still understates the potential loss from failing to account for reciprocity. As noted above, other countries may select a domestic SCC in response to the U.S. selecting a domestic number. Since a GDP-based SCC would be higher for the U.S. than other nations, U.S. industry would be placed at a competitive disadvantage internationally if all countries reverted to their own domestic-only SCCs. Thus, not only should the United States account for reciprocity, but it should do so in a general equilibrium context.

Extraterritorial Interests: Circular A-4 requires agencies to count all significant costs and benefits, and specifically explains the importance of including "non-use" values like "bequest and existence values": "ignoring these values in your regulatory analysis may significantly understate the benefits and/or costs of regulatory action."[55] Similarly, while Circular A-4 distinguishes altruism from non-use values, the guidance instructs agencies that "if there is evidence of selective altruism, it needs to be considered specifically in both benefits and costs."[56] Many costs and benefits accrue to U.S. citizens from use values, non-use values, and altruism attached to climate effects occurring outside the U.S. borders.

U.S. citizens have economic and other interests abroad that are not fully reflected in the U.S. share of global GDP. As explained above, GDP does not reflect significant U.S. ownership interests in foreign businesses, properties, and other assets, as well as consumption abroad including tourism, or even the 8 million Americans living abroad.

The United States also has a willingness to pay—as well as a legal obligation—to protect the global commons of the oceans and Antarctica from climate damages. For example, the Madrid Protocol on Environmental Protection to the Antarctic Treaty commits the United States and other parties to the "comprehensive protection of the Antarctic environment," including "regular and effective monitoring" of "effects of activities carried on both within and outside the Antarctic Treaty area on the Antarctic environment."[57] The share of climate damages for which the United States is responsible is not limited to our geographic borders.

Similarly, U.S. citizens value natural resources and plant and animal lives abroad, even if they never use those resources or see those plants or animals. For example, the "existence value" of restoring the Prince William Sound after the 1989 Exxon Valdez oil tanker disaster—that is, the benefits derived by Americans who would never visit Alaska but nevertheless felt strongly about preserving the existence of this pristine environment—was estimated in the billions of dollars.[58] Though the methodologies for calculating existence value remain controversial,[59] U.S. citizens certainly have a non-zero willingness to pay to protect rainforests, charismatic megafauna like pandas, and other life and environments existing in foreign countries. U.S. citizens also have an altruistic willingness to pay to protect foreign citizens'

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[55] Circular A-4 at 22.

[56] *Id.*

[57] Madrid Protocol on Environmental Protection to the Antarctic Treaty (1991), http://www.ats.aq/documents/recatt/Att006_e.pdf

[58] RICHARD REVESZ & MICHAEL LIVERMORE, RETAKING RATIONALITY 121 (2008).

[59] *Id.* at 129.

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health and welfare.[60] This altruism is "selective altruism," consistent with Circular A-4, because the United States is directly responsible for most of the historic emissions contributing to climate change.[61]

The inextricable interconnectedness of global economic interests is apparent from the fact that BLM never attempts to separate out cost savings to foreign interests. Yet a significant portion of the proposed rescission's alleged cost savings would ultimately accrue to foreign owners and foreign customers of U.S. firms. All industry compliance costs ultimately fall on the owners, employees, or customers of regulated and affected firms. Of the oil and gas producers that lease land from BLM and so were subject to the 2016 Rule's compliance obligations, many such companies have foreign investors and foreign customers who will bear some portion of those compliance costs. For example, ConocoPhillips, which has a significant number of BLM's oil and gas leases in Alaska,[62] is a public company with many foreign investors. The Government Pension Fund of Norway, for instance, owned over seven million shares in ConocoPhillips as of 2017.[63] Economy-wide, between 20-30% of U.S. stocks and 35% of U.S. corporate debt are held by foreigners,[64] with significant foreign direct investment in U.S. mining and fossil fuel extraction and U.S. utilities.[65] U.S. producers also increasingly export oil and gas to foreign consumers.[66] A significant portion of the regulatory effects passing through regulated companies would ultimately be experienced by foreign owners or foreign customers. Yet despite counting compliance costs in full regardless of whether they are accrued inside or outside of the United States, BLM ignores legitimate effects of climate change occurring outside U.S. borders. This inconsistent treatment of costs and benefits is patently arbitrary and capricious.

Standards of Rational Decisionmaking Require Consideration of Important, Globally Interconnected Climate Costs

The Administrative Procedure Act, as interpreted by the Supreme Court in *State Farm*, requires agencies to consider all "important aspect[s] of the problem" and articulate a rational connection between the facts and the choice made.[67]

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[60] *See* Arden Rowell, *Foreign Impacts and Climate Change*, 39 Harvard Environmental Law Rev. 371 (2015); David A. Dana, *Valuing Foreign Lives and Civilizations in Cost-Benefit Analysis: The Case of the United States and Climate Change Policy* (Northwestern Faculty Working Paper 196, 2009), http://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=1195&context=facultyworkingpapers (discussing U.S. charitable giving abroad and foreign aid, and how those metrics likely severely underestimate true U.S. willingness to pay to protect foreign welfare).

[61] Datablog, *A History of CO_2 Emissions*, THE GUARDIAN (Sept. 2, 2009) (from 1900-2004, the United States emitted 314,772.1 million metric tons of carbon dioxide; Russia and China follow, with only around 89,000 million metric tons each).

[62] *See* e.g., Bureau of Land Management, *2013 NPR-A Oil & Gas Current Lease Report* (2013), https://www.blm.gov/sites/blm.gov/files/uploads/Oil_Gas_Alaska_2013_NPR-A_Oil_%26_Gas_Leases_Rpt_07-15-2013.pdf.

[63] See Morningstar, ConocoPhillips Major Shareholders (last visited Dec. 12, 2017), http://investors.morningstar.com/ownership/shareholders-major.html?t=COP&region=usa&culture=en-US&ownerCountry=USA.

[64] Heather Long, *Foreign Investors Can't Get Enough of the U.S.*, CNN, Oct. 1, 2015, http://money.cnn.com/2015/10/01/investing/foreign-investors-buy-us-stocks-bonds/index.html.

[65] Dept. of Treasury, *U.S. Portfolio Holdings of Foreign Securities*, exhibit 19 (2017) https://www.treasury.gov/press-center/press-releases/Documents/shl2016_final_20170421.pdf (market value of foreign holdings of U.S. securities, by industry).

[66] *See* U.S. Energy Info. Admin., *U.S. Natural Gas Exports and Re-Exports by Country* (Nov. 30, 2017), https://www.eia.gov/dnav/ng/ng_move_expc_s1_a.htm.

[67] 5 U.S.C. § 706; *see* Motor Vehicle Manufacturers Assoc. v. State Farm Mutual Auto. Ins. Co., 463 U.S. 29, 41-42 (1983) (applying the standards of review to deregulatory action and concluding that when "rescinding a rule" an agency "is obligated

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Two courts of appeals have already applied arbitrary and capricious review to support the use of a global social cost of carbon in setting regulatory standards. In *Center for Biological Diversity v. NHTSA*, the U.S. Court of Appeals for the Ninth Circuit not only held that it was arbitrary not to monetize the greenhouse gas benefits of vehicle efficiency standards, but also approvingly cited a partial consensus among experts around an estimate of "$50 per ton of carbon (or $13.60 per ton CO2),"[68] which, in the year 2006 when the rule was issued, would have been consistent with estimates of a global social cost of carbon.[69] More recently, in *Zero Zone v. Department of Energy*, the Court of Appeals for the Seventh Circuit found, in response to petitioners' challenge that the agency's consideration of the global social cost of carbon was arbitrary, that the agency had acted reasonably in considering the global climate effects.[70]

For more details on the justification for a global value of the social cost of greenhouse gases, including the applicable standards of rational decisionmaking, please see Peter Howard & Jason Schwartz, *Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon*, 42 Columbia J. Envtl. L. 203 (2017). Another strong defense of the global valuation as consistent with best economic practices appears in a letter published in a recent issue of *The Review of Environmental Economics and Policy*, co-authored by Nobel laureate Kenneth Arrow.[71]

No Current Methodology for Estimating a "Domestic-Only" Value Is Consistent with Circular A-4

OMB, the National Academies of Sciences, and the economic literature all agree that existing methodologies for calculating a "domestic-only" value of the social cost of greenhouse gases are deeply flawed and result in severe and misleading underestimates.

In developing the social cost of carbon, the IWG did offer some such domestic estimates. Using the results of one economic model (FUND) as well as the U.S. share of global gross domestic product ("GDP"), the group generated an "approximate, provisional, and ***highly speculative***" range of 7–23% of the global social cost of carbon as an estimate of the purely direct climate effects to the United States.[72] Yet, as the IWG itself acknowledged, this range is almost certainly an underestimate because it ignores significant, indirect costs to trade, human health, and security that are likely to "spill over" into the United States as other regions experience climate change damages, among other effects.[73]

Neither the existing IAMs nor a share of global GDP are appropriate bases for calculating a domestic-only estimate. The IAMs were never designed to calculate a domestic SCC, since a global SCC is the economic efficient value. FUND, like other IAMS, includes some simplifying assumptions: of relevance, FUND and the other IAMs are not able to capture the adverse effects that the impacts of climate change in other countries will have on the United States through trade linkages, national security, migration,

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to supply a reasoned analysis for the change beyond that which may be required when an agency does not act in the first instance").

[68] 538 F.3d at 1199, 1201.

[69] *See* Average Fuel Economy Standards, Passenger Cars and Light Trucks; Model Years 2011-2015, 73 Fed. Reg. 24,352, 24,414 (May 2, 2008) (the National Highway Traffic Safety Administration estimated that $14 per ton of carbon dioxide approximated global benefits).

[70] 832 F.3d at 679.

[71] Richard Revesz, Kenneth Arrow et al., *The Social Cost of Carbon: A Global Imperative*, 11 REEP 172 (2017).

[72] INTERAGENCY WORKING GROUP ON SOCIAL COST OF CARBON, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12,866 at 11 (2010).

[73] *Id.* (explaining that the IAMs, like FUND, do "not account for how damages in other regions could affect the United States (e.g., global migration, economic and political destabilization").

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and other forces.[74] This is why the IWG characterized the domestic-only estimate from FUND as a "highly speculative" underestimate. Similarly, a domestic-only estimate based on some rigid conception of geographic borders or U.S. share of world GDP will fail to capture all the climate-related costs and benefits that matter to U.S. citizens.[75] U.S. citizens have economic and other interests abroad that are not fully reflected in the U.S. share of global GDP. GDP is a "monetary value of final goods and services—that is, those that are bought by the final user—produced in a country in a given period of time."[76] GDP therefore does not reflect significant U.S. ownership interests in foreign businesses, properties, and other assets, as well as consumption abroad including tourism,[77] or even the 8 million Americans living abroad.[78] At the same time, GDP is also over-inclusive, counting productive operations in the United States that are owned by foreigners. Gross National Income ("GNI"), by contrast, defines its scope not by location but by ownership interests.[79] However, not only has GNI fallen out of favor as a metric used in international economic policy,[80] but using a domestic-only SCC based on GNI would make the SCC metrics incommensurable with other costs in regulatory impact analyses, since most regulatory costs are calculated by U.S. agencies regardless of whether they fall to U.S.-owned entities or to foreign-owned entities operating in the United States.[81] Furthermore, both GDP and GNI are dependent on what happens in other countries, due to trade and the international flow of capital. The artificial constraints of both metrics counsel against a rigid split based on either U.S. GDP or U.S. GNI.[82]

As a result, in 2015, OMB concluded, along with several other agencies, that "good methodologies for estimating domestic damages do not currently exist."[83] Similarly, the NAS recently concluded that current IAMs cannot accurately estimate the domestic social cost of greenhouse gases, and that

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[74] *See, e.g.*, Dept. of Defense, *National Security Implications of Climate-Related Risks and a Changing Climate* (2015), *available at* http://archive.defense.gov/pubs/150724-congressional-report-on-national-implications-of-climate-change.pdf?source=govdelivery.

[75] A domestic-only SCC would fail to "provide to the public and to OMB a careful and transparent analysis of the anticipated consequences of economically significant regulatory actions." Office of Information and Regulatory Affairs, *Regulatory Impact Analysis: A Primer* 2 (2011).

[76] Tim Callen, *Gross Domestic Product: An Economy's All*, IMF, http://www.imf.org/external/pubs/ft/fandd/basics/gdp.htm (last updated Mar. 28, 2012).

[77] "U.S. residents spend millions each year on foreign travel, including travel to places that are at substantial risk from climate change, such as European cities like Venice and tropical destinations like the Caribbean islands." David A. Dana, *Valuing Foreign Lives and Civilizations in Cost-Benefit Analysis: The Case of the United States and Climate Change Policy* (Northwestern Faculty Working Paper 196, 2009), http://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=1195&context=facultyworkingpapers.

[78] Assoc. of Americans Resident Oversees, https://www.aaro.org/about-aaro/6m-americans-abroad. Admittedly 8 million is only 0.1% of the total population living outside the United States.

[79] *GNI, Atlas Method (Current US$)*, The World Bank, http://data.worldbank.org/indicator/NY.GNP.ATLS.CD.

[80] *Id*.

[81] U.S. Office of Management and Budget & Secretariat General of the European Commission, *Review of Application of EU and US Regulatory Impact Assessment Guidelines on the Analysis of Impacts on International Trade and Development* 13 (2008).

[82] Advanced Notice of Proposed Rulemaking on Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44,354, 44,415 (July 30, 2008) ("Furthermore, international effects of climate change may also affect domestic benefits directly and indirectly to the extent U.S. citizens value international impacts (e.g., for tourism reasons, concerns for the existence of ecosystems, and/or concern for others); U.S. international interests are affected (e.g., risks to U.S. national security, or the U.S. economy from potential disruptions in other nations).").

[83] In November 2013, OMB requested public comments on the social cost of carbon. In 2015, OMB along with the rest of the Interagency Working Group issued a formal response to those comments. Interagency Working Group on the Social Cost of Carbon, *Response to Comments: Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12,866* at 36 (July 2015) [hereinafter, OMB 2015 Response to Comments].

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estimates based on U.S. share of global GDP would be likewise insufficient.[84] William Nordhaus, the developer of the DICE model, cautioned earlier this year that "regional damage estimates are both incomplete and poorly understood," and "there is little agreement on the distribution of the SCC by region."[85] In short, any domestic-only estimate will be inaccurate, misleading, and out of step with the best available economic literature, in violation of Circular A-4's standards for information quality.

BLM Relies on Sources that Cannot Accurately Calculate a Domestic-Only Estimate and that Explicitly Caution Against Using Domestic-Only Estimates

BLM reports that its domestic-only estimates are "calculated directly" from the models FUND and PAGE; for the model DICE, BLM simply assumes that U.S. damages are 10% of global damages. BLM thus uses these models in ways they were never designed for—indeed, in ways their designers specifically cautioned against. BLM furthermore fails to assess the most up-to-date literature on U.S. damages and fails to take steps to reflect spillover effects, reciprocal benefits, or U.S. interests beyond our borders. BLM's methodology is deeply flawed.

The integrated assessment models used by the agency to calculate the social cost of methane were designed to create global estimates and are best suited for those purposes. The models are limited in how accurately and fully they can estimate domestic values of the social cost of methane. For example, the models make simplifying assumptions about the extent of heterogeneity in crucial parameters like relative prices and discount rates.[86] The models also simplify or ignore completely global spillovers from trade, migration, and other sources.[87] These types of spillovers will not, in many cases, affect the global estimate of climate change damages, but they will change (perhaps dramatically so) the domestic estimates, as detailed below. For example, trade effects will net to zero globally. A decrease in exports by one country must correspond to a decrease in imports for another country.[88] Global estimates will also generally be more accurate than domestic estimates because aggregation of multiple values reduces the error of the overall estimate.[89]

Examining the individual models used by the agency to calculate the domestic social cost of methane highlights the current limitations facing calculation of a domestic value of the social cost of greenhouse gases. The agency uses three models: FUND 3.8, PAGE09, and DICE 2010.[90] The FUND model generally estimates domestic damages from climate change by scaling estimates according to gross domestic product or population. For instance, forestry damages are "mapped to the FUND regions assuming that the impact is uniform [relative] to GDP."[91] Similarly, domestic energy consumption changes are a function of gross domestic product, and the authors note that "heating demand is linear in the number of people" in a FUND region.[92] Scaling damages by gross domestic product and population will fail to

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[84] National Academies of Sciences, Engineering, and Medicine, *Valuing climate damages: Updating estimation of the social cost of carbon dioxide* at 53 (2017) [hereinafter NAS Second Report].

[85] William Nordhaus, *Revisiting the Social Cost of Carbon*, 114 PNAS 1518, 1522 (2017).

[86] Christian Gollier & James K. Hammitt, *The Long-Run Discount Rate Controversy*, 6 ANNU. REV. RESOUR. ECON. 273–295 (2014) at 287-289.

[87] *See generally* Howard & Schwartz (2017), *supra* note 21.

[88] *See, e.g.* PAUL R. KRUGMAN, MAURICE OBSTFELD & MARC J. MELITZ, INTERNATIONAL ECONOMICS: THEORY AND POLICY (10 ed. 2015). Such changes could have an effect on overall levels of trade, in turn effecting global damage estimates.

[89] *See, e.g.* SIDNEY I RESNICK, A PROBABILITY PATH (2013) at 203.

[90] 2018 RIA at 71.

[91] DAVID ANTHOFF & RICHARD S. J. TOL, THE CLIMATE FRAMEWORK FOR UNCERTAINTY, NEGOTIATION, AND DISTRIBUTION (FUND), TECHNICAL DESCRIPTION, VERSION 3.8 (2014) at 8.

[92] *Id.* at 10.

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capture important differences between countries like pre-existing climate, interconnectedness of trade relationships, climate change preparedness, and preferences.

These issues are readily apparent in the case of agricultural damage estimates in FUND. Agriculture is one of the most important sectors driving the relatively low damages in the FUND model. Yet, recent evidence on this sector that incorporates cutting-edge estimates of crop yield changes finds that the FUND model substantially understates the agricultural damages from climate change.[93] Particularly for domestic damages, new research shows that FUND dramatically understates the effect of warming on agricultural outcomes globally and for individual countries like the United States.[94] These higher damage estimates come from updates to the relationship between warming and crop yield but also from a more thorough modeling of international trade in agricultural products.

The PAGE09 model scales global damages estimates according to regional coastline length, with the IWG noting that, "The [domestic] scaling factor in PAGE09 is based on the length of a region's coastline relative to the EU…Because of the long coastline in the EU, other regions are, on average, less vulnerable than the EU for the same sea level and temperature increase."[95] The model also uses GDP scaling, stating that "other regions lose more or less [output] depending upon their GDP per capita and weights factors."[96] Coast-line length provides a reasonable scaling factor for damages from flooding, coastal storms, and other sea-level rise issues, but it likely understates damages to the United States, where increases in mortality, agricultural losses, and other effects will likely also occur in inland, warm areas of the country.[97] Scaling by gross domestic product has the same limitations noted above in the context of the FUND model.

Finally, the author of DICE 2010 has explicitly warned against using a domestic-only value. In a recent article, William Nordhaus states that, "The regional estimates [of the social cost of greenhouse gases] are poorly understood, often varying by a factor of 2 across the three models. Moreover, regional damage estimates are highly correlated with output shares." He later reiterates that "the regional damage estimates are both incomplete and poorly understood."[98] These statements reinforce the conclusion of OMB that "good methodologies for estimating domestic damages do not currently exist."[99]

BLM's inaccurate and arbitrary methodological shortcuts in estimating a domestic-only social cost of methane are exemplified by the application of a 10% domestic share to the DICE results. That percentage is based on one set of estimates of regional shares for the social cost of carbon. BLM admits that transferring this share estimate to the social cost of methane results in an underestimate, because regional shares are highly correlated with output and U.S. share of global output is higher during the shorter lifespan of methane compared to during the longer lifespan of carbon dioxide.[100] Yet BLM makes

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[93] Frances C Francis C Moore, Uris Lantz C Baldos & Thomas Hertel, *Economic impacts of climate change on agriculture: a comparison of process-based and statistical yield models*, 12 ENVIRON. RES. LETT. 65008 (2017).

[94] F. C. Moore et al., *New Science of Climate Change Impacts on Agriculture Implies Higher Social Cost of Carbon*, 1–43 (2017).

[95] IWG, 2013 Technical Update to the Social Cost of Carbon, at 10.

[96] Chris Hope, *Critical issues for the calculation of the social cost of CO2: why the estimates from PAGE09 are higher than those from PAGE2002*, 117 CLIM. CHANGE 531–543 (2013) at 539.

[97] Solomon Hsiang et al., *Economic Damage from Climate Change in the United States*, 1369 SCIENCE. 1362–1369 (2017).

[98] William D Nordhaus, *Revisiting the social cost of carbon*, 114 PROC. NATL. ACAD. SCI. U. S. A. 1518–1523 (2017) at 1522.

[99] OMB 2015 Response to Comments, *supra* 109.

[100] 2018 RIA at 71-72.

no effort to adjust its estimate to reflect the shorter lifespan of methane, remaining content to let stand a severe underestimate of forgone climate benefits.

In conclusion, BLM's estimation of the domestic-only social cost of methane ignores "important aspect[s] of the problem" and fails to articulate a rational connection between the data and the choice made, and is therefore arbitrary and capricious in violation of the Administrative Procedure Act.[101]

4. BLM Must Rely on a 3% or Lower Discount Rate for Intergenerational Effects—or a Declining Discount Rate

Because of the long lifespan of greenhouse gases and the long-term or irreversible consequences of climate change, the effects of today's emissions changes will stretch out over the next several centuries. The time horizon for an agency's analysis of climate effects, as well as the discount rate applied to future costs and benefits, determines how an agency treats future generations. Previously, federal agencies had focused on a central estimate of the social cost of greenhouse gases calculated at a 3% discount rate. BLM now proposes to give equal consideration to estimates calculated at a 7% discount rate, alleging that this is required by Circular A-4.[102] BLM is wrong. Not only does use of a 7% discount rate violate BLM's statutorily required consideration of impacts on future generations, but a 7% rate for intergenerational climate effects is inconsistent with best economic practices, including under Circular A-4. In 2015, OMB explained that "Circular A-4 is a living document. . . . [T]he use of ***7 percent is <u>not</u> considered appropriate*** for intergenerational discounting. There is wide support for this view in the academic literature, and it is recognized in Circular A-4 itself. "[103] While Circular A-4 tells agencies generally to use a 7% discount rate in addition to lower rates for typical rules,[104] the guidance does not intend for default assumptions to produce analyses inconsistent with best economic practices. Circular A-4 clearly supports using lower rates to the exclusion of a 7% rate for the costs and benefits occurring over the extremely long, 300-year time horizon of climate effects.

BLM's Statutory Authority Requires Protecting the Needs of Future Generations; a 7% Discount Rate Ignores Those Future Needs

The statutory authorities for BLM's 2016 waste prevention rule include the Mineral Leasing Act of 1920 and the Federal Land Policy and Management Act of 1976. The Mineral Leasing Act requires the Department of the Interior to "safeguard[ ] the public welfare" including through lease terms for the prevention of environmental harm.[105] The agency may also suspend lease operations "in the interest of

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[101] 5 U.S.C. § 706; *see* Motor Vehicle Manufacturers Assoc. v. State Farm Mutual Auto. Ins. Co., 463 U.S. 29, 41-42 (1983) (applying the standards of review to deregulatory action and concluding that when "rescinding a rule" an agency "is obligated to supply a reasoned analysis for the change beyond that which may be required when an agency does not act in the first instance").

[102] 2018 RIA at 34.

[103] OMB 2015 Response to Comments, *supra* note 83, at 36.

[104] Circular A-4 at 36 ("For regulatory analysis, you should provide estimates of net benefits using both 3 percent and 7 percent....If your rule will have important intergenerational benefits or costs you might consider a further sensitivity analysis using a lower but positive discount rate in addition to calculating net benefits using discount rates of 3 and 7 percent.").

[105] 30 U.S.C. § 187; See Natural Resources Defense Council, Inc. v. Berklund, 458 F. Supp. 925, 936 n.17 (D. DC 1978).

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conservation of natural resources,"[106] which courts have found includes preventing environmental harms.[107]

The Federal Land Policy and Management Act requires the agency to manage public lands in a manner that will "protect the quality of scientific, scenic, historical, *ecological, environmental, air and atmospheric*, water resources, and archeological values."[108] Interior must manage public lands according to the principles of "multiple use,"[109] which is defined to mean

> the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present *and future needs of the American people*; . . . a combination of balanced and diverse resource uses that takes into account the *long-term needs of future generations for renewable and nonrenewable resources, including*, but not limited to, recreation, range, timber, minerals, *watershed, wildlife and fish, and natural scenic*, scientific and historical values; and harmonious and coordinated management of the various resources *without permanent impairment of* the productivity of the land and *the quality of the environment* . . . .[110]

The statutory text is clear. The Department of the Interior must consider and balance the long-term needs of future generations, including the need to protect environmental and "atmospheric" values.

The discount rate determines how federal agencies treat future generations. One billion dollars in climate damages occurring 300 years from now is worth one billion dollars if discounted at a 0% rate; at a 2.5% rate, it is worth just over $600,000; at a 7% rate, it is worth less than $2. In other words, applying a 7% discount rate means society would be willing to spend less than $2 today to prevent $1,000,000,000 in damages from occurring in 300 years. By applying such a discount rate, BLM is effectively ignoring the welfare of future generations of Americans, in violation of the agency's congressional mandate.

A 7% Discount Rate is Not "Sound and Defensible" or "Appropriate" for Climate Effects

Circular A-4 clearly requires agency analysts to do more than rigidly apply default assumptions: "You cannot conduct a good regulatory analysis according to a formula. Conducting high-quality analysis requires competent professional judgment."[111] As such, analysis must be "based on the best reasonably obtainable scientific, technical, and economic information available,"[112] and agencies must "*[u]**se sound and defensible values*** or procedures to monetize benefits and costs, and ensure that key analytical assumptions are defensible."[113] Rather than assume a 7% discount rate should be applied automatically to every analysis, Circular A-4 requires agencies to justify the choice of discount rates for each analysis: "[S]tate in your report what assumptions were used, *such as . . . the discount rates* applied to future benefits and costs," and explain "clearly how you arrived at your estimates."[114] Based on Circular A-4's

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[106] 30 U.S.C. § 209.

[107] Copper Valley Machine Works v. Andrus, 653 F.2d 595, 601 & nn.7–8 (D.C. Cir. 1981); Hoyl v. Babbitt, 129 F.3d 1377, 1380 (10th Cir. 1997); Getty Oil Co. v. Clark, 614 F. Supp. 904, 916 (D. Wyo. 1985).

[108] 43 U.S.C. § 1701(a)(8).

[109] 43 U.S.C. § 1702(c), 1732(a).

[110] 43 U.S.C. § 1702(c).

[111] Circular A-4 at 3.

[112] *Id.* at 17.

[113] *Id.* at 27.

[114] *Id.* at 3.

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criteria, there are numerous reasons why applying a 7% discount rate to climate effects that occur over a 300-year time horizon would be unjustifiable.

First, basing the discount rate on the **consumption rate of interest** is the correct framework for analysis of climate effects; a discount rate based on the private return to capital is inappropriate. Circular A-4 does suggest that 7% should be a "default position" that reflects regulations that primarily displace capital investments; however, the Circular explains that "[w]hen regulation primarily and directly affects private consumption . . . *a lower discount rate is appropriate*."[115] The 7% discount rate is based on a private sector rate of return on capital, but private market participants typically have short time horizons. By contrast, climate change concerns the public well-being broadly. Rather than evaluating an optimal outcome from the narrow perspective of investors alone, economic theory requires analysts to make the optimal choices based on societal preferences and social discount rates. Moreover, because climate change is expected to largely affect large-scale consumption, as opposed to capital investment,[116] a 7% rate is inappropriate.

In 2013, OMB called for public comments on the social cost of greenhouse gases. In its 2015 Response to Comment document,[117] OMB (together with the other agencies from the IWG) explained that

> the consumption rate of interest is the correct concept to use . . . as the impacts of climate change are measured in consumption-equivalent units in the three IAMs used to estimate the SCC. This is consistent with OMB guidance in Circular A-4, which states that when a regulation is expected to primarily affect private consumption—for instance, via higher prices for goods and services—it is appropriate to use the consumption rate of interest to reflect how private individuals trade-off current and future consumption.[118]

The Council of Economic Advisers similarly interprets Circular A-4 as requiring agencies to choose the appropriate discount rate based on the nature of the regulation: "[I]n Circular A-4 by the Office of Management and Budget (OMB) the appropriate discount rate to use in evaluating the net costs or benefits of a regulation depends on whether the regulation primarily and directly affects private consumption or private capital."[119] The NAS also explained that a consumption rate of interest is the

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[115] *Id.* at 33.

[116] "There are two rationales for discounting future benefits—one based on consumption and the other on investment. The consumption rate of discount reflects the rate at which society is willing to trade consumption in the future for consumption today. Basically, we discount the consumption of future generations because we assume future generations will be wealthier than we are and that the utility people receive from consumption declines as their level of consumption increases. . . . The investment approach says that, as long as the rate of return to investment is positive, we need to invest less than a dollar today to obtain a dollar of benefits in the future. Under the investment approach, the discount rate is the rate of return on investment. If there were no distortions or inefficiencies in markets, the consumption rate of discount would equal the rate of return on investment. There are, however, many reasons why the two may differ. As a result, using a consumption rather than investment approach will often lead to very different discount rates." Maureen Cropper, *How Should Benefits and Costs Be Discounted in an Intergenerational Context?*, 183 RESOURCES 30, 33.

[117] Note that this document was not withdrawn by Executive Order 13,783.

[118] OMB 2015 Response to Comments, *supra* note 83, at 22.

[119] Council of Econ. Advisers, *Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate* at 1 (CEA Issue Brief, 2017), *available at* https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf. In theory, the two rates would be the same, but "given distortions in the economy from taxation, imperfect capital markets, externalities, and other sources, the SRTP and the marginal product of capital need not coincide, and analysts face a choice between the appropriate opportunity cost of a project and the appropriate discount rate for its benefits." *Id.* at 9. The correct discount rate for climate change is the social return to capital (i.e., returns minus the costs of externalities), not the private return to capital (which measures solely the returns).

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appropriate basis for a discount rate for climate effects.[120] There is also strong consensus through the economic literature that a capital discount rate like 7% is inappropriate for climate change.[121] Finally, each of the three integrated assessment models upon which BLM bases its analysis—DICE, FUND, and PAGE—uses consumption discount rates; a capital discount rate is thus inconsistent with the underlying models. (See the technical appendix on discounting attached to these comments for more details.) For these reason, 7% is an inappropriate choice of discount rate for the impacts of climate change.

Second, **uncertainty over the long time horizon** of climate effects should drive analysts to select a lower discount rate. As an example of when a 7% discount rate is appropriate, Circular A-4 identifies an EPA rule with a 30-year timeframe of costs and benefits.[122] By contrast, greenhouse gas emissions generate effects stretching out across 300 years. As Circular A-4 notes, while "[p]rivate market rates provide a reliable reference for determining how society values time within a generation, but for extremely long time periods no comparable private rates exist."[123]

Circular A-4 discusses how uncertainty over long time horizons drives the discount rate lower: "the longer the horizon for the analysis," the greater the "uncertainty about the appropriate value of the discount rate," which supports a lower rate.[124] Circular A-4 cites the work of renowned economist Martin Weitzman and concludes that the "certainty-equivalent discount factor corresponds to ***the minimum discount rate having any substantial positive probability***."[125] The NAS makes the same point about discount rates and uncertainty.[126] In fact, as discussed more below and in the technical appendix on discounting, uncertainty over the discount rate is best addressed by adopting a declining discount rate framework.

Third, a 7% discount rate **ignores catastrophic risks and the welfare of future generations**. As demonstrated in BLM's graph of the frequency distribution of social cost of methane estimates, the 7% rate truncates the long right-hand tail of social costs relative to the 3% rate's distribution. The long right-hand tail represents the possibility of catastrophic damages. As Pindyck explains in an article that BLM cites prominently, "the possibility of a catastrophic outcome is an essential driver of the [social cost of greenhouse gases]."[127] The 7% discount rate effectively assumes that present-day Americans are barely

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[120] NAS Second Report, *supra* note 84, at 28; *see also* Kenneth Arrow et al., Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?, 272 Science 221 (1996) (explaining that a consumption-based discount rate is appropriate for climate change).

[121] In addition to the CEA and NAS reports, see, for example, this article by the former chair of the NAS panel on the social cost of greenhouse gases: Richard Newell (2017, October 10). Unpacking the Administration's Revised Social Cost of Carbon. Available at http://www.rff.org/blog/2017/unpacking-administration-s-revised-social-cost-carbon. *See also* Comments from Robert Pindyck, to BLM, on the Social Cost of Methane in the Proposed Suspension of the Waste Prevention Rule (submitted Nov. 5, 2017, https://www.regulations.gov/document?D=BLM-2017-0002-16107).

[122] Circular A-4 at 34. *See also* OMB 2015 Response to Comments, *supra* note 83, at 21 ("While most regulatory impact analysis is conducted over a time frame in the range of 20 to 50 years").

[123] Circular A-4 at 36.

[124] *Id.*

[125] *Id.*; *see also* CEA, *supra* note 119, at 9: "Weitzman (1998, 2001) showed theoretically and Newell and Pizer (2003) and Groom et al. (2007) confirm empirically that discount rate uncertainty can have a large effect on net present values. A main result from these studies is that if there is a persistent element to the uncertainty in the discount rate (e.g., the rate follows a random walk), then it will result in an effective (or certainty-equivalent) discount rate that declines over time. Consequently, lower discount rates tend to dominate over the very long term, regardless of whether the estimated investment effects are predominantly measured in private capital or consumption terms (see Weitzman 1998, 2001; Newell and Pizer 2003; Groom et al. 2005, 2007; Gollier 2008; Summers and Zeckhauser 2008; and Gollier and Weitzman 2010)."

[126] NAS Second Report, *supra* note 84, at 27.

[127] Pindyck, Robert. 2013. "Climate change policy: What do the models tell us?" Journal of Economic Literature, 51(3), 860-872.

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willing to pay anything at all to prevent medium- to long-term catastrophes. This assumption violates BLM's statutory duty to protect the future needs of Americans. At the same time, the 7% distribution also misleadingly exaggerates the possibility of negative estimates of the social cost of greenhouse gases.[128] A negative social cost of methane implies a discount rate so high that society is willing to sacrifice serious impacts to future generations for the sake of small, short-term benefits (such as slightly and temporarily improved fertilization for agriculture). Again, this assumption contravenes BLM's statutory responsibilities to protect the welfare of future Americans.

Fourth, a 7% discount rate would be inappropriate for climate change because it is based on **outdated data and diverges from the current economic consensus**. Circular A-4 requires that assumptions—including discount rate choices—are "based on the best reasonably obtainable scientific, technical, and economic information available."[129] Yet Circular A-4's own default assumption of a 7% discount rate was published 14 years ago and was based on data from decades ago.[130] Circular A-4's guidance on discount rates is in need of an update, as the Council of Economic Advisers detailed earlier this year after reviewing the best available economic data and theory:

> The discount rate guidance for Federal policies and projects was last revised in 2003. Since then a general reduction in interest rates along with a reduction in the forecast of long-run interest rates, warrants serious consideration for a reduction in the discount rates used for benefit-cost analysis.[131]

In addition to recommending a value below 7% as the discount factor based on private capital returns, the Council of Economic Advisers further explains that, because long-term interest rates have fallen, a discount rate based on the consumption rate of interest "should be at most 2 percent,"[132] which further confirms that applying a 7% rate to a context like climate change would be wildly out of step with the latest data and theory. Similarly, recent expert elicitations—a technique supported by Circular A-4 for filling in gaps in knowledge[133]—indicate that a growing consensus among experts in climate economics for a discount rate between 2% and 3%; 5% represents the upper range of values recommended by experts, and few to no experts support discount rates greater than 5% being applied to the costs and benefits of climate change.[134] Based on current economic data and theory, the most appropriate discount rate for climate change is 3% or lower.

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[128] In the Monte Carlo simulation data, the 7% discount rate doubles the frequency of negative estimates compared to the 3% discount rate simulations, from a frequency of 4% to 8%.

[129] CEQ regulations implementing NEPA similarly require that information in NEPA documents be "of high quality" and states that "[a]ccurate scientific analysis . . . [is] essential to implementing NEPA." 40 C.F.R. § 1500.1(b).

[130] The 7% rate was based on a 1992 report; the 3% rate was based on data from the thirty years preceding the publication of Circular A-4 in 2003. Circular A-4 at 33.

[131] CEA, *supra* note 119, at 1; *id.* at 3 ("In general the evidence supports lowering these discount rates, with a plausible best guess based on the available information being that the lower discount rate should be at most 2 percent while the upper discount rate should also likely be reduced."); *id.* at 6 ("The Congressional Budget Office, the Blue Chip consensus forecasts, and the Administration forecasts all place the ten year treasury yield at less than 4 percent in the future, while at the same time forecasting CPI inflation of 2.3 or 2.4 percent per year. The implied real ten year Treasury yield is thus below 2 percent in all these forecasts.").

[132] *Id.* at 1.

[133] Circular A-4 at 41.

[134] Peter Howard & Derek Sylvan, *The Economic Climate: Establishing Expert Consensus on the Economics of Climate Change* (Inst. Policy Integrity Working Paper 2015/1); M.A. Drupp, et al., *Discounting Disentangled: An Expert Survey on the Determinants of the Long-Term Social Discount Rate* (London School of Economics and Political Science Working Paper, May 2015) (finding consensus on social discount rates between 1-3%). Pindyck, in a survey of 534 experts on climate change, finds a mean discount rate of 2.9% in the climate change context and this rate drops to 2.6% when he drops individuals that lack

Fifth, Circular A-4 requires more of analysts than giving all possible assumptions and scenarios equal attention in a sensitivity analysis; if alternate assumptions would fundamentally change the decision, Circular A-4 requires analysts to select the **most appropriate assumptions from the sensitivity analysis**.

Circular A-4 indicates that significant intergenerational effects will warrant a special sensitivity analysis focused on discount rates even lower than 3%:

> Special ethical considerations arise when comparing benefits and costs across generations. . . It may not be appropriate for society to demonstrate a similar preference when deciding between the well-being of current and future generations. . . If your rule will have important intergenerational benefits or costs you might consider a further sensitivity analysis using a lower but positive discount rate in addition to calculating net benefits using discount rates of 3 and 7 percent.[135]

Elsewhere in Circular A-4, OMB clarifies that sensitivity analysis should not result in a rigid application of all available assumptions regardless of plausibility. Circular A-4 instructs agencies to depart from default assumptions when special issues "call for different emphases" depending on "the sensitivity of the benefit and cost estimates to the key assumptions."[136] More specifically:

> If benefit or cost estimates depend heavily on certain assumptions, you should make those assumptions explicit and carry out *sensitivity analyses using plausible alternative assumptions*. If the value of net benefits changes from positive to negative (or vice versa) or if the relative ranking of regulatory options changes with alternative plausible assumptions, you should conduct further analysis to determine ***which of the alternative assumptions is more appropriate***.[137]

In other words, if using a 7% discount rate would fundamentally change the agency's decision compared to using a 3% or lower discount rate, the agency must evaluate which assumption is most appropriate. Since OMB, the Council of Economic Advisers, the National Academies of Sciences, and the economic literature all conclude that a 7% rate is inappropriate for climate change, agencies should select a 3% or lower rate. BLM's selection of a 7% discount rate cannot be justified as "based on the best reasonably obtainable scientific, technical, and economic information available" and so is inconsistent with best practices for cost-benefit analysis under Circular A-4.

Application of a Declining Discount Rate Is Actionable Under the Current Economic Literature

Circular A-4 contemplates the use of declining discount rates in its reference to the work of Weitzman.[138] As the Council of Economic Advisers explained earlier this year, Weitzman and others developed the foundation for a declining discount rate approach, wherein rates start relatively higher for near-term costs and benefits but steadily decline over time according to a predetermined schedule

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confidence in their knowledge. Pindyck, R. S. (2016). *The social cost of carbon revisited* (No. w22807). National Bureau of Economic Research. Unlike Howard and Sylvan (2015), Pindyck (2016) combines economists and natural scientists in his survey, though the mean constant discount rate drops to 2.7% when including only economists. Again, this further supports the finding that the appropriate discount rate is between 2% and 3%.

[135] Circular A-4 at 35-36.

[136] *Id.* at 3.

[137] *Id.* at 42.

[138] Circular A-4, at page 36, cites to Weitzman's chapter in Portney & Weyant, eds. (1999); that chapter, at page 29, recommends a declining discount rate approach: "a sliding-scale social discounting strategy" with the rate at 3-4% through year 25; then around 2% until year 75; then around 1% until year 300; and then 0% after year 300.

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until, in the very long-term, very low rates dominate due to uncertainty.[139] The National Academies of Sciences' report also strongly endorses a declining discount rate approach.[140] Notably, Marten et al., upon which BLM implicitly relies for developing the methodology for the social cost of methane,[141] also note the "agreement that the use of a constant discount rate over long time horizons with uncertain changes in the consumption per capita growth is not theoretically consistent."[142]

One possible schedule of declining discount rates was proposed by Weitzman.[143] It is derived from a broad survey of top economists and other climate experts and explicitly incorporates arguments around interest rate uncertainty. Work by Arrow *et al*, Cropper *et al*, and Gollier and Weitzman, among others, similarly argue for a declining interest rate schedule and lay out the fundamental logic.[144] Another schedule of declining discount rates has been adopted by the United Kingdom.[145]

The technical appendix on discounting attached to these comments more thoroughly reviews the various schedules of declining discount rates available for agencies to select and explains why agencies not only can but should adopt a declining discount framework to address uncertainty.

A 300-Year Time Horizon Is Required

Related to the choice of discount rate, a 300-year time horizon for analysis of climate effects is required by best economic practices. In 2017, the National Academies of Sciences issued a report stressing the importance of a longer time horizon for calculating the social cost of greenhouse gases. The report states that, "[i]n the context of the socioeconomic, damage, and discounting assumptions, the time horizon needs to be long enough to capture the vast majority of the present value of damages."[146] The report goes on to note that the length of the time horizon is dependent "on the rate at which undiscounted damages grow over time and on the rate at which they are discounted. Longer time horizons allow for representation and evaluation of longer-run geophysical system dynamics, such as

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[139] CEA, *supra* note 119, at 9 ("[A]nother way to incorporate uncertainty when discounting the benefits and costs of policies and projects that accrue in the far future—applying discount rates that decline over time. This approach uses a higher discount rate initially, but then applies a graduated schedule of lower discount rates further out in time. The first argument is based on the application of the Ramsey framework in a stochastic setting (Gollier 2013), and the second is based on Weitzman's 'expected net present value' approach (Weitzman 1998, Gollier and Weitzman 2010). In light of these arguments, the governments of the United Kingdom and France apply declining discount rates to their official public project evaluations.").

[140] NAS Second Report, *supra* note 84.

[141] BLM relies on IWG (2016), which in turn relied on Marten et al. (2015).

[142] Marten, A.L., Kopits, E.A., Griffiths, C.W., Newbold, S.C., and A. Wolverton. 2015. Incremental CH4 and N2O Mitigation Benefits Consistent with the U.S. Government's SC-CO2 Estimates. Climate Policy. 15(2): 272-298.

[143] Martin L. Weitzman, *Gamma Discounting*, 91 Am. Econ. Rev. 260, 270 (2001). Weitzman's schedule is as follows:

1-5 years	6-25 years	26-75 years	76-300 years	300+ years
4%	3%	2%	1%	0%

[144] Kenneth J. Arrow et al., *Determining Benefits and Costs for Future Generations*, 341 Science 349 (2013); Kenneth J. Arrow et al., *Should Governments Use a Declining Discount Rate in Project Analysis?*, Rev Environ Econ Policy 8 (2014); Maureen L. Cropper et al., *Declining Discount Rates*, American Economic Review: Papers and Proceedings (2014); Christian Gollier & Martin L. Weitzman, *How Should the Distant Future Be Discounted When Discount Rates Are Uncertain?* 107 Economics Letters 3 (2010).

[145] Joseph Lowe, H.M. Treasury, U.K., Intergenerational Wealth Transfers and Social Discounting: Supplementary Green Book Guidance 5 (2008), *available at* http://www.hm-treasury.gov.uk/d/4(5).pdf. The U.K. declining discount rate schedule that subtracts out a time preference value is as follows:

0-30 years	31-75 years	76-125 years	126-200 years	201-300 years	301+ years
3.00%	2.57%	2.14%	1.71%	1.29%	0.86%

[146] NAS Second Report, *supra* note 84, at 78.

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sea level change and the carbon cycle."[147] In other words, after selecting the appropriate discount rate based on theory and data (in this case, 3% or below), analysts should determine the time horizon necessary to capture all costs and benefits that will have important net present values at the discount rate. Therefore, a 3% or lower discount rate for climate change implies the need for a 300-year horizon to capture all significant values. NAS reviewed the best available, peer-reviewed scientific literature and concluded that the effects of greenhouse gas emissions over a 300-year period are sufficiently well established and reliable as to merit consideration in estimates of the social cost of greenhouse gases.[148]

5. BLM Arbitrarily Fails to Follow Prescribed Practices for Dealing with Uncertainty

As discussed above, BLM's response to uncertainty is to offer an alternative analysis that omits any monetization of the social cost of methane. This approach is clearly incorrect. BLM is not permitted, under either case law on rational decisionmaking or under OMB guidance on cost-benefit analysis, to simply give up in the face of uncertainty. BLM uses uncertainty as an excuse to present a scenario that does nothing to treat uncertainty with serious analytical rigor. BLM admits that the probability distributions for the social cost of methane feature "long right tails,"[149] but then does nothing to address the catastrophic risks represented by those tails. BLM should have followed the procedures prescribed by Circular A-4 to address uncertainty. As the Interagency Working Group did, BLM should have addressed uncertainty over the discount rate by running a scenario with a 2.5% or lower discount rate, or else a declining discount rate. And BLM should have addressed uncertainty over catastrophic damages, tipping points, option value, and risk aversion by presenting an estimate at the 95th percentile. By failing to run such sensitivity analyses, BLM overlooks how different (and more plausible) assumptions would change its cost-benefit calculation.

(Uncertainty in general, as well as uncertainty over the discount rate in particular, are discussed in greater detail in the technical appendices attached to these comments.)

Circular A-4's Prescriptions for Uncertainty

Circular A-4 requires thorough treatment of uncertainty around both values and outcomes,[150] and for especially large or complex matters it recommends a formal probabilistic analysis.[151] Generally, Circular A-4 encourages agencies to disclose the full probability distribution of potential consequences, including both upper and lower bound estimates in addition to central estimates.[152]

However, this guidance comes with some caveats. First, this approach to central estimates and the probability distribution "is appropriate as long as society is 'risk neutral' with respect to the regulatory alternatives."[153] But if society is risk averse—as is the case with climate change[154]—different

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[147] *Id.*

[148] Nat'l Acad. Of Sci., *Assessment of Approaches to Updating the Social Cost of Carbon* 49 (2016), at 32.

[149] 2018 RIA at 75.

[150] Circular A-4, at 42, requires probability distributions for "values as well for each of the outcomes"; the social cost of greenhouse gases is a value with a probability distribution.

[151] *Id.* at 41.

[152] Circular A-4 at 18, 40; *id.* at 45 ("When you provide only upper and lower bounds (in addition to best estimates), you should, if possible, *use the 95 and 5 percent* confidence bounds.").

[153] *Id.* at 42.

[154] *See* INTERAGENCY WORKING GROUP ON SOCIAL COST OF CARBON, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12,866 at 11 (2010).

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considerations need to be taken into account. Second, in 2011, the Office of Information and Regulatory Affairs interpreted Circular A-4's goal as "not to characterize the full range of *possible* outcomes . . . but rather the range of *plausible* outcomes."[155] Agency analysts must exercise judgment. Finally, as with all elements of agencies' economic analyses, Circular A-4 stresses that "Your analysis should be credible, objective, realistic, and scientifically balanced."[156]

Consequently, while it may be appropriate to disclose the full probability distribution of an uncertainty analysis, it is not appropriate under Circular A-4 to give a low-percentile estimate of the social cost of greenhouse gases equal weight in decision-making with the central and upper-percentile estimates. Giving equal attention to a low-percentile estimate is not "credible, objective, realistic, and scientifically balanced," does not reflect "plausible" scenarios, and would undermine consideration of risk aversion. Instead, a proper and plausible treatment of uncertainty in the context of climate change will support higher estimates of the social cost of greenhouse gases.

A 95th Percentile Value as a Treatment of Uncertainty over Damages

The IWG accounted for uncertainty in numerous rigorous ways. The group modeled the uncertainty over the value of the equilibrium climate sensitivity parameter using the Roe and Baker distribution calibrated to the IPCC reports. Additionally, using well-established analytic tools to capture and reflect uncertainty, including a Monte Carlo simulation to randomly select the equilibrium climate sensitivity parameter and other uncertainty parameters selected by the model developers, the IWG quantitatively modeled the uncertainty underlying how greenhouse gas emissions affect temperature.

To further deal with uncertainty, the IWG recommended to agencies a range of four estimates: three central or mean-average estimates at a 2.5%, 3%, and 5% discount rate respectively, and a 95th percentile value at the 3% discount rate. While the IWG's technical support documents disclosed fuller probabilities distributions, these four estimates were chosen by agencies to be the focus for decisionmaking. In particular, application of the 95th percentile value was not part of an effort to show the probability distribution around the 3% discount rate; rather, the 95th percentile value serves as a methodological shortcut to approximate the uncertainties around low-probability but high-damage, catastrophic, or irreversible outcomes that are currently omitted or undercounted in the economic models.

The shape of the distribution of climate risks and damages includes a long tail of lower-probability, high-damage, irreversible outcomes due to "tipping points" in planetary systems, inter-sectoral interactions, and other deep uncertainties. Climate damages are not normally distributed around a central estimate, but rather feature a significant right skew toward catastrophic outcomes. In fact, a 2015 survey of economic experts concludes that catastrophic outcomes are increasingly likely to occur.[157] Because the three integrated assessment models that the IWG's methodology relied on are unable to systematically account for these potential catastrophic outcomes, a 95th percentile value was selected instead to

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[155] Office of Information and Regulatory Affairs, *Regulatory Impact Analysis: A Primer* 2 (2011). This is best understood as drawing the line at insignificant or scientifically unsupported outcomes. By contrast, the low-probability but catastrophic potential outcomes of climate change are highly significant and the scientific literature demands giving them due attention.

[156] Circular A-4 at 39.

[157] Policy Integrity, *Expert Consensus on the Economics of Climate Change* 2 (2015), *available at* http://policyintegrity.org/files/publications/ExpertConsensusReport.pdf [hereinafter *Expert Consensus*] ("Experts believe that there is greater than a 20% likelihood that this same climate scenario would lead to a 'catastrophic' economic impact (defined as a global GDP loss of 25% or more)."). *See also* Robert Pindyck, *The Social Cost of Carbon Revisited* (National Bureau of Economic Research, No. w22807, 2016).

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account for such uncertainty. There are no similarly systematic biases pointing in the other direction which might warrant giving weight to a low-percentile estimate.

Additionally, the 95th percentile value addresses the strong possibility of widespread risk aversion with respect to climate change. The integrated assessment models do not reflect that individuals likely have a higher willingness to pay to reduce low-probability, high-impact damages than they do to reduce the likelihood of higher-probability but lower impact damages with the same expected cost. Beyond individual members of society, governments also have reasons to exercise some degree of risk aversion to irreversible outcomes like climate change.

In short, the 95th percentile estimate attempts to capture risk aversion and uncertainties around lower-probability, high-damage, irreversible outcomes that are currently omitted or undercounted by the models. There is no need to balance out this estimate with a low-percentile value, because the reverse assumptions are not reasonable:

- There is no reason to believe the public or the government will be systematically risk seeking with respect to climate change.[158]
- The consequences of overestimating the risk of climate damages (i.e., spending more than we need to on mitigation and adaptation) are not nearly as irreversible as the consequences of underestimating the risk of climate damage (i.e., failing to prevent catastrophic outcomes).
- Though some uncertainties might point in the direction of lower social cost of greenhouse gas values, such as those related to the development of breakthrough adaptation technologies, the models already account for such uncertainties around adaptation; on balance, most uncertainties strongly point toward higher, not lower, social cost of greenhouse gas estimates.[159]
- There is no empirical basis for any "long tail" of potential benefits that would counteract the potential for extreme harm associated with climate change.

Moreover, even the best existing estimates of the social cost of greenhouse gases are likely underestimated because the models currently omit many significant categories of damages—such as depressed economic growth, pests, pathogens, erosion, air pollution, fire, dwindling energy supply, health costs, political conflict, and ocean acidification—and because of other methodological choices.[160] There is little to no support among economic experts to give weight to any estimate lower than the 5%

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[158] As a 2009 survey revealed, the vast majority of economic experts support the idea that "uncertainty associated with the environmental and economic effects of greenhouse gas emissions increases the value of emission controls, assuming some level of risk-aversion." *See Expert Consensus, supra* note 157, at 3 (citing 2009 survey).

[159] *See* Richard L. Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, 508 NATURE 173 (2014). R. Tol, *The Social Cost of Carbon*, 3 Annual Rev. Res. Econ. 419 (2011) ("[U]ndesirable surprises seem more likely than desirable surprises. Although it is relatively easy to imagine a disaster scenario for climate change—for example, involving massive sea level rise or monsoon failure that could even lead to mass migration and violent conflict—it is not at all easy to imagine that climate change will be a huge boost to human welfare.").

[160] *See* Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, *supra* note 159; Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon* (Cost of Carbon Project Report, 2014); Frances C. Moore & Delavane B. Diaz, *Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy*, 5 NATURE CLIMATE CHANGE 127 (2015) (demonstrating SCC may be biased downward by more than a factor of six by failing to include the climate's effect on economic growth).

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discount rate estimate.[161] Rather, even a discount rate at 3% or below likely continues to underestimate the true social cost of greenhouse gases.

The National Academies of Sciences did recommend that the IWG document its full treatment of uncertainty in an appendix and disclose low-probability as well as high-probability estimates of the social cost of greenhouse gases.[162] However, that does not mean it would be appropriate for individual agencies to rely on low-percentile estimates to justify decisions. While disclosing low-percentile estimates as a sensitivity analysis may promote transparency, relying on such an estimate for decisionmaking—in the face of contrary guidance from the best available science and economics on uncertainty and risk—would not be a "credible, objective, realistic, and scientifically balanced" approach to uncertainty.

By not disclosing the social cost of methane at the 95th percentile value, BLM has failed to address uncertainties over catastrophic outcomes, tipping points, risk aversion, and option value, and so has violated the prescriptions of Circular A-4.

A Lower or Declining Discount Rate as a Treatment of Uncertainty

As explained above, BLM should have adopted a declining discount rate. But minimally, BLM should have at least run a scenario at a discount rate lower that 3%.[163] Circular A-4 strongly recommends that, for rules with "important intergenerational benefits or costs," agencies should run a "sensitivity analysis using a lower but positive discount rate."[164] The Interagency Working Group used a 2.5% discount rate to address uncertainty. BLM fails to run the social cost of methane at anything but a 3% and a 7% discount rate, and so has failed to adequately address uncertainty.

6. BLM Has Cherry-Picked Methodological Revisions to Advance a Predetermined Goal, Without Engaging in a Holistic Update

BLM explains that its estimates of the social cost of methane are simply "interim values" until an improved estimate can be developed.[165] The revisions to the Interagency Working Group's 2016 estimates that BLM made to produce these interim values are all methodologically unsound: ignoring the global values and calculating an inaccurate and incomplete domestic-only estimate; applying the inappropriate 7% discount rate; and failing to disclose a 95th percentile estimate. What links these select

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[161] The existing estimates based on the 5% discount rate already provides a lower-bound; indeed, if anything the 5% discount rate is already far too conservative as a lower-bound. A recent survey of 365 experts on the economics of climate change found that 90% of experts believe a 3% discount rate or lower is appropriate for climate change; a 5% discount rate falls on the extremely high end of what experts would recommend. *Expert Consensus, supra* note 157, at 21; *see also* Drupp, M.A., et al. *Discounting Disentangled: An Expert Survey on the Determinants of the Long-Term Social Discount Rate* (London School of Economics and Political Science Working Paper, May 2015) (finding consensus on social discount rates between 1-3%). Only 8% of the experts surveyed believe that the central estimate of the social cost of carbon is below $40, and 69% of experts believed the value should be at or above the central estimate of $40. *Expert Consensus, supra* note 157, at 18.

[162] Nat'l Acad. Of Sci., *Assessment of Approaches to Updating the Social Cost of Carbon* 49 (2016) ("[T]he IWG could identify a high percentile (e.g., 90th, 95th) and corresponding low percentile (e.g., 10th, 5th) of the SCC frequency distributions on each graph.").

[163] For example, the Council of Economic Advisers suggests that, in lieu of a declining discount rate, it is still appropriate "to pick a flat but somewhat lower discount-rate schedule for projects involving distant costs and benefits." CEA, *supra* note 119, at 9.

[164] Circular A-4 at 35-36.

[165] 2018 RIA at 34.

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revisions together is a common, predetermined goal: lowering the social cost of methane to support deregulation.

This is an arbitrary approach to updating the social cost of methane. BLM does not engage with any of the most recent literature on damages (see the technical appendix attached to these comments on damage literature), does not update the underlying models (BLM continues to use DICE-2010, even though DICE-2016R has been published[166]), does not move toward a declining discount rate, and does not implement any of the recommendations for improving the social cost of greenhouse gas methodology as articulated by the National Academies of Sciences. Agencies should pursue a holistic update of the social cost of greenhouse gas methodology, but BLM only seems interested in revisions designed to lower the valuation. As such, BLM's interim values are biased and should not be used in analysis.

To ensure that the agency is using the best available data and methodologies to monetize the full social cost of greenhouse gases, a thorough review of the relevant economics and scientific literature is critical. Specifically, the agency should consider the data, assumptions, and methods applied in the latest peer-reviewed publications with special attention applied to consensus-type documents, such as the Intergovernmental Panel on Climate Change. The agency should adopt such consensus findings as their central assumptions; alternative views with significant support should be considered through sensitivity analysis. An agency should undergo such a thorough review at frequent intervals—such as every three years (as undertaken by the IWG) or every five years (as recommended by the NAS panel).

The now disbanded Interagency Working Group undertook such a process of regular and systematic revisions. In 2010—and again in the 2013 and 2016 updates—the IWG's analytic process was science-based, open, and transparent. The 2010 Technical Support Document (TSD) set out in detail the IWG's decision-making process with respect to how it assessed and employed the models. The Government Accountability Office (GAO) found that "the working group's processes and methods reflected the following three principles: Used consensus-based decision making, Relied on existing academic literature and models, and Took steps to disclose limitations and incorporate new information."[167]

To ensure social cost of greenhouse gases reflect the best available science, agencies should not cherry pick modeling-assumptions. Instead, any update of the social cost of greenhouse gases requires a thorough review of peer-reviewed research to develop consensus-based modeling assumptions. In particular, the review process allows for the development of pre-specified frameworks and criteria upon which assumptions can be assessed. In fact, the NAS recently conducted such a review—and developed these frameworks and criteria—to enable a thorough near-term update of social cost of greenhouse gas estimates by agencies. The National Academies of Sciences' reports are attached to these comments, so that BLM might review their recommendations for a holistic update to the methodology.

7. BLM Fails to Appropriately Consider Unquantified Benefits

BLM compares its calculation of monetized cost savings against its calculation of monetized forgone benefits and concludes that its proposed rescission will deliver "positive net benefits."[168] The agency also claims to have "estimated all of the significant costs and benefits."[169] Both of these statements

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[166] Nordhaus, W. D. (2017). Revisiting the social cost of carbon. *Proceedings of the National Academy of Sciences*, 201609244.

[167] GAO, REGULATORY IMPACT ANALYSIS: Development of Social Cost of Carbon Estimates, GAO-14-663 (2014).

[168] 83 Fed. Reg. at 7939.

[169] 2018 RIA at 34 ("pursuant to E.O. 12866, and in an effort to provide full transparency to the public regarding the impacts of its actions, the BLM has estimated all of the significant costs and benefits of this rule to the extent that data and available methodologies permit, consistent with the best science currently available.").

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overlook the fact that BLM gives no weight to the unquantified forgone benefits to climate, as well as other unquantified forgone benefits, such as the public health consequences of the additional tons of VOCs that will be emitted under the proposed suspension and the impacts on communities and wildlife from unchecked flaring. Even putting aside BLM's severely manipulated underestimates of the monetized forgone climate benefits, BLM has failed to explain why the proposed suspension's estimated cost savings justify the sum of both the monetized and unmonetized forgone benefits.

Experts widely acknowledge that even the best existing estimates of the social cost of greenhouse gases are almost certainly underestimates of true global damages—perhaps severe underestimates.[170] Using different discount rates; selecting different models; applying different treatments to uncertainty, climate sensitivity, and the potential for catastrophic damages; and making other reasonable assumptions could yield very different, and much larger estimates.[171] For example, a 2014 report found current social cost of carbon estimates omit or poorly quantify damages to the following sectors:

> agriculture, forestry, and fisheries (including pests, pathogens, and weeds, erosion, fires, and ocean acidification); ecosystem services (including biodiversity and habitat loss); health impacts (including Lyme disease and respiratory illness from increased ozone pollution, pollen, and wildfire smoke); inter-regional damages (including migration of human and economic capital); inter-sector damages (including the combined surge effects of stronger storms and rising sea levels); exacerbation of existing non-climate stresses (including the combined effect of the over pumping of groundwater and climate-driven reductions in regional water supplies); socially contingent damages (including increases in violence and other social conflict); decreasing growth rates (including decreases in labor productivity and increases in capital depreciation); weather variability (including increased drought and inland flooding); and catastrophic impacts (including unknown unknowns on the scale of the rapid melting of Arctic permafrost or ice sheets).[172]

Circular A-4 requires that "When there are important non-monetary values at stake, you should also identify them in your analysis."[173] Specifically, agencies must "Include a summary table that lists all the unquantified benefits and costs, and use your professional judgment to highlight (e.g., with categories or rank ordering) those that you believe are most important."[174] The Circular cautions that "the most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit estimate."[175] BLM must therefore fully disclose the limitations of its social cost of greenhouse gas estimates and include detailed charts of all important, unquantified climate effects. BLM's cursory reference to "impact categories omitted"[176] is insufficient. BLM must then explain why, after giving appropriate weight to all the unquantified climate effects and all the unquantified forgone benefits from VOC emissions, the proposed rescission's cost savings justify its forgone benefits.

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[170] *See* Richard L. Revesz, Peter H. Howard, Kenneth Arrow, Lawrence H. Goulder, Robert E. Kopp, Michael A. Livermore, Michael Oppenheimer & Thomas Sterner, *Global Warming: Improve Economic Models of Climate Change*, 508 NATURE 173 (2014).

[171] *Id.*; *see also* Joint Comments from Institute for Policy Integrity et al., to Office of Information and Regulatory Affairs, on the Technical Update of the Social Cost of Carbon, OMB-2013-0007-0085, Feb. 26, 2014.

[172] Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon* 5 (Cost of Carbon Project Report, 2014), http://costofcarbon.org/.

[173] Circular A-4 at 3.

[174] *Id.* at 27.

[175] *Id.* at 2.

[176] 2018 RIA at 75.

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8. The Environmental Assessment's Presentation Is Misleading

BLM's environmental assessment misleadingly claims that "the actual effects . . . on global climate change" of the methane emissions that would be reduced under the 2016 rule "cannot be reliably assessed at this time and thus are sufficiently uncertain as to be not reasonably foreseeable."[177] Instead of applying the social cost of methane or otherwise assessing the actual climate impacts of the proposed rescission, BLM merely quantifies the additional short tons of methane that will be emitted as a result: 175,000 short tons.[178] Unfortunately, this presentation of short tons of methane fails to give the public and decisionmakers the necessary context to assess the significance of the climate consequences associated with the forgone emissions reductions.

First, to follow the standard practice in discussing the climate effects of non-carbon dioxide greenhouse gases and allow for apples-to-apples comparisons, BLM should have translated the forgone methane reductions into carbon dioxide-equivalent metric tons. BLM attempts to put the forgone methane reductions in context by comparing them to total U.S. methane emissions in 2015, but it lists those emissions in metric tons of carbon dioxide-equivalent (655.7 million).[179] Similarly, BLM presents potential greenhouse gas decreases from reduced transportation in carbon dioxide-equivalents.[180] By comparison, 175,000 short tons of methane look misleadingly small. In fact, the forgone methane reductions due to the proposed suspension will total somewhere between 5 million and 14 million metric tons of carbon dioxide-equivalents, using the latest global warming potentials from the IPCC.[181]

Moreover, BLM should have provided helpful context by monetizing the additional tons that will be emitted under the proposed suspension. Courts review NEPA documents "under an arbitrary and capricious standard," which requires "a reasonably thorough discussion of the significant aspects of the probable environmental consequences," to "foster both informed decisionmaking and informed public participation."[182] In particular, "the impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impact analysis that NEPA requires," and it is arbitrary to fail to "provide the necessary contextual information about the cumulative and incremental environmental impacts."[183]

To "provide the necessary contextual information," economic theory shows that one useful tool is monetization of environmental impacts. As Prof. Cass Sunstein has explained, drawing from the work of recent Nobel laureate economist Richard Thaler, a well-documented mental heuristic called "probability neglect" causes people to irrationally reduce small probability risks entirely down to zero.[184] In this case, for example, many decisionmakers and interested citizens would wrongly reduce down to zero the climate risks associated with the 0.61% of total U.S. methane emissions that BLM calculates will be emitted under the proposed suspension, simply due to the leading zero before the decimal. Yet the

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[177] BLM, Draft Environmental Assessment: Waste Prevention, Production Subject to Royalties, and Resource Conservation; Rescission or Revision of Certain Requirements 14 (2018).

[178] *Id.* at 18 tbl.4a (2018).

[179] *Id.* at 18.

[180] *Id.*

[181] IPCC Working Group I, Fifth Assessment Report, Climate Change 2013: The Physical Science Basis, Chapter 8: Anthropogenic and Natural Radiative Forcing (2014) at 633, 711-712, 714 (Table 8.7), available at https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf (see the adjustment identified in note B for fossil methane; 85-87 times greater than carbon after 20 years, and 30-36 times greater after 100 years).

[182] *CBD v. NHTSA*, 538 F.3d 1172, 1194 (9th Cir. 2008) (citations omitted). *See also* Montana Envtl. Info. Ctr. v. Office of Surface Mining, cv 15-106-M-DWM, at 12-13 (D.Mt., Aug. 14, 2017).

[183] *CBD,* 538 F.3d at 1217; *see also Montana Envtl. Info. Ctr., supra*, at 45.

[184] Cass R. Sunstein, Probability Neglect: Emotions, Worst Cases, and Law 112 Yale L61, 63, 72 (2002).

monetized expected cost of the climate risks associated with those same emissions—about $189 million[185]—is less likely overlooked. As the Environmental Protection Agency's website explains, "abstract measurements" of so many tons of greenhouse gases can be rather inscrutable for the public, unless "translat[ed] . . . into concrete terms you can understand."[186] Monetization contextualizes the significance of the additional tons of emissions.

Similarly, non-monetized effects are often irrationally treated as worthless.[187] Courts have begun to strike down administrative decisions for failing to give weight to non-monetized effects.[188] Most relevantly, in *Center for Biological Diversity v. NHTSA*, the U.S. Court of Appeals for the Ninth Circuit found it arbitrary and capricious to give zero value "to the most significant benefit of more stringent [fuel economy] standards: reduction in carbon emissions."[189]

BLM is required by NEPA to provide enough context to ensure that the public and decisionmakers would not overlook the associated climate risks. BLM's presentation of so many short tons of methane likely failed to provide such context. Monetization is one way that BLM could provide the necessary context to foster both informed decisionmaking and informed public participation.[190] As BLM's sister agency, the Office of Surface Mining, has explained, including the social cost of greenhouse gases in a NEPA document "provide[s] further context and enhance[s] the discussion of climate change impacts in the NEPA analysis."[191]

9. BLM Appropriately Gives Equal Weight to the Three Most Peer-Reviewed Models, but Should Use the Updated Models

BLM explains that it has relied on "the inputs and modeling developed by the now-disbanded Interagency Working Group for the purposes of providing discrete alternative scenarios that reflect the best available Federal agency estimates of social costs."[192] Indeed, because the Interagency Working Group used the best available data and methodology, it is appropriate for agencies to continue to rely on its methodology and its 2016 estimates. In fact, BLM should have relied more consistently on the Interagency Working Group's inputs and assumptions, and so focused on a global valuation calculation at a 3% or lower discount rate. BLM should also clarify whether its reference point was the Interagency Working Group's 2016 technical addendum on the social cost of methane, based on the work of Marten et al., or if instead BLM used earlier work by the Interagency Working Group on the social cost of carbon

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[185] 2016 RIA at 109, tbl. 8-2a (showing the benefits of the 2016 rule for the year 2017).

[186] EPA, Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator (last updated Sept. 2017).

[187] Richard Revesz, *Quantifying Regulatory Benefits,* 102 Cal. L. Rev. 1424, 1434-35, 1442 (2014).

[188] *Id.* at 1428, 1434.

[189] 538 F.3d at 1199.

[190] While the regulations promulgated by the Council on Environmental Quality to implement NEPA do not require a "monetary cost-benefit analysis," 40 C.F.R. § 1502.23, monetization nevertheless remains an available tool for contextualizing information. As the Council on Environmental Quality has explained, monetization may be "appropriate and relevant" and, in particular, "the Federal social cost of carbon . . . provides a harmonized, interagency metric that can give decision makers and the public useful information for their NEPA review." CEQ, *Final Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* 32-33 & fn.86 (2016), *available* at https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf.

[191] *Final Environmental Impact Statement—Four Corners Power Plant and Navajo Mine Energy Project* at 4.2-26 to 4.2-27 (2015). *Available at* https://www.wrcc.osmre.gov/initiatives/fourCorners/documents/FinalEIS/ Section%204.2%20-%20Climate%20Change.pdf.

[192] 2018 RIA at 73.

and simply adjusted for methane's relative global warming potential. The latter approach is not favored by economists, as it undercounts the true social cost of methane, and BLM would need to justify such a choice and provide an opportunity for public comment on such justification.

BLM also explains the virtues of equally weighting the results of the three most peer-reviewed integrated assessment models in order to balance out the limitations and omissions of any one model.[193] In any future applications of the social cost of methane, BLM should continue to rely on the Interagency Working Group's methodology and use multiple peer-reviewed models. That said, BLM has failed to use the most up-to-date versions of those models, and should use the updated models in future calculations, including in any revised analysis of its proposed suspension.[194]

Agencies Should Continue to Rely on the Interagency Working Group's Methodology and Estimates

In 2016, IWG published updated central estimates for the social cost of greenhouse gases: $50 per ton of carbon dioxide, $1440 per ton of methane, and $18,000 per ton of nitrous oxide (in 2017 dollars for year 2020 emissions).[195] Notwithstanding the recent Executive Order disbanding the IWG, the estimates updated by that group in 2016 are still the best estimates of the lower bound of the social cost of greenhouse gases, reflecting current best practices and best scientific and economic literature. Agencies should continue to use estimates of a similar or higher value[196] in their regulatory analyses and environmental impact statements. In particular, when estimating the social cost of greenhouse gases, agencies should use multiple peer-reviewed models, a global estimate of climate damages, and a 3% or lower discount rate for the central estimate.

Any departure from IWG's most recent estimates would require agencies to engage with the complex integrated assessment models and ensure consistency with the most current scientific and economic literature, which overwhelmingly supports a global estimate based on a 3% or lower discount rate. Indeed, since the IWG's estimates omit important damage categories and so are best treated as a lower bound, if anything the social cost of greenhouse gas values used by agencies should be even higher.

Agencies Must Not Rely on a Single Model, but Must Use Multiple, Peer-Reviewed Models

Circular A-4 requires agencies to use "the best reasonably obtainable scientific, technical, and economic information available. To achieve this, you should rely on peer-reviewed literature, where available."[197]

Since the IWG first issued the federal social cost of carbon protocol in 2010, this methodology has relied on the three most cited, most peer-reviewed integrated assessment models (IAMs). These three IAMs—called DICE (the Dynamic Integrated Model of Climate and the Economy[198]), FUND (the Climate Framework for Uncertainty, Negotiation, and Distribution[199]), and PAGE (Policy Analysis of the

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[193] *Id.* at 74.

[194] *Id.* at 71.

[195] U.S. Interagency Working Group on the Social Cost of Greenhouse Gases (IWG), "Technical support document: Technical update of the social cost of carbon for regulatory impact analysis under executive order 12866 & Addendum: Application of the methodology to estimate the social cost of methane and the social cost of nitrous oxide" (2016; https://obamawhitehouse.archives.gov/omb/oira/social-cost-of-carbon).

[196] *See supra* note 19.

[197] OMB, Circular A-4, at 17.

[198] William D. Nordhaus, *Estimates of the social cost of carbon: concepts and results from the DICE-2013R model and alternative approaches*, 1 JOURNAL OF THE ASSOCIATION OF ENVIRONMENTAL AND RESOURCE ECONOMISTS 1 (2014).

[199] David Anthoff & Richard S.J. Tol, THE CLIMATE FRAMEWORK FOR UNCERTAINTY, NEGOTIATION AND DISTRIBUTION (FUND), TECHNICAL DESCRIPTION, VERSION 3.6 (2012), *available at* http://www.fund-model.org/versions.

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Greenhouse Effect[200])—draw on the best available scientific and economic data to link physical impacts to the economic damages of each marginal ton of greenhouse gas emissions. As noted previously, each model translates emissions into changes in atmospheric greenhouse gas concentrations, atmospheric concentrations into temperature changes, and temperature changes into economic damages, which can then be adjusted according to a discount rate. These three models have been combined with inputs derived from peer-reviewed literature on climate sensitivity, socio-economic and emissions trajectories, and discount rates. The results of the three models have been given equal weight in federal agencies' estimates and have been run through statistical techniques like Monte Carlo analysis to account for uncertainty.

In a 2017 report, the National Academies of Sciences (NAS) recommended future improvements to this methodology. Specifically, over the next five years the NAS recommends unbundling the four essential steps in the IAMs into four separate "modules": a socio-economic and emissions scenario module, a climate change module, an economic damage module, and a discount rate module.[201] Unbundling these four steps into separate modules could allow for easier, more transparent updates to each individual component in order to better reflect the best available science and capture the full range of uncertainty in the literature. These four modules could be built from scratch or drawn from the existing IAMs. Either way, the integrated modular framework envisioned by NAS for the future will require significant time and resource commitments from federal agencies.

In the meantime, the NAS has supported the continued near-term use of the existing social cost of greenhouse gas estimates based on the DICE, FUND, and PAGE models, as used by federal agencies to date.[202] In short, DICE, FUND, and PAGE continue to represent the state-of-the-art models. The Government Accountability Office found in 2014 that the estimates derived from these models and used by federal agencies are consensus-based, rely on peer-reviewed academic literature, disclose relevant limitations, and are designed to incorporate new information via public comments and updated research.[203] In fact, the social cost of greenhouse gas estimates used in federal regulatory proposals and EISs have been subject to over 80 distinct public comment periods.[204] The economics literature confirms that estimates based on these three IAMs remain the best available estimates.[205] In 2016, the U.S. Court of Appeals for the Seventh Circuit held the estimates used to date by agencies are reasonable.[206] Just last month, the District of Montana rejected an agency's Environmental Assessment for failure to

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[200] Chris Hope, *The Marginal Impact of CO_2 from PAGE2002: An Integrated Assessment Model Incorporating the IPCC's Five Reasons for Concern*, 6 INTEGRATED ASSESSMENT J. 19 (2006).

[201] Nat'l Acad. Sci., Eng. & Medicine, *Valuing Climate Damages: Updating Estimates of the Social Cost of Carbon Dioxide* 3 (2017) [hereinafter "NAS, Second Report"] (recommending an "integrated modular approach").

[202] Specifically, NAS concluded that a near-term update was not necessary or appropriate and the current estimates should continue to be used while future improvements are developed over time. Nat'l Acad. Sci., Eng. & Medicine, *Assessment of Approaches to Updating the Social Cost of Carbon: Phase 1 Report on a Near-Term Update* 1 (2016) [hereinafter "NAS, First Report"].

[203] Gov't Accountability Office, *Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates* (2014).

[204] Howard & Schwartz, *supra* note 21, at Appendix A.

[205] *E.g.*, Richard G. Newell et al., *Carbon Market Lessons and Global Policy Outlook*, 343 SCIENCE 1316 (2014); Bonnie L. Keeler et al., *The Social Costs of Nitrogen*, 2 SCIENCE ADVANCES e1600219 (2016); Richard L. Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, 508 NATURE 173 (2014) (co-authored with Nobel Laureate Kenneth Arrow, among others).

[206] *Zero Zone*, 832 F.3d at 678-79 (7th Cir. 2016) (finding that the agency "acted reasonably" in using global estimates of the social cost of carbon, and that the estimates chosen were not arbitrary or capricious).

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incorporate the federal social cost of carbon estimates into its cost-benefit analysis of a proposed mine expansion.[207]

Regardless of Executive Order 13,783's withdrawal of the guidance requiring federal agencies to rely on IWG's technical support documents to estimate the social cost of greenhouse gases, IWG's choice of DICE, FUND, and PAGE, its use of inputs and assumptions, and its statistical analysis still represent the state-of-the-art approach based on the best available, peer-reviewed literature. This approach satisfies Circular A-4's requirements for information quality and transparency. Therefore, in complying with the Executive Order's instructions to ensure that social cost of greenhouse gas estimates are consistent with Circular A-4, agencies will necessarily have to rely on models like DICE, FUND, and PAGE, to use the same or similar inputs and assumptions as the IWG, and to apply statistical analyses like Monte Carlo.

The unavoidable fact is that DICE, FUND, and PAGE are still the dominant, most peer-reviewed models,[208] and most estimates in the literature continue to rely on those models.[209] Each of these models has been developed over decades of research, and has been subject to rigorous peer review, documented in the published literature. While other models exist, they lack DICE's, FUND's, and PAGE's long history of peer review or exhibit other limitations. For example, the World Bank has created ENVISAGE, which models a more detailed breakdown of market sectors,[210] but unfortunately does not account for non-market impacts and so would omit a large portion of significant climate effects. Models like ENVISAGE are therefore not currently appropriate choices under the criteria of Circular A-4.[211]

An approach based on multiple, peer-reviewed models (like DICE, FUND, and PAGE) is more rigorous and more consistent with Circular A-4 than reliance on a single model or estimate. DICE, FUND, and PAGE each include many of the most significant climate effects, use appropriate discount rates and other assumptions, address uncertainty, are based on peer-reviewed data, and are transparent.[212] However, each IAM also has its own limitations and is sensitive to its own assumptions. No model fully captures all the significant climate effects.[213] By giving weight to multiple models—as the IWG did—agencies can balance out some of these limitations and produce more robust estimates.[214]

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[207] *Montana Environmental Information Center*, 2017 WL 3480262, at *12-15, 19.

[208] *See* Interagency Working Group on the Social Cost of Carbon, *Response to Comments: Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12,866* at 7 (July 2015) ("DICE, FUND, and PAGE are the most widely used and widely cited models in the economic literature that link physical impacts to economic damages for the purposes of estimating the SCC."), *citing* Nat'l Acad. Sci., Eng. & Medicine, *Hidden Cost of Energy: Unpriced Consequences of Energy Production and Use* (2010) ("the most widely used impact assessment models").

[209] R.S. Tol, *The Social Cost of Carbon*, 3 Annual Rev. Res. Econ. 419 (2011); T. Havranek et al., *Selective Reporting and the Social Cost of Carbon*, 51 Energy Econ. 394 (2015).

[210] World Bank, *The Environmental Impact and Sustainability Applied General Equilibrium (ENVISAGE) Model* (2008), *available at* http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1193838209522/Envisage7b.pdf.

[211] Similarly, Intertemporal Computable Equilibrium System (ICES) does not account for non-market impacts. *See* https://www.cmcc.it/models/ices-intertemporal-computable-equilibrium-system. Other models include CRED, which is worthy of further study for future use. Frank Ackerman, Elizabeth A. Stanton & Ramón Bueno, *CRED: A New Model of Climate and Development*, 85 Ecological Economics 166 (2013). Accounting for omitted impacts more generally, E.A. Stanton, F. Ackerman, R. Bueno, *Reason, Empathy, and Fair Play: The Climate Policy Gap*, (Stockholm Environment Inst. Working Paper 2012-02), find a doubling of the SCC using the CRED model.

[212] While sensitivity analysis can address parametric uncertainty within a model, using multiple models helps address structural uncertainty.

[213] *See* Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon* 5 (Cost of Carbon Project Report, 2014), http://costofcarbon.org/.

[214] Moore, F., Baldos, U., & Hertel, T. (2017). Economic impacts of climate change on agriculture: a comparison of process-based and statistical yield models. *Environmental Research Letters*.

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Finally, while agencies should be careful not to cherry-pick a single estimate from the literature, it is noteworthy that various estimates in the literature are consistent with the numbers derived from a weighted average of DICE, FUND, and PAGE—namely, with a central estimate of about $40 per ton of carbon dioxide, and a high-percentile estimate of about $120, for year 2015 emissions (in 2016 dollars, at a 3% discount rate). The latest central estimate from DICE's developers is $87 (at a 3% discount rate);[215] from FUND's developers, $12;[216] and from PAGE's developers, $123, with a high-percentile estimate of $332.[217]

In fact, much of the literature suggests that a central estimate of $40 per ton is a very conservative underestimate. A 2013 meta-analysis of the broader literature found a mean estimate of $59 per ton of carbon dioxide,[218] and a soon-to-be-published update by the same author finds a mean estimate of $108 (at a 1% discount rate).[219] A 2015 meta-analysis—which sought out estimates besides just those based on DICE, FUND, and PAGE—found a mean estimate of $83 per ton of carbon dioxide.[220] Various studies relying on expert elicitation[221] from a large body of climate economists and scientists have found mean estimates of $50 per ton of carbon dioxide,[222] $96-$144 per ton of carbon dioxide,[223] and $80-$100 per ton of carbon dioxide.[224] There is a growing consensus in the literature that even the best existing estimates of the social cost of greenhouse gases may severely underestimate the true marginal cost of climate damages.[225] Overall, a central estimate of $40 per ton of carbon dioxide at a 3% discount rate, with a high-percentile estimate of about $120 for year 2015 emissions, is consistent with the best available literature; if anything, the best available literature supports considerably higher estimates.[226]

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[215] William Nordhaus, *Revisiting the Social Cost of Carbon*, Proc. Nat'l Acad. Sci. (2017) (estimate a range of $21 to $141).

[216] D. Anthoff & R. Tol, *The Uncertainty about the Social Cost of Carbon: A Decomposition Analysis Using FUND*, 177 Climatic Change 515 (2013).

[217] C. Hope, *The social cost of CO2 from the PAGE09 model*, 39 Economics (2011); C. Hope, *Critical issues for the calculation of the social cost of CO2*, 117 *Climatic Change*, 531 (2013).

[218] R. Tol, *Targets for Global Climate Policy: An Overview*, 37 J. Econ. Dynamics & Control 911 (2013).

[219] R. Tol, *Economic Impacts of Climate Change* (Univ. Sussex Working Paper No. 75-2015, 2015).

[220] S. Nocera et al., *The Economic Impact of Greenhouse Gas Abatement through a Meta-Analysis: Valuation, Consequences and Implications in terms of Transport Policy*. 37 Transport Policy 31 (2015).

[221] Circular A-4, at 41, supports use of expert elicitation as a valuable tool to fill gaps in knowledge.

[222] Scott Holladay & Jason Schwartz, *Economists and Climate Change* 43 (Inst. Policy Integrity Brief, 2009 (directly surveying experts about the SCC).

[223] Peter Howard & Derek Sylvan, *The Economic Climate: Establishing Expert Consensus on the Economics of Climate Change* (Inst. Policy Integrity Working Paper 2015/1) (using survey results to calibrate the DICE-2013R damage function).

[224] R. Pindyck, *The Social Cost of Carbon Revisited* (Nat'l Bureau of Econ. Res. No. w22807, 2016) ($80-$100 is the trimmed range of estimates at a 4% discount rate; without trimming of outlier responses, the estimate is $200).

[225] *E.g.,* Howard & Sylvan, *supra* note 223; Pindyck, *supra* note 224. The underestimation results from a variety of factors, including omitted and outdated climate impacts (including ignoring impacts to economic growth and tipping points), simplified utility functions (including ignoring relative prices), and applying constant instead of a declining discount rate. *See* Howard, *supra* note 213; Revesz et al., *supra* note 2056; J.C. Van Den Bergh & W.J. Botzen, A Lower Bound to the Social Cost of CO2 Emissions, 4 Nature Climate Change 253 (2014) (proposing $125 per metric ton of carbon dioxide in 1995 dollars, or about $200 in today's dollars, as the lower bound estimate). *See also* F.C. Moore & D.B. Diaz, *Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy*, 5 Nature Climate Change 127 (2015) (concluding the SCC may be six times higher after accounting for potential growth impacts of climate change). Accounting for both potential impacts of climate change on economic growth and other omitted impacts, S. Dietz and N. Stern find a two- to seven-fold increase in the SCC. *Endogenous growth, convexity of damage and climate risk: how Nordhaus' framework supports deep cuts in carbon emissions*. 125 *The Economic Journal* 574 (2015).

[226] Note that the various estimates cited in the paragraph have not all been converted to standard 2017$, and may not all reflect the same year emissions. Nevertheless, the magnitude of this range suggests that $40 per ton of year 2015 emissions is a conservative estimate.

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Similarly, a comparison of international estimates of the social cost of greenhouse gases suggests that a central estimate of $40 per ton of carbon dioxide is a very conservative value. Sweden places the long-term valuation of carbon dioxide at $168 per ton; Germany calculates a "climate cost" of $167 per ton of carbon dioxide in the year 2030; the United Kingdom's "shadow price of carbon" has a central value of $115 by 2030; Norway's social cost of carbon is valued at $104 per ton for year 2030 emissions; and various corporations have adopted internal shadow prices as high as $80 per ton of carbon dioxide.[227]

Indeed, a number of our organizations have previously commented on ways in which the IWG's approach could be improved to more accurately reflect the true social cost of greenhouse gases. As discussed in our Technical Appendix on Uncertainty, the IWG's SCC estimates represents a lower bound by, for example, failing to include a risk premium and only partially modeling tipping points. We strongly encourage further efforts to address these omissions, as well as omitted climate damages more generally. Nevertheless, the IWG's approach represents the best and most rigorous effort that the U.S. government has engaged in thus far to realistically estimate the social cost of greenhouse gases. We therefore strongly urge BLM to adopt the IWG's approach for estimating the social cost of carbon, with the understanding that such estimates should be seen as a conservative lower-bound estimate of the true impacts of this pollutant.

BLM Should Use the Most Updated Models

BLM explains it uses DICE 2010, FUND 3.8, and PAGE 2009.[228] However, not only is DICE 2010 not considered to be a major update of the DICE model,[229] but two major updates have occurred more recently: DICE-2013R[230] and DICE-2016R.[231] In using the outdated DICE 2010, BLM has failed to use the "best available science and economics" as required by Executive Order 13,783, and failed to follow the recommendations of the National Academies of Sciences on updating the integrated assessment models.[232] Updating from DICE 2010 to the most recent model would increase the social cost of greenhouse gases and enable a Monte Carlo simulation (as in FUND and PAGE) to better specify uncertainty.[233]

Sincerely,

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[227] *See* Howard & Schwartz, *supra* note 21, at Appendix B. All these estimates are in 2016$.

[228] 2018 RIA at 71.

[229] *See* Nordhaus, W., & Sztorc, P. (2013). DICE 2013R: Introduction and user's manual.

[230] Nordhaus, W. (2014). Estimates of the social cost of carbon: concepts and results from the DICE-2013R model and alternative approaches. *Journal of the Association of Environmental and Resource Economists*, *1*(1/2), 273-312.

[231] Nordhaus, W. D. (2017). Revisiting the social cost of carbon. *Proceedings of the National Academy of Sciences*, 201609244.

[232] *See* National Academies of Sciences, Engineering, and Medicine. (2017). *Valuing climate damages: Updating estimation of the social cost of carbon dioxide*. National Academies Press. Note that the Interagency Working Group was incorrect in 2016 in failing to update the DICE model from DICE-2010 to DICE-2013R, which was available at the time. *Cf.* IWG, 2013 Technical Update (updating the models). *See also* Marten, A.L., Kopits, E.A., Griffiths, C.W., Newbold, S.C., and A. Wolverton. 2015. Incremental CH4 and N2O Mitigation Benefits Consistent with the U.S. Government's SC-CO2 Estimates. Climate Policy. 15(2): 272-298 (anticipating that the models will be continually updated).

[233] The update would also increase BLM's calculation of the domestic-only share from 10% to 15%, *see* Nordhaus, W. D. (2017). Revisiting the social cost of carbon. *Proceedings of the National Academy of Sciences*, 201609244. But, as explained *supra* in these comments, a domestic-only value is the wrong framework and is inaccurate.

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* No part of this document purports to present New York University School of Law's views, if any.

Attached:

- Technical Appendix on Uncertainty
- Technical Appendix on Discounting
- Technical Appendix on Damage Literature
- National Academies of Sciences, *Valuing Climate Damages: Updating Estimates of the Social Cost of Carbon Dioxide* (2017)
- Robert S. Pindyck, Comments on Proposed Rule and Regulatory Impact Analysis on the Delay and Suspension of Certain Requirements for Waste Prevention and Resource Conservation (2017)
- Peter Howard & Jason Schwartz, *Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon*, 42 Columbia J. Envtl. L. 203 (2017)
- Richard L. Revesz et al., *Best Cost Estimate of Greenhouse Gases*, 357 Science 6352 (2017)
- Peter Howard & Thomas Sterner, *Few and Not So Far Between: A Meta-analysis of Climate Damage Estimates*. *Environmental and Resource Economics*, 1-29 (2016).
- Peter Howard & Derek Sylvan, *The Economic Climate: Establishing Expert Consensus on the Economics of Climate Change* (Inst. Policy Integrity Working Paper 2015/1)

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Technical Appendix: Uncertainty

Contrary to the arguments made by many opposed to strong federal climate action, uncertainty about the full effects of climate change *raises* the social cost of greenhouse gases and warrants *more* stringent climate policy.[234] Integrated assessment models (IAMs) currently used to calculate the SCC show that the net effect of uncertainty about economic damage resulting from climate change, costs of mitigation, future economic development, and many other parameters raises the SCC compared to the case where models simply use our current best guesses of these parameters.[235] Even so, IAMs still underestimate the impact of uncertainty on the SCC by not accounting for a host of fundamental features of the climate problem: the irreversibility of climate change, society's aversion to risk and other social preferences, option value, and many catastrophic impacts.[236] Rather than being a reason not to take action, uncertainty increases the SCC and should lead to more stringent policy to address climate change.[237]

Types of Uncertainty in the IAMs

IAMs incorporate two types of uncertainty: parametric uncertainty and stochastic uncertainty. Parametric uncertainty covers uncertainty in model design and inputs, including the selected parameters, correct functional forms, appropriate probability distribution functions, and model structure. With learning, these uncertainties should decline over time as more information becomes available.[238] Stochastic uncertainty is persistent randomness in the economic-climate system, including various environmental phenomena such as volcanic eruptions and sun spots.[239] Uncertainties are present in each component of the IAMs: socio-economic scenarios, the simple climate model, the damage and abatement cost functions, and the social welfare function (including the discount rate).[240]

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[234] Sonja Peterson, *Uncertainty and economic analysis of climate change: A survey of approaches and findings*, 11 Environmental Modeling & Assessment 1-17 (2006) ("Most modeling results show (as can be expected) that there is optimally more emission abatement if uncertainties in parameters or the possibility of catastrophic events are considered.").

[235] *Id.;* Richard SJ Tol, Safe policies in an uncertain climate: an application of FUND, 9 *Global Environmental Change* 221-232 (1999).

[236] Robert S Pindyck, *Uncertainty in environmental economics*, 1 Review of environmental economics and policy 45-65 (2007); Alexander Golub, Daiju Narita, and Matthias GW Schmidt, *Uncertainty in integrated assessment models of climate change: Alternative analytical approaches*, 19 Environmental Modeling & Assessment 99-109 (2014); Lemoine, Derek, and Ivan Rudik, *Managing Climate Change Under Uncertainty: Recursive Integrated Assessment at an Inflection Point*, 9 Annual Review of Resource Economics 18.1-18.26 (2017).

[237] *See* cites *supra* note 236.

[238] Learning comes in multiple forms: passive learning of anticipated information that arrives exogenous to the emission policy (such as academic research), active learning of information that directly stems from the choice of the GHG emission level (via the policy process), and learning of unanticipated information. Antje Kann & John P. Weyant, *Approaches for performing uncertainty analysis in large-scale energy/economic policy models*, 5 Environmental Modeling & Assessment 29-46 (2000); Derek Lemoine & Ivan Rudik, *Managing Climate Change Under Uncertainty: Recursive Integrated Assessment at an Inflection Point*, 9 *Annual Review of Resource Economics* 18.1-18.26 (2017).

[239] A potential third type of uncertainty arises due to ethical or value judgements: normative uncertainty. Peterson (2006) *supra* note 234; Geoffrey Heal & Antony Millner, *Reflections: Uncertainty and decision making in climate change economics*, 8 Review of Environmental Economics and Policy 120-137 (2014). For example, there is some normative debate over the appropriate consumption discount rate to apply in climate economics, though widespread consensus exists that using the social opportunity cost of capital is inappropriate (see earlier discussion). Preference uncertainty should be modeled as a declining discount rate over time (see earlier discussion), not using uncertain parameters. Kann & Weyant, *supra* note 238 and Golub et al. *supra* note 236.

[240] Peterson (2006), *supra* note 234; Pindyck (2007), *supra* note 236; Heal & Millner 2014, *supra* note 239.

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When modeling climate change uncertainty, scientists and economists have long emphasized the importance of accounting for the potential of catastrophic climate change.[241] Catastrophic outcomes combine several overlapping concepts including unlucky states of the world (i.e., bad draws), deep uncertainty, and climate tipping points and elements.[242] Traditionally, IAM developers address uncertainty by specifying probability distributions over various climate and economic parameters. This type of uncertainty implies the possibility of an especially bad draw if multiple uncertain parameters turn out to be lower than we expect, causing actual climate damages to greatly exceed expected damages.

Our understanding of the climate and economic systems is also affected by so-called "deep uncertainty," which can be thought of as uncertainty over the true probability distributions for specific climate and economic parameters.[243] The mean and variance of many uncertain climate phenomena are unknown due to lack of data, resulting in "fat-tailed distributions"—i.e., the tail of the distributions decline to zero slower than the normal distribution. Fat-tailed distributions result when the best guess of the distribution is derived under learning.[244] Given the general opinion that bad surprises are likely to outweigh good surprises in the case of climate change,[245] modelers capture deep uncertainty by selecting probability distributions with a fat upper tail which reflects the greater likelihood of extreme events.[246] The possibility of fat tails increases the likelihood of a "very" bad draw with high economic costs, and can result in a very high (and potentially infinite) expected cost of climate change (a phenomenon known as the dismal theory).[247]

Climate tipping elements are environmental thresholds where a small change in climate forcing can lead to large, non-linear shifts in the future state of the climate (over short and long periods of time) through positive feedback (i.e., snowball) effects.[248] Tipping points refer to economically relevant thresholds after which change occurs rapidly (i.e., Gladwellian tipping points), such that opportunities for adaptation and intervention are limited.[249] Tipping point examples include the reorganization of the Atlantic meridional overturning circulation (AMOC) and a shift to a more persistent El Niño regime in the Pacific Ocean.[250] Social tipping points—including climate-induced migration and conflict—also exist.

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[241] William Nordhaus, A Question of Balance: Weighing the Options on Global Warming Policies (2008); Robert E. Kopp, Rachael L. Shwom, Gernot Wagner, and Jiacan Yuan, Tipping elements and climate–economic shocks: Pathways toward integrated assessment, 4 *Earth's Future* 346-372 (2016).

[242] Kopp et al. (2016), *supra* note 241.

[243] *Id.*

[244] William Nordhaus, *An Analysis of the Dismal Theorem* (Cowles Foundation Discussion Paper No. 1686, 2009); Martin L. Weitzman, *Fat-tailed uncertainty in the economics of catastrophic climate change*, 5 Review of Environmental Economics and Policy 275-292 (2011). Robert S Pindyck, *Fat tails, thin tails, and climate change policy*, 5 Review of Environmental Economics and Policy 258-274 (2011).

[245] Michael D Mastrandrea, Calculating the benefits of climate policy: examining the assumptions of integrated assessment models (Pew Center on Global Climate Change Working Paper, 2009); Richard SJ Tol, On the uncertainty about the total economic impact of climate change, 53 Environmental and Resource Economics 97-116 (2012).

[246] Weitzman (2011), *supra* note 244, makes clear that "deep structural uncertainty about the unknown unknowns of what might go very wrong is coupled with essentially unlimited downside liability on possible planetary damages. This is a recipe for producing what are called 'fat tails' in the extreme of critical probability distributions."

[247] Martin L Weitzman, *On modeling and interpreting the economics of catastrophic climate change*, 91 The Review of Economics and Statistics 1-19 (2009); Nordhaus (2009), *supra* note 244; Weitzman (2011), *supra* note 244.

[248] Tipping elements are characterized by: (1) deep uncertainty, (2) absence from climate models, (3) larger resulting changes relative to the initial change crossing the relevant threshold, and (4) irreversibility. Kopp et al. (2016), *supra* note 241.

[249] *Id.*

[250] *Id.*; Elmar Kriegler, Jim W. Hall, Hermann Held, Richard Dawson, and Hans Joachim Schellnhuber, Imprecise probability assessment of tipping points in the climate system, 106 *Proceedings of the national Academy of Sciences* 5041-5046 (2009);

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These various tipping points interact, such that triggering one tipping point may affect the probabilities of triggering other tipping points.[251] There is some overlap between tipping point events and fat tails in that the probability distributions for how likely, how quick, and how damaging tipping points will be are unknown.[252] Accounting fully for these most pressing, and potentially most dramatic, uncertainties in the climate-economic system matter because humans are risk averse and tipping points—like many other aspects of climate change—are, by definition, irreversible

How IAMs and the IWG Account for Uncertainty

Currently, IAMs (including all of those used by the IWG) capture uncertainty in two ways: deterministically and through uncertainty propagation. For the deterministic method, the modeler assumes away uncertainty (and thus the possibility of bad draws and fat tails) by setting parameters equal to their most likely (median) value. Using these values, the modeler calculates the median SCC value. Typically, the modeler conducts sensitivity analysis over key parameters—one at a time or jointly—to determine the robustness of the modeling results. This is the approach employed by Nordhaus in the preferred specification of the DICE model[253] used by the IWG.

Uncertainty propagation is most commonly carried out using Monte Carlo simulation. In these simulations, the modeler randomly draws parameter values from each of the model's probability distributions, calculates the SCC for the draw, and then repeats this exercise thousands of times to calculate a mean social cost of carbon.[254] Tol, Anthoff, and Hope employ this technique in FUND and PAGE—as did the IWG (2010, 2013, and 2016)[255]—by specifying probability distributions for the climate and economic parameters in the models. These models are especially helpful for assessing the net effect of different parametric and stochastic uncertainties. For instance, both the costs of mitigation and the damage from climate change are uncertain. Higher costs would warrant less stringent climate policies, while higher damages lead to more stringent policy, so theoretically, the effect of these two factors on climate policy could be ambiguous. Uncertainty propagation in an IAM calibrated to empirically motivated distributions, however, shows that climate damage uncertainty outweighs the effect of cost uncertainty, leading to a stricter policy when uncertainty is taken into account than when it is ignored.[256]

Delavane Diaz & Klaus Keller, A potential disintegration of the West Antarctic Ice Sheet: Implications for economic analyses of climate policy, 106 *The American Economic Review* 607-611 (2016). See Table 1 of Kopp et al. (2016) *supra* note 241, for a full list of known tipping elements and points.

[251] Kriegler et al. (2009), *supra* note 250; Cai, Yongyang, Timothy M. Lenton, and Thomas S. Lontzek, *Risk of multiple interacting tipping points should encourage rapid CO2 emission reduction*, 6 Nature Climate Change 520-525 (2016); Kopp et al. (2016) *supra* note 241.

[252] Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon* 5 (Cost of Carbon Project Report, 2014), http://costofcarbon.org/; Kopp et al. (2016) *supra* note 241.

[253] *See* Nordhaus, W., & Sztorc, P. (2013). DICE 2013R: Introduction and user's manual.

[254] In alternative calculation method, the modeler "performs optimization of polices for a large number of possible parameter combinations individually and estimates their probability weighted sum." Golub et al. *supra* note 236. In more recent DICE-2016, Nordhaus conducts a three parameter analysis using this method to determine a SCC confidence interval. Given that PAGE and FUND model hundred(s) of uncertainty parameters, this methodology appears limited in the number of uncertain variables that can be easily specified.

[255] Interagency Working Group on Social Cost of Carbon, Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12,866 (2010). Interagency Working Group on Social Cost of Carbon, Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12,866 (2013). Interagency Working Group on Social Cost of Carbon, Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12,866 (2016).

[256] Tol (1999), *supra* note 235, in characterizing the FUND model, states, "Uncertainties about climate change impacts are more serious than uncertainties about emission reduction costs, so that welfare-maximizing policies are stricter under uncertainty than under certainty."

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This can be seen in the resulting right-skewed distribution of the SCC (see Figure 1 in IWG (2016)) where the mean (Monte Carlo) SCC value clearly exceeds the median (deterministic) SCC value.

The IWG was rigorous in addressing uncertainty. First, it conducted Monte Carlo simulations over the above IAMs specifying different possible outcomes for climate sensitivity (represented by a right skewed, fat tailed distribution to capture the potential of higher than expected warming). It also used scenario analysis: five different emissions growth scenarios and three discount rates. Second, the IWG (2016)[257] reported the various moments and percentiles—including the 95th percentile—of the resulting SCC estimates. Third, the IWG put in place an updating process, e.g., the 2013 and 2016 revisions, which updates the models as new information becomes available.[258] As such, the IWG used the various tools that economists have developed over time to address the uncertainty inherent in estimating the economic cost of pollution: reporting various measures of uncertainty, using Monte Carlo simulations, and updating estimates as evolving research advances our knowledge of climate change. Even so, the IWG underestimate the SCC by failing to capture key features of the climate problem.

Current IAMs Underestimate the SCC by Failing to Sufficiently Model Uncertainty

Given the current treatment of uncertainty by the IWG (2016) and the three IAMs that they employ, the IWG (2016) estimates represent an underestimate of the SCC. DICE clearly underestimates the true value of the SCC by effectively eliminating the possibility of bad draws and fat tails through a deterministic model that relies on the median SCC value. Even with their calculation of the mean SCC, the FUND and PAGE also underestimate the metric's true value by ignoring key features of the climate-economic problem. Properly addressing the limitations of these models' treatment of uncertainty would further increase the SCC.

First, current IAMs insufficiently model catastrophic impacts. DICE fails to model both the possibility of bad draws and fat tails by applying the deterministic approach. Alternatively, FUND and PAGE ignore deep uncertainty by relying predominately on the thin-tailed triangular and gamma distributions.[259] The IWG (2010) only partially addresses this oversight by replacing the ECS parameter in DICE, FUND, and PAGE with a fat-tailed, right-skewed distribution calibrated to the IPCC's assumptions (2007), even though many other economic and climate phenomenon in IAMs are likely characterized by fat tails, including climate damages from high temperature levels, positive climate feedback effects, and tipping points.[260] Recent work in stochastic dynamic programming tends to better integrate fat tails – particularly with respect to tipping points (see below) – and address additional aversion to this type of uncertainty (also known as ambiguity aversion); doing so can further increase the SCC under uncertainty.[261]

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[257] IWG (2016) *supra* note 278.

[258] IWG (2010) *supra* note 278.

[259] Howard (2014), *supra* note 252. While both FUND and PAGE employ thin tailed distributions, the resulting distribution of the SCC is not always thin-tailed. In PAGE09, the ECS parameter is endogenous, such that the distribution of the ECS has a long tail following the IPCC (2007). *See* Z Chen, M Marquis, KB Averyt, M Tignor, & HL Miller, Contribution of working group I to the fourth assessment report of the intergovernmental panel on climate change (2007). Similarly, while Anthoff and Tol do not explicitly utilize fat-tail distributions, the distribution of net present welfare from a Monte Carlos simulation is fat tailed. DAVID ANTHOFF & RICHARD S. J. TOL, THE CLIMATE FRAMEWORK FOR UNCERTAINTY, NEGOTIATION, AND DISTRIBUTION (FUND), TECHNICAL DESCRIPTION, VERSION 3.8 (2014). Explicitly modeling parameter distributions as fat tailed may further increase the SCC.

[260] Weitzman (2011), *supra* note 244; Kopp et al. (2016) *supra* note 241.

[261] Derek Lemoine & Christian P. Traeger, *Ambiguous tipping points*, 132 Journal of Economic Behavior & Organization 5-18 (2016); Lemoine & Rudik (2017), *supra* note 236. IAM modelers currently assume that society is equally averse to known unknown and known unknowns. Lemoine & Traeger, *id*.

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In contrast to their approach to fat tails, the IAMs used by the IWG (2010; 2013; 2016) sometimes address climate tipping points, though they do not apply state-of-the-art methods for doing so. In early versions of DICE (DICE-2010 and earlier), Nordhaus implicitly attributes larger portions of the SCC to tipping points by including certainty equivalent damages of catastrophic events - representing two-thirds to three-quarter of damages in DICE – calibrated to an earlier Nordhaus (1994) survey of experts.[262] In PAGE09, Hope also explicitly models climate tipping points as a singular, discrete event (of a 5% to 25% loss in GDP) that has a probability (which grows as temperature increases) of occurring in each time period.[263] Though not in the preferred versions of the IAMs employed by the IWG, some research also integrates specific tipping points into these IAMs finding even higher SCC estimates.[264] Despite the obvious methodological basis for addressing tipping points, the latest versions of DICE[265] and FUND exclude tipping points in their preferred specifications. Research shows that if these models were to correctly account for the full range of climate impacts—including tipping points—the resulting SCC estimates would increase.[266]

The IWG approach also fails to include a risk premium—that is, the amount of money society would require in order to accept the uncertainty (i.e., variance) over the magnitude of warming and the resulting damages from climate change relative to mean damages (IWG, 2010; IWG, 2015)). The mean of a distribution, which is a measure of a distribution's central tendency, represents only one descriptor or "moment" of a distribution's shape. Each IAM parameter and the resulting SCC distributions have differing levels of variance (i.e., spread around the mean), skewness (i.e., a measure of asymmetry), and

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[262] William Nordhaus & Joseph Boyer, Warning the World: Economic Models of Global Warming (2000); Nordhaus (2008) *supra* note 264; Howard (2014), *supra* note 252; Kopp et al. (2016) *supra* note 241.

[263] Hope (2006) also calibrated a discontinuous damage function in PAGE-99 used by IWG (2010); see Chris Hope, *The Marginal Impact of CO_2 from PAGE2002: An Integrated Assessment Model Incorporating the IPCC's Five Reasons for Concern*, 6 INTEGRATED ASSESSMENT J. 19 (2006). Howard (2014), *supra* note 252.

[264] Kopp et al. (2016) *supra* note 241.

[265] For DICE-2013 and DICE-2016, Nordhaus calibrates the DICE damage function using a meta-analysis based on estimates that mostly exclude tipping point damages. Peter H Howard & Thomas Sterner, *Few and Not So Far Between: A Meta-analysis of Climate Damage Estimates*, 68 Environmental and Resource Economics 1-29 (2016).

[266] Using FUND, Link and Tol (2011) find that a collapse of the AMOC would decrease GDP (and thus increase the SCC) by a small amount. Earlier modeling of this collapse in DICE find a more significance increase. P. Michael Link & Richard SJ Tol, Estimation of the economic impact of temperature changes induced by a shutdown of the thermohaline circulation: an application of FUND, 104 *Climatic Change* 287-304 (2011); Klaus Keller, Kelvin Tan, François MM Morel, & David F. Bradford, *Preserving the Ocean Circulation: Implications for Climate Policy*, 47 Climatic Change 17-43 (2000); Michael D Mastrandrea & Stephen H. Schneider, *Integrated assessment of abrupt climatic changes*, 1 Climate Policy 433-449 (2001); Klaus Keller, Benjamin M. Bolker, & David F. Bradford, *Uncertain climate thresholds and optimal economic growth*, 48 Journal of Environmental Economics and management 723-741 (2004). With respect to thawing of the permafrost, Hope and Schaefer (2016) and Gonzalez-Eguino and Neumann (2016) find increases in damages (and thus an increase in the SCC) when integrating this tipping element into the PAGE09 and DICE-2013R, respectively. Chris Hope & Kevin Schaefer. *Economic impacts of carbon dioxide and methane released from thawing permafrost*, 6 Nature Climate Change 56-59 (2016); Mikel González-Eguino & Marc B. Neumann, *Significant implications of permafrost thawing for climate change control*, 136 Climatic Change 381-388 (2016). Looking at the collapse of the West Antarctic Ice sheet, Nicholls et al. (2008) find a potential for significant increases in costs (and thus the SCC) in FUND. Robert J Nicholls, Richard SJ Tol, & Athanasios T. Vafeidis, Global estimates of the impact of a collapse of the West Antarctic ice sheet: an application of FUND, 91 *Climatic Change* 171-191 (2008). Ceronsky et al. (2011) model three tipping points (collapse of the Atlantic Ocean Meridional Overturning Circulation, large scale dissociation of oceanic methane hydrates; and a high equilibrium climate sensitivity parameter), and finds a large increase in the SCC in some cases. Megan Ceronsky, David Anthoff, Cameron Hepburn, and Richard SJ Tol, *Checking the price tag on catastrophe: The social cost of carbon under non-linear climate response* (ESRI working paper No. 392, 2011).

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kurtosis (which, like skewness, is another descriptor of a distribution's tail) as well as means.[267] It is generally understood that people are risk averse in that they prefer input parameter distributions and (the resulting) SCC distributions with lower variances, holding the mean constant.[268] While the IWG assumes a risk-neutral central planner by using a constant discount rate (setting the risk premium to zero), this assumption does not correspond with empirical evidence,[269] current IAM assumptions,[270] the NAS (2017) recommendations, nor with the IWG's own discussion (2010) of the possible values of the elasticity of the marginal utility of consumption. Evidence from behavioral experiments indicate that people and society are also averse to other attributes of parameter distributions – specifically to the thickness of the tails of distributions – leading to an additional ambiguity premium (Heal and Millner, 2014).[271] Designing IAMs to properly account for the risk and ambiguity premiums from uncertain climate damages would increase the resulting SCC values they generate.

Even under the IWG's current assumption of risk neutrality, the mean SCC from uncertainty propagation excludes the (real) option value of preventing marginal CO_2 emissions.[272] Option value reflects the value of future flexibility due to uncertainty and irreversibility; in this case, the irreversibility of CO2 emissions due to their long life in the atmosphere.[273] If society exercises the option of emitting an additional unit of CO2 emissions today, "we will lose future flexibility that the [mitigation] option gave" leading to possible "regret and…a desire to 'undo'" the additional emission because it "constrains future

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[267] Alexander Golub & Michael Brody, *Uncertainty, climate change, and irreversible environmental effects: application of real options to environmental benefit-cost analysis*, 7 Journal of Environmental Studies and Sciences 7 519-526 (2017); see Figure 1 in IWG (2016) supra note 278.

[268] In other words, society prefers a narrow distribution of climate damages around mean level of damages X to a wider distribution of damages also centered on the same mean of X because they avoid the potential for very high damages even at the cost of eliminating the chance of very low damages.

[269] IWG, 2010 *supra* note 278, at fn 22; Cai et al., 2016, *supra* note 251, at 521.

[270] The developers of each of the three IAMs used by the IWG (2010; 2013; 2016) assume a risk aversion society. Nordhaus and Sztorc 2013 *supra* note 276; Anthoff & Tol (2013) *supra* note 282; DAVID ANTHOFF & RICHARD S. J. TOL, THE CLIMATE FRAMEWORK FOR UNCERTAINTY, NEGOTIATION, AND DISTRIBUTION (FUND), TECHNICAL DESCRIPTION, VERSION 3.5 (2010); Chris Hope, *Critical issues for the calculation of the social cost of CO2: why the estimates from PAGE09 are higher than those from PAGE2002*, 117 CLIM. CHANGE 531–543 (2013) at 539.

[271] According to Heal and Millner (2014) *supra* note 262, there is an ongoing debate of whether ambiguity aversion is rational or a behavioral mistake. Given the strong possibility that this debate is unlikely to be resolved, the authors recommend exploring both assumptions.

[272] Kenneth J Arrow & Anthony C. Fisher, *Environmental preservation, uncertainty, and irreversibility*, 88 The Quarterly Journal of Economics 312-319 (1974); Avinash K Dixit and Robert S Pindyck, Investment under uncertainty (1994); Christian P Traeger, On option values in environmental and resource economics, 37 Resource and Energy Economics 242-252 (2014).

In the discrete emission case, there are two overlapping types of option value: real option value and quasi-option value. Real option value is the full value of future flexibility of maintaining the option to mitigate, and mathematically equals the maximal value that can be derived from the option to [emit] now or later (incorporating learning) less the maximal value that can be derived from the possibility to [emit] now or never. Traeger (2014) *supra* note 295, equation 5. Quasi-option value is the value of future learning conditional on delaying the emission decision, which mathematically equals the value of mitigation to the decision maker who anticipates learning less the value of mitigation to the decision maker who anticipates only the ability to delay his/her decision, and not learning. *Id.* The two values are related, such that real option value can be decomposed into:

$$\mathrm{DPOV} = \mathbf{Max}\{QOV + SOV - \mathbf{Max}\{NPV, 0\}, 0\} = \mathbf{Max}\{QOV + SOV - \mathrm{SCC}, 0\}$$

where DPOV is the real option value, QOV is quasi-option value, SOV is simple option value (the value of the option to emit in the future condition on mitigating now), and NPV is the expected net present value of emitting the additional unit or the mean SCC in our case. *Id.*

[273] Even if society drastically reduced CO2 emissions, CO2 concentrations would continue to rise in the near future and many impacts would occur regardless due to lags in the climate system. Robert S Pindyck, *Uncertainty in environmental economics*, 1 Review of environmental economics and policy 45-65 (2007).

behavior."[274] Given that the SCC is calculated on the Business as Usual (BAU) emission pathway, option value will undoubtedly be positive for an incremental emission because society will regret this emission in most possible futures.

Though sometimes the social cost of carbon and a carbon tax are thought of as interchangeable ways to value climate damages, agencies should be careful to distinguish two categories of the literature. The first is the economic literature that calculates the optimal carbon tax in a scenario where the world has shifted to an optimal emissions pathway. The second is literature that assesses the social cost of carbon on the business-as-usual (BAU) emissions pathway; the world is currently on the BAU pathway, since optimal climate policies have not been implemented. There are currently no numerical estimates of the risk premium and option value associated with an incremental emission on the BAU emissions path. Although there are stochastic dynamic optimization models that implicitly account for these two values, they analyze *optimal,* sequential decision making under climate uncertainty.[275] By nature of being optimization models (instead of policy models), these complex models focus on calculating the optimal tax and not the social cost of carbon, which differ in that the former is the present value of marginal damages on the optimal emissions path rather than on the BAU emissions path.[276] While society faces the irreversibility of emissions on the BAU emissions path when abatement is essentially near zero (i.e., far below the optimal level even in the deterministic problem),[277] the stochastic dynamic optimization model must also account for a potential counteracting abatement cost irreversibility – the sunk costs of investing in abatement technology if we learn that climate change is less severe than expected – by the nature of being on the optimal emissions path that balances the cost of emissions and abatement. In the optimal case, uncertainty and irreversibility of abatement *can theoretically* lead to a lower optimal emissions tax, unlike the social cost of carbon. The difference in the implication for the optimal tax and the SCC means that the stochastic dynamic modeling results are less applicable to the SCC.

What can we learn from new literature on stochastic dynamic programming models?

Bearing in mind the limitations of stochastic dynamic modeling, some new research provides valuable insights that are relevant to calculation of the social cost of greenhouse gases. The new and growing stochastic dynamic optimization literature implies that the IWG's SCC estimates are downward biased. The literature is made up of three models – real option, finite horizon, and infinite horizon models – of which the infinite time horizon (i.e., stochastic dynamic programming (SDP)) models are the most comprehensive for analyzing the impact of uncertainty on optimal sequential abatement policies.[278] Recent computational advancements in SDP are helping overcome the need for strong simplifying assumptions in this literature for purpose of tractability. Traditionally, these simplifications led to

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[274] Pindyck (2007) *supra* note 296.

[275] Kann & Weyant *supra* note 261; Pindyck (2007) *supra* note 296; Golub et al. (2014) *supra* note *259*.

[276] Nordhaus (2014) makes this difference clear when he clarifies that "With an optimized climate policy…the SCC will equal the carbon price…In the more realistic case where climate policy is not optimized, it is conventional to measure the SCC as the marginal damage of emissions along the actual path. There is some inconsistency in the literature on the definition of the path along which the SCC should be calculated. This paper will generally define the SCC as the marginal damages along the baseline path of emissions and output and not along the optimized emissions path." William D. Nordhaus, *Estimates of the Social Cost of Carbon: Concepts and Results from the DICE-2013R Model and Alternative Approaches*, 1 J. ASSOC. ENVIRON. RESOUR. ECON. 1 (2014).

[277] On the BAU path, emissions far exceed their optimal level even without considering uncertainty. As a consequence, society is likely to regret an additional emission of CO2 in most future states of the world. Alternatively, society is unlikely to regret current abatement levels unless the extremely unlikely scenarios that there is little to no warming and/or damages from climate change.

[278] Kann & Weyant *supra* note 261; Pindyck (2007) *supra* note 296; Golub et al. (2014) *supra* note *259*.

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unrealistically fast rates of learning – leading to incorrect outcomes – and difficulty in comparing results across papers (due to differing uncertain parameters, models of learning, and model types). Even so, newer methods still only allow for a handful of uncertain parameters compared to the hundreds of uncertain parameters in FUND and PAGE. Despite these limitations, the literature supports the above finding that the SCC, if anything, increases under uncertainty.[279]

First, uncertainty increases the optimal emissions tax under realistic parameter values and modeling scenarios. While the impact of uncertainty on the optimal emissions tax (relative to the deterministic problem) depends on the uncertain parameters considered, the type of learning, and the model type (real option, finite horizon, and infinite horizon), the optimal tax clearly increases when tipping points or black swan events are included in stochastic optimization problems.[280] For SDP models, uncertainty tends to strengthen the optimal emissions path relative to the determinist case even without tipping points,[281] and these results are strengthened under realistic preference assumptions.[282] Given that there is no counter-balancing tipping abatement cost,[283] the complete modeling of climate uncertainty – which fully accounts for tipping points and fat tails – increases the optimal tax. Uncertainty leads to a stricter optimal emissions policy even if with irreversible mitigation costs, highlighting that the SCC would also increase when factoring in risk aversion and irreversibility given that abatement costs are very low on the BAU emissions path.

Second, given the importance of catastrophic impacts under uncertainty (as shown in the previous paragraph), the full and accurate modeling of tipping points and unknown knowns is critical when modeling climate change. The most sophisticated climate-economic models of tipping points – which include the possibility of multiple correlated tipping points in stochastic dynamic IAMs – find an increase in the optimal tax by 100%[284] to 800%[285] relative to the deterministic case without them. More realistic modeling of tipping points will also increase the SCC.

Finally, improved modeling of preferences will amplify the impact of uncertainty on the SCC. Adopting Epstein-Zin preferences that disentangle risk aversion and time preferences can significantly increase the SCC under uncertainty.[286] Recent research has shown that accurate estimation of decisions under

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[279] Kann & Weyant *supra* note 261; Pindyck (2007) *supra* note 296; Golub et al. (2014) *supra* note *259*; Lemoine & Rudik 2017 supra note *259*. Comparing the optimal tax to the mean SCC is made further difficult by the frequent use of DICE as the base from which most stochastic dynamic optimization models are built. As a consequence, deterministic model runs are frequently the base of comparison for these models (Lemoine & Rudik, *id*).

[280] The real options literature tends to find an increase in the optimal emissions path under uncertainty relative to the deterministic case (Pindyck 2007 *supra* note 296), though the opposite is true when modelers account for the possibility of large damages (i.e., tipping point or black swan events) even with a risk-neutral society (Pindyck 2007 *supra* note 296; Golub et al 2014 *supra* note *259*). Solving finite horizon models employing non-recursive methods, modelers find that the results differ depending on the model of learning – the research demonstrates stricter emission paths under uncertainty without learning (with emission reductions up to 30% in some cases) and the impact under passive learning has a relatively small impact due the presence of sunken mitigation investment costs - except when tipping thresholds are included (Golub et al 2014 *supra* note *259*).

[281] Using SDP, modelers find that uncertainty over the equilibrium climate sensitivity parameter generally increases the optimal tax by a small amount, though the magnitude of this impact is unclear (Golub et al. (2014) *supra* note *259*; Lemoine & Rudik 2017 supra note *259*). Similarly, non-catastrophic damages can have opposing effects dependent on the parameters changed, though emissions appear to decline overall when you consider their uncertainty jointly.

[282] Pindyck (2007) *supra* note 296; Golub et al. (2014) *supra* note *259*; Lemoine & Rudik 2017 supra note *259*.

[283] Pindyck (2007) *supra* note 296.

[284] Derek Lemoine & Christian P. Traeger, *Economics of tipping the climate dominoes*. 6 NAT. CLIM. CHANG. 514-519 (2016).

[285] Cai et al. 2016 *supra* note 251.

[286] Cai et al. 2016 *supra* note 251; Lemoine & Rudik 2017 supra note *259*. The standard utility function adopted in IAMs with constant relative risk version implies that the elasticity of substitution equals the inversion of relative risk aversion. As a

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uncertainty crucially depends on distinguishing between risk and time preferences.[287] By conflating risk and time preferences, current models substantially understate the degree of risk aversion exhibited by most individuals, artificially lowering the SCC. Similarly, adopting ambiguity aversion increase the SCC, but to a much lesser extent than risk aversion.[288] Finally, allowing for the price of non-market goods to increase with their relative scarcity can amplify the positive effect that even small tipping points have on the SCC if the tipping point impacts non-market services.[289] Including more realistic preference assumptions in IAMs would further increase the SCC under uncertainty.

Introducing stochastic dynamic modeling (which captures option value and risk premiums), updating the representation of tipping points, and including more realistic preference structures in traditional IAMs will – as in the optimal tax – further increase the SCC under uncertainty

Conclusion: Uncertainty Raises the Social Cost of Greenhouse Gases

Overall, the message is clear: climate uncertainty is *never* a rationale for ignoring the SCC or shortening the time horizon of IAMs. Instead, our best estimates suggest that increased variability implies a higher SCC and a need for more stringent emission regulations.[290] Current omission of key features of the climate problem under uncertainty (the risk and climate premiums, option value, and fat tailed probability distributions) and incomplete modeling of tipping points imply that the SCC will further increase with the improved modeling of uncertainty in IAMs.

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consequence, the society's preferences for the intra-generational distribution of consumption, the intergenerational distribution of consumption, and risk aversion hold a fixed relationship. For purposes of stochastic dynamic programming, this is problematic because this assumption conflates intertemporal consumption smoothing and risk aversion. WJ Wouter Botzen & Jeroen CJM van den Bergh, *Specifications of social welfare in economic studies of climate policy: overview of criteria and related policy insights*, 58 Environmental and Resource Economics 1-33 (2014). By adopting the Epstein-Zinn utility function which separates these two parameters, modelers can calibrate them according to empirical evidence. For example, Cai et al. (2016) *supra* note 251 replace the DICE risk aversion of 1.45 and elasticity parameter of 1/1.45 with values of 3.066 and 1.5, respectively.

[287] James Andreoni & Charles Sprenger, *Risk Preferences Are Not Time Preferences*, 102 Am. Econ. Rev. 3357–3376 (2012).

[288] Lemoine & Traeger (2016) *supra* note 307.

[289] Typically, IAMs assume constant relative prices of consumption goods. Reyer Gerlagh & B. C. C. Van der Zwaan, *Long-term substitutability between environmental and man-made goods*, 44 Journal of Environmental Economics and Management 329-345 (2002); Thomas Sterner & U. Martin Persson, *An even sterner review: Introducing relative prices into the discounting debate*, 2 Review of Environmental Economics and Policy 61-76 (2008). By replacing the standard isoelastic utility function in IAMs with a nested CES utility function following Sterner and Persson (2008), Cai et al. (2015) find that even a relatively small tipping point (i.e., a 5% loss) can substantially increase the SCC in the stochastic dynamic setting. Yongyang Cai, Kenneth L. Judd, Timothy M. Lenton, Thomas S. Lontzek, & Daiju Narita, *Environmental tipping points significantly affect the cost– benefit assessment of climate policies*, 112 Proc. Natl. Acad. Sci. 4606-4611 (2015).

[290] Golub et al. (2014) *supra* note *259* states "The most important general policy implication from the literature is that despite a wide variety of analytical approaches addressing different types of climate change uncertainty, none of those studies supports the argument that no action against climate change should be taken until uncertainty is resolved. On the contrary, uncertainty despite its resolution in the future is often found to favor a stricter policy." *See also* Comments from Robert Pindyck, to BLM, on the Social Cost of Methane in the Proposed Suspension of the Waste Prevention Rule (submitted Nov. 5, 2017) ("Specifically, my expert opinion about the uncertainty associated with Integrated Assessment Models (IAMs) was used to justify setting the SC-CH4 to zero until this uncertainty is resolved. That conclusion does not logically follow and I have rejected it in the past, and I reiterate my rejection of that view again here. While at this time we do not know the Social Cost of Carbon (SCC) or the Social Cost of Methane with precision, we do know that the correct values are well above zero…Because of my concerns about the IAMs used by the now-disbanded Interagency Working Group to compute the SCC and SC-CH4, I have undertaken two lines of research that do not rely on IAMs…[They lead] me to believe that the SCC is larger than the value estimated by the U.S. Government."

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Technical Appendix: Discounting

The Underlying IAMs All Use a Consumption Discount Rate

Employing a consumption discount rate would also ensure that the U.S. government is consistent with the assumptions employed by the underlying IAM models: DICE, FUND, and PAGE. Each of these IAMs employs consumption discount rates calibrated using the standard Ramsey formula.[291] In DICE-2010, the elasticity of the pure rate of time preference is 1.5 and an elasticity of the marginal utility of consumption (η) of 2.0. Together with its assumed per capita consumption growth path, the average discount rate over the next three hundred years is 2.4%.[292] However, more recent versions of DICE (DICE-2013R and DICE-2016) update η to 1.45; this implies an increase of the average discount rate over the timespan of the models to between 3.1% and 3.2% depending on the consumption growth path.[293] In FUND 3.8 and (the mode values in) PAGE09, both model parameters are equal to 1.0. Based on the assumed growth rate of the U.S. economy (without climate damages), the average U.S. discount rate in FUND 3.8 is 2.0% over the timespan of the model (without considering climate damages). Unlike FUND 3.8, PAGE09 specifies triangular distributions for both parameters with a pure rate of time preference of between 0.1 and 2 with a mean of 1.03 and an elasticity of the marginal utility of consumption of between 0.5 and 2 with a mean 1.17. Using the PAGE09's mode values (without accounting for climate damages), the average discount rate over the timespan of the models is approximately 3.3% with a range of 1.2% to 6.5%. Rounding up the annual growth rate over the last 50 years to approximately 2%,[294] the range of best estimates of the SDR implied in the short-run by these three models is approximately 3% (PAGE09's mode estimate and FUND 3.8) to 4.4% (DICE-2016), though the PAGE09 model alone implies a range of 1.1% to 6.0% with a central estimate of 3%. The range of potential consumption discount rates in these IAMs is relatively consistent with IWG[295] in the short-run, though the discount rates of the IAMs employed by the IWG decline over time (due to declining growth rates over time) implying a potential upward bias to the IWG consumption discount rates.

A Declining Discount Rate is Justified to Address Discount Rate Uncertainty

A strong consensus has developed in economics that the appropriate way to discount intergenerational benefits is through a declining discount rate.[296] Not only are declining discount rate theoretically

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[291] Richard Newell (2017, October 10). Unpacking the Administration's Revised Social Cost of Carbon. Available at http://www.rff.org/blog/2017/unpacking-administration-s-revised-social-cost-carbon.

[292] Due to a slowing of global growth, DICE-2010 implies a declining discount rate schedule of 5.1% in 2015, 3.9% from 2015 to 2050; 2.9% from 2055 to 2100; 2.2% from 2105 to 2200, and 1.9% from 2205 to 2300. This would be a steeper decline if Nordhaus accounted for the positive and normative uncertainty underlying the SDR.

[293] Due to a slowing of global growth, DICE-2016 implies a declining discount rate schedule of 5.1% in 2015, 4.7% from 2015 to 2050; 4.1% from 2055 to 2100; 3.1% from 2105 to 2200, and 2.5% from 2205 to 2300.

[294] According to the World Bank, the average global and United States per capita growth rates were 1.7% and 1.9%, respectively.

[295] Interagency Working Group on Social Cost of Carbon, Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12,866 (2010). Interagency Working Group on Social Cost of Carbon, Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12,866 (2013). Interagency Working Group on Social Cost of Carbon, Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12,866 (2016).

[296] Kenneth J. Arrow et al., *Determining Benefits and Costs for Future Generations*, 341 Science 349 (2013); Kenneth J. Arrow et al., *Should Governments Use a Declining Discount Rate in Project Analysis?*, Rev Environ Econ Policy 8 (2014); Maureen L. Cropper et al., *Declining Discount Rates*, American Economic Review: Papers and Proceedings (2014); Christian Gollier & Martin L. Weitzman, *How Should the Distant Future Be Discounted When Discount Rates Are Uncertain?* 107 Economics Letters 3 (2010). Arrow et al. (2014) at 160-161 states that "We have argued that theory provides compelling arguments for using a declining certainty-

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correct, they are actionable (i.e., doable given our current knowledge) and consistent with OMB's *Circular A-4*. Perhaps the best reason to adopt a declining discount rate is the simple fact that there is considerable uncertainty around which discount rate to use. The uncertainty in the rate points directly to the need to use a declining rate, as the impact of the uncertainty grows exponentially over time such that the correct discount rate is not an arithmetic average of possible discount rates.[297] Uncertainty about future discount rates could stem from a number of sources particularly salient in the context of climate change, including uncertainty about future economic growth, consumption, the consumption rate of interest, and preferences. Additionally, economic theory shows that if there is debate or disagreement over which discount rate to use, this should lead to the use of a declining discount rate.[298] Though, the range of potential discount rates is limited by theory to potential consumption discount rates (see earlier discussion), which is certainly less than 7%.

There is a consensus that declining discount rates are appropriate for intergenerational discounting

Since the IWG undertook its initial analysis and before the most recent estimates of the SCC, a large and growing majority of leading climate economists' consensus[299] has come out in favor of using a declining discount rate for climate damages to reflect long-term uncertainty in interest rates. This consensus view is held whether economists favor descriptive (i.e., market) or prescriptive (i.e., normative) approaches to discounting.[300] Several key papers[301] outline this consensus and present the arguments that strongly support the use of declining discount rates for long-term benefit-cost analysis in both the normative and positive contexts. Finally, in a recent survey of experts on the economics of climate change, Howard and Sylvan (2015)[302], found that experts support using a declining discount rate relative to a constant discount rate at a ratio of approximately 2 to 1.

Economists have recently highlighted two main motivations for using a declining discount rate, which we elaborate on in what follows. First, if the discount rate for a project is fixed but uncertain, then the certainty-equivalent discount rate will decline over time, meaning that benefits should be discounted using a declining rate.[303] Second, uncertainty about the growth rate of consumption or output also implies that a declining discount rate should be used, so long as shocks to consumption are positively

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equivalent discount rate," and concludes the paper by stating "Establishing a procedure for estimating a [declining discount rate] for project analysis would be an improvement over the OMB's current practice of recommending fixed discount rates that are rarely updated."

[297] Larry Karp, Global warming and hyperbolic discounting, 89 Journal of Public Economics 261-282 (2005) (The mathematical "intuition for this result is that as [time] increases, smaller values of r in the support of the distribution are relatively more important in determining the expectation of e−rt" where r is the constant discount rate.") Or as Cameron Hepburn, *Hyperbolic Discounting And Resource Collapse*, 103 *Royal Economic Society Annual Conference 2004* (2004) puts it, ("The intuition behind this idea is that scenarios with a higher discount rate are given less weight as time passes, precisely because their discount factor is falling more rapidly" over time.)

[298] Martin L Weitzman, Gamma discounting, 91 AM. ECON. REV. 260-271 (2001). Geoffrey M. Heal, & Antony Millner, Agreeing to disagree on climate policy, 111 PROC. NATL. ACAD. SCI. 3695-3698 (2014).

[299] *See generally* Arrow et al. (2013), *supra* note 317.

[300] Mark C. Freeman, Ben Groom, Ekaterini Panopoulou, & Theologos Pantelidis, Declining discount rates and the Fisher Effect: Inflated past, discounted future?, 73 J. ENVIRON. ECON. MANAGE. 32-49 (2015).

[301] *See generally* Arrow et al., 2013; Arrow et al., 2014;; Cropper et al., 2014, *supra* note 317. *See also* Christian Gollier, & James K. Hammitt, The long-run discount rate controversy, 6 ANNU. REV. RESOUR. ECON. 273-295 (2014).

[302] Peter Howard & Derek Sylvan, *The Economic Climate: Establishing Expert Consensus on the Economics of Climate Change,* INST. POLICY INTEGRITY WORKING PAPER (2015).

[303] This argument was first developed in Weitzman (1998) and Weitzman (2001). Martin L Weitzman, Why the Far-Distant Future Should Be Discounted at Its Lowest Possible Rate, 36 J. ENVIRON. ECON. MANAGE. 201–208 (1998). Martin L Weitzman, Gamma discounting, 91 AM. ECON. REV. 260-271 (2001). *See* Weitzman (2001) *supra* note 319.

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correlated over time.[304] In addition to these two arguments, other motivations for declining discount rates have long been recognized. For instance, if the growth rate of consumption declines over time, the Ramsey rule[305] for discounting will lead to a declining discount rate.[306]

In the descriptive setting adopted by the IWG (2010),[307] economists have demonstrated that calculating the expected net present value of a project is equivalent to discounting at a declining certainty equivalent discount rate when (1) discount rates are uncertain, and (2) discount rates are positively correlated.[308] Real consumption interest rates are uncertain given that there are no multi-generation assets to reflect long-term discount rates and the real returns to all assets—including government bonds—are risky due to inflation and default risk.[309] Furthermore, recent empirical work analyzing U.S. government bonds demonstrates that they are positively correlated over time; this empirical work has estimated several declining discount rate schedules that the IWG can use.[310]

Currently when evaluating projects, the U.S. government applies the descriptive approach using constant rates of 3% and 7% based on the private rates of return on consumer savings and capital investments. As discussed previously, applying a capital discount rate to climate change costs and benefits is inappropriate. Instead, analysis should focus on the uncertainty underlying the future consumption discount rate.[311] Past U.S. government analyses[312] modeled three consumption discount rates reflecting this uncertainty. If the U.S. government correctly returns its focus on multiple consumption discount rates, then the expected net present value argument given above implies that a declining discount rate is the appropriate way to perform discounting. As an alternative, given that the Ramsey discount rate approach is the appropriate methodology in intergenerational settings, the U.S. government could use a fixed, low discount rate as an approximation of the Ramsey equation following

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[304] *See* Christian Gollier, Should we discount the far-distant future at its lowest possible rate?, 3 *Economics: The Open-Access, Open-Assessment E-Journal* 1-14 (2009).

[305] The Ramsey discount rate equation for the social discount rate is $r = \delta + \eta * g$ where r is the social discount rate, δ is the pure rate of time preference, η is the aversion to inter-generational inequality, and *g* is the growth rate of per capita consumption. For the original development, *see*, Frank Plumpton Ramsey, *A mathematical theory of saving*, 38 The Economic Journal 543-559 (1928).

[306] Higher growth rates lead to higher discounting of the future in the Ramsey model because growth will make future generations wealthier. If marginal utility of consumption declines in consumption, then, one should more heavily discount consumption gains by wealthier generations. Thus, if growth rates decline over time, then the rate at which the future is discounted should also decline. *See, e.g.,* Arrow et al. (2014) supra note 317 at 148. It is standard in IAMs to assume that the growth rate of consumption will fall over time. *See, e.g.,* William D. Nordhaus, Revisiting the social cost of carbon, 114 PROC. NATL. ACAD. SCI. 1518-1523 (2017) at 1519 ("Growth in global per capita output over the 1980–2015 period was 2.2% per year. Growth in global per capita output from 2015 to 2050 is projected at 2.1% per year, whereas that to 2100 is projected at 1.9% per year.") Similarly, Chris Hope, The social cost of CO2 from the PAGE09 model, Economics The Open-Access, Open-Assessment E-Journal Discussion Paper No. 2011-39 (2011) at 22 assumes that growth will decline. For instance, in the U.S., growth is 1.9% per year in 2008 and declines to 1.7% per year by 2040. Using data provided by Dr. David Anthoff (one of the founders of FUND), FUND assumes that the global growth rate was 1.8% per year from 1980–2015 period, 1.4% per year from 2015 to 2050 and 2015 to 2100, and then dropping to 1.0% from 2100 to 2200 and then 0.7% from 2200 to 2300. *See* David Anthoff, & Richard SJ Tol, The Climate Framework for Uncertainty, Negotiation and Distribution (FUND): Technical description, Version 3.8." Discussion paper. URL http://www.fund-model.org.

[307] [307] *See* IWG (2010), *supra* note 316.

[308] *See* Arrow et al. (2014) *supra* note 317 at 157.

[309] *See generally* Gollier and Hammitt 2014, *supra* note 322.

[310] *See generally* Arrow et al., 2013; Arrow et al., 2014;; Cropper et al., 2014, *supra* note 317. *See also* Freeman et al. (2015), *supra* note 321. Finally, see Elyès Jouini, & Clotilde Napp, How to aggregate experts' discount rates: An equilibrium approach, 36 ECON. MODELLING 235-243 (2014).

[311] *See generally* Newell (2017) *supra* note 312.

[312] *See* IWG (2010; 2013; 2016) *supra* note 316.

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the recommendation of Marten et al. (2015);[313] see our discussion on Martin et al. (2015). This is roughly IWG (2010)[314]'s goal for using the constant 2.5% discount rate.

If the normative approach to discounting is used in the future (i.e., the current approach of IAMs), economists have demonstrated that an extended Ramsey rule[315] implies a declining discount rate when (1) the growth rate of per capita consumption is stochastic,[316] and (2) consumption shocks are positively correlated over time (or their mean or variances are uncertain).[317] While a constant adjustment downwards (known as the precautionary effect[318]) can be theoretically correct when growth rates are independent and identically distributed,[319] empirical evidence supports the two above assumptions for the United States, thus implying a declining discount rate (Cropper et al., 2014; Arrow et al., 2014; IPCC, 2014).[320] We should further expect this positive correlation to strengthen over time due to the negative impact of climate change on consumption, as climate change causes an uncertain permanent reduction in consumption (Gollier, 2009).[321]

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[313] *See* Alex L.Marten, Elizabeth A. Kopits, Charles W. Griffiths, Stephen C. Newbold, & Ann Wolverton, Incremental CH4 and N2O mitigation benefits consistent with the US Government's SC-CO2 estimates, 15 CLIMATE POL'Y 272-298 (2015).

[314] *See* IWG (2010) *supra* note 316.

[315] If the future growth of consumption is uncertainty with mean μ and variance σ^2, an extended Ramsey equation $r = \delta + \eta * \mu - 0.5\eta^2\sigma^2$ applies where r is the social discount rate, δ is the pure rate of time preference, η is the aversion to inter-generational inequality, and g is the growth rate of per capita consumption. Gollier (2012, Chapter 3) shows that we can rewrite the extended discount rate as $r = \delta + \eta * g - 0.5\eta(\eta + 1)\sigma^2$ where g is the growth rate of expected consumption and $\eta + 1$ is prudence. Christian Gollier, Pricing the Planet's Future: The Economics of Discounting in an Uncertain World, Princeton University Press (2012) at Chapter 3.

[316] The IWG assumption of five possible socio-economic scenarios implies an uncertain growth path.

[317] *See generally* Arrow et al., 2013; Arrow et al., 2014; Gollier & Hammitt, 2014; Cropper et al., 2014, *supra* note 317. The intuition of this result requires us to recognize that the social planner is prudent in these models (i.e., saves more when faces riskier income). When there is a positive correlation between growth rates in per capita consumption, the representative agent faces more cumulative risk over time with respect to the "duration of the time spent in the bad state." Christian Gollier, Discounting with fat-tailed economic growth, 37*Journal of Risk and Uncertainty* 171-186 (2008). In other words, "the existence of a positive correlation in the changes in consumption tends to magnify the long-term risk compared to short-term risks. This induces the prudent representative agent to purchase more zero-coupon bonds with a long maturity, thereby reducing the equilibrium long-term rate." Christian Gollier, The consumption-based determinants of the term structure of discount rates, 1 *Mathematics and Financial Economics* 81-101 (2007). Mathematically, the intuition is that under prudence, the third term in the extended Ramsey equation (*see* footnote 323) is negative, and a "positive [first-degree stochastic] correlation in changes in consumption raises the riskiness of consumption at date T, without changing its expected value. Under prudence, this reduces the interest rate associated to maturity T" (Gollier et al., 2007) by "increasing the strength of the precautionary effect" in the extended Ramsey equation (Arrow et al., 2014; Cropper et al., 2014 *supra* note 317).

[318] The precautionary effect measures aversion to future "wiggles" in consumption (i.e., preference for consumption smoothing); see Christian P Traeger, *On option values in environmental and resource economics*, 37 *Resource and Energy Economics* 242-252 (2014).

[319] *See* Cropper et al 2014 *supra* note 317.

[320] Cropper et al., 2014; Arrow et al., 2014; IPCC, 2014) Essentially, the precautionary effect increases over time when shocks to the growth rate are positively correlated, implying that future societies require higher returns to face the additional uncertainty. See Cropper et al., 2014 and Arrow et al., 2014 *supra* note 317. *See also* Intergovernmental Panel on Climate Change, *Climate Change 2014–Impacts, Adaptation and Vulnerability: Regional Aspects*, Cambridge University Press, 2014 [hereinafter, IPCC 2014].

[321] *See* Christian Gollier, Should we discount the far-distant future at its lowest possible rate?, 3 *Economics: The Open-Access, Open-Assessment E-Journal* 1-14 (2009). Due to the deep uncertainty characterizing future climate damages, some analysts argue that the stochastic processes underlying the long-run consumption growth path cannot be econometrically estimated; see Gollier (2012) *supra* note 336 and Martin L Weitzman, A Review of The Stern Review of the Economics of Climate Change, 45 J. ECON. LIT. 703 (2007). In other words, economic damages, and thus future economic growth, are ambiguous. Agents must then form subjectivity probabilities, which may be better interpreted as a belief (*see* Cropper et al., 2014 *Supra* note 317). Again, theory shows that ambiguity leads to a declining discount rate schedule by Jensen's inequality (*see* Cropper et al 2014 *supra* note 317).

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Several papers have estimated declining discount rate schedules for specific values of the pure rate of time preference and elasticity of marginal utility of consumption[322], though recent work demonstrates that the precautionary effect increases and discount rates decrease further when catastrophic economic risks (such as the Great Depression and the 2008 housing crisis) are modeled.[323] It should be noted that this decline in discount rates due to uncertainty in the global growth path is in addition to that resulting from a declining central growth path over time.[324]

Additionally, a related literature has developed over the last decade demonstrating that normative uncertainty (i.e., heterogeneity) over the pure rate of time preference (δ)—a measure of impatience—also leads to a declining social discount rate.[325] Despite individuals differing in their pure rate of time preference,[326] an equilibrium (consumption) discount exists in the economy. In the context of IAMs, modelers aggregate social preferences (often measured using surveyed experts) by calibrating the preferences of a representative agent to this equilibrium.[327] The literature generally finds a declining social discount rate due to a declining collective pure rate of time preference.[328] The heterogeneity of preferences and the uncertainty surrounding economic growth hold simultaneously,[329] leading to potentially two sources of declining discount rates in the normative context.

Declining Rates are Actionable and Time-Consistent

There are multiple declining discount rate schedules from which the U.S. government can choose, of which several are provided in Arrow et al. (2014) and Cropper et al. (2014).[330] One possible declining interest rate schedule for consideration by the IWG is the one proposed by Weitzman (2001).[331] It is derived from a broad survey of top economists in context of climate change, and explicitly incorporates arguments around interest rate uncertainty.[332] Other declining discount rate schedule include Newell

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[322] For example, Arrow et al. (2014) *supra* note 317

[323] *See* Gollier and Hammitt 2014 *supra* note 322 and Arrow et al. (2014) *supra* note 317.

[324] A common assumption in IAMs is that global growth will slow over time leading to a declining discount rate schedule over time; *see* footnote 7. Uncertainty over future consumption growth and heterogeneous preferences (discussed below) would lead to a more rapid decline in the social discount rate. See also Marten et al 2015 *supra* note 345 and William D. Nordhaus, *Estimates of the Social Cost of Carbon: Concepts and Results from the DICE-2013R Model and Alternative Approaches*, 1 J. ASSOC. ENVIRON. RESOUR. ECON. 1 (2014).

[325] See Arrow et al 2014 and Cropper et al 2014 *supra 317*. See also Mark C. Freeman, & Ben Groom, How certain are we about the certainty-equivalent long term social discount rate?, 79 J. ENVIRON. ECON. MANAGE. 152-168 (2016).

[326] *See* Christian Gollier, & Richard Zeckhauser, Aggregation of heterogeneous time preferences, 113 J. POL. 878-896 (2005).

[327] See Antony Millner & Geoffrey Heal, *Collective intertemporal choice: time consistency vs. time invariance,* Grantham Research Institute on Climate Change and the Environment No. 220 (2015). See also Freeman and Groom 2016 *supra* 346.

[328] See Jouini and Napp, 2014 *supra* note 331, Freeman and Groom 2016 *supra* 346, and Gollier & Zeckhauser, 2005 *supra* note 347. *See also* Elyès Jouini, Jean-Michel Marin, & Clotilde Napp, Discounting and divergence of opinion, 145 J. ECON. THEORY 830-859 (2010). The intuition for declining discount rates due to heterogeneous pure rates of time preference is laid out in Gollier and Zeckhauser (2005). In equilibrium, the least patient individuals trade future consumption to the most patient individuals for current consumption, subject to the relative value of their tolerance for consumption fluctuations. Thus, while public policies in the near term mostly impact the most impatient individuals (i.e., the individuals with the most consumption in the near term), long-run public policies in the distant future are mostly going to impact the most patient individuals (i.e., the individuals with the most consumption in the long-run).

[329] *See* Jouini and Napp 2014 *supra* note 331 and Jouini et al 2010 *supra* note 349.

[330] *See* Arrow et al 2014 and Cropper et al 2014 *supra* note 317.

[331] Weitzman (2001)'s schedule is as follows: 4% for 1-5 years; 3% for 6-25 years; 2% for 26-75 years; 1% for 76-300 years; and 0% for 300+ years; see Weitzman (2001) *supra* note 319.

[332] Freeman and Groom (2015) demonstrate that this schedule only holds if the heterogeneous responses to the survey were due to differing ethical interpretations of the corresponding discount rate question; *see* Mark C Freeman., & Ben Groom, Positively gamma discounting: combining the opinions of experts on the social discount rate, 125 ECON. J. 1015-1024 (2015). A recent survey by Drupp et al. (2015) – which includes Freeman and Groom as co-authors – supports the Weitzman (2001)

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and Pizer (2003); Groom et al. (2007); Freeman et al. (2015).[333] Many leading economists support the United States government adopting a declining discount rate schedule.[334] Moreover, the United States would not be alone in using a declining discount rate. It is standard practice for the United Kingdom and French governments, among others.[335] The U.K. schedule explicitly subtracts out an estimated time preference.[336] France's schedule is roughly similar to the United Kingdom's. Importantly, all of these discount rate schedules yield lower present values than the constant 2.5% discount rate employed by IWG (2010),[337] suggesting that even the lowest discount rate evaluated by the IWG is too high.[338] The consensus of leading economists is that a declining discount rate schedule should be used, harmonious with the approach of other countries like the United Kingdom. Adopting such a schedule would likely increase the SCC substantially from the administration's 3% estimate, potentially up to two to three fold (Arrow et al., 2013; Arrow et al., 2014; Freeman et al., 2015).[339]

A declining discount rate motived by discount rate or growth rate uncertainty avoids the time inconsistency problem that can arise if a declining pure rate of time preference (δ) is used. Circular A-4 cautions that "[u]sing the same discount rate across generations has the advantage of preventing time-inconsistency problems."[340] A time inconsistent decision is one where a decision maker changes his or her plan over time, solely because time has passed. For instance, consider a decision maker choosing whether to make an investment that involves an up-front payment followed by future benefits. A time consistent decision maker would invest in the project if it had a positive net-present value, and that decision would be the same whether it was made 10 years before investment or 1 year before investment. A time inconsistent decision maker might change his or her mind as the date of the investment arrived, despite no new information becoming available. Consider a decision maker who has a declining pure rate of time preference (δ) trying to decide whether to invest in a project that has large up-front costs followed by future benefits. 10 years prior to the date of investment, the decision maker will believe that this project is a relatively unattractive investment because both the benefits and costs would be discounted at a low rate. Closer to the date of investment, however, the costs would be relatively highly discounted, possibly leading to a reversal of the individual's decision. Again, the discount rate schedule is time consistent as long as δ is constant.

The arguments provided here for using a declining consumption discount rate are not subject to this time inconsistency critique. First, time inconsistency occurs if the decision maker has a declining pure

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assumption; see Moritz A Drupp, Mark Freeman, Ben Groom, & Frikk Nesje, Discounting disentangled, Memorandum, Department of Economics, University of Oslo, No. 20/2015 (2015).

[333] See Richard G. Newell, and William A. Pizer, Discounting the distant future: how much do uncertain rates increase valuations?, 46 J. ENVIRON. ECON. MANAGE. 52-71 (2003). See also Ben Groom, Phoebe Koundouri, Ekaterini Panopoulou, &Theologos Pantelidis, Discounting the distant future: how much does model selection affect the certainty equivalent rate?, 22 J. APPL. ECONOMETRICS 641-656 (2007). Finally, see Freeman et al., 2015 *supra* note 353.

[334] *See* Arrow et al 2014 and Cropper et al 2014 *supra* note 317.

[335] *See* Gollier and Hammitt 2014 *supra* note 322 and Cropper et al 2014 *supra* note 317.

[336] The U.K. declining discount rate schedule that subtracts out a time preference value is as follows (Lowe, 2008): 3.00% for 0-30 years; 2.57% for 31-75 years; 2.14% for 76-125 years; 1.71% for 126- 200 years; 1.29% for 201- 300 years; and 0.86% for 301+ years.

[337] *See* IWG (2010) *supra* note 316.

[338] Using the IWG's 2010 SCC model, Johnson and Hope (2012) find that the U.K. and Weitzman schedules yield SCCs of $55 and $175 per ton of CO_2, respectively, compared to $35 at a 2.5% discount rate. Because the 2.5% discount rate was included by the IWG (2010) to proxy for a declining discount rate, this result indicates that constant discount rate equivalents may be insufficient to address declining discount rates. *See* IWG (2010) *supra* note 316.

[339] *See* Arrow et al 2013 and Arrow et al 2014 *supra* note 317. See also Freeman et al., 2015 *supra* note 353.

[340] *Circular A-4* at 35.

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rate of time preference, not due to a decreasing discount rate term structure.[341] Second, uncertainty about growth or the discount rate avoids time inconsistency because uncertainty is only resolved in the future, after investment decisions have already been made. As the NAS (2017) notes, "One objection frequently made to the use of a declining discount rate is that it may lead to problems of time inconsistency....This apparent inconsistency is not in fact inconsistent....At present, no one knows what the distribution of future growth rates...will be; it may be different or the same as the distribution in 2015. Even if it turns out to be the same as the distribution in 2015, that realization is new information that was not available in 2015."[342]

We should note that time-inconsistency is not a reason to ignore heterogeneity (i.e., normative uncertainty) over the pure rate of time preference (δ). If the efficient declining discount rate schedule is time-inconsistent, the appropriate solution is to select the best time-consistent policy. Millner and Heal (2014)[343] do just this by demonstrating that a voting procedure – whereby the median voter determines the collective preference – is: (1) time consistent, (2) welfare enhancing relative to the non-commitment, time-inconsistent approach, and (3) preferred by a majority of agents relative to all other time-consistent plans. Due to the right skewed distribution of the pure rate of time preference and the social discount rate as shown in all previous surveys,[344] the median is less than the mean social discount rate (and pure rate of time preference); the mean social discount rate is what holds in the very short-run under various aggregation methods, such as Weitzman (2001) and Freeman and Groom (2015).[345] Combining an uncertain growth rate and heterogeneous preference together implies a declining discount rate starting at a lower value in the short-run. In addition to the reasons discussed earlier in the comments, this is another reason to exclude a discount rate as high as 7%.

There is an economic consensus on the appropriateness of employing a consumption discount rate (and the inappropriateness of a capital discount rate) in the context of climate change

There is a strong consensus among economists that it is theoretically correct to use consumption discount rates in the intergenerational setting of climate change, such as in the calculation of the SCC. Similarly, there is a strong consensus that a capital discount rate is inappropriate according to "good economics" (Newell, 2017).[346] This consensus holds across panels of experts on the social cost of

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[341] Gollier (2012) *supra* note 336 ("It is often suggested in the literature that economic agents are time inconsistent if the term structure of the discount rate is decreasing. This is not the case. What is crucial for time consistency is the constancy of the rate of impatience, which is a cornerstone of the classic analysis presented in this book. We have seen that this assumption is compatible with a declining monetary discount rate.").

[342] National Academies of Sciences, Engineering, and Medicine, *Valuing climate damages: Updating estimation of the social cost of carbon dioxide* at 53 (2017) at 182.

[343] Antony Millner, & Geoffrey Heal, Collective intertemporal choice: time consistency vs. time invariance, Grantham Research Institute on Climate Change and the Environment No. 220 (2015).

[344] See Weitzman (2001) *supra* note 319, Howard and Sylvan 2015 *supra* note 323, and Drupp et al 2015 *supra* note 353.

[345] See Weitzman (2001) *supra* note 319 and Freeman et al., 2015 *supra* note 353.

[346] The former co-chair of the National Academy of Sciences' Committee on Assessing Approaches to Updating the Social Cost of Carbon – Richard Newell (2017) *supra* note 312 – states that "[t]hough the addition of an estimate calculated using a 7 percent discount rate is consistent with past regulatory guidance under OMB Circular A-4, there are good reasons to think that such a high discount rate is inappropriate for use in estimating the SCC...It is clearly inappropriate, therefore, to use such modeling results with OMB's 7 percent discount rate, which is intended to represent the historical before-tax return on private capital...This is a case where unconsidered adherence to the letter of OMB's simplified discounting approach yields results that are inconsistent with and ungrounded from good economics."

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carbon[347]; surveys of experts on climate change and discount rates;[348] the three most commonly cited IAMs employed in calculating the federal SCC; and the government's own analysis.[349] For more analysis of this issue, see the discussion in the main body our Comments on the inappropriateness using a discount rate premised on the return to capital in intergenerational settings.

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[347] See generally NAS 2017 *supra* note 363.

[348] See Weitzman (2001) *supra* note 319, Howard and Sylvan 2015 *supra* note 323, Drupp et al 2015 *supra* note 353, and Robert Pindyck, The social cost of carbon revisited, National Bureau of Economic Research No. w22807(2016).

[349] *See* IWG 2010 *supra* note 316 and Council of Econ. Advisers, *Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate* at 1 (CEA Issue Brief, 2017).

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Technical Appendix: Damage Literature

The Fourth National Climate Assessment was recently published by the U.S. Global Change Research Program.[350] In addition to reviewing that report and the literature on U.S. damages cited therein, BLM must review the following literature, which contains some of the most up-to-date estimates of U.S. damages from climate change.

Overall Damage Estimates and Review Articles

Solomon Hsiang et al., *Economic Damage from Climate Change in the United States*, 356 SCIENCE. 1362–1369 (2017).

Delavane Diaz & Frances Moore, *Quantifying the economic risks of climate change*, 7 NAT. CLIM. CHANG. 774–782 (2017).

Roberto Roson & Martina Sartori, *Estimation of Climate Change Damage Functions for 140 Regions in the GTAP 9 Database*, 1 J. GLOB. ECON. ANAL. 78–115 (2016).

Derek Lemoine & Sarah Kapnick, *A top-down approach to projecting market impacts of climate change*, NAT. CLIM. CHANG. 7 (2015).

Marshall Burke, Solomon M. Hsiang & Edward Miguel, *Global non-linear effect of temperature on economic production*, 527 NATURE 235–239 (2015).

Agriculture Damages

Wolfram Schlenker, *Crop Responses to Climate and Weather: Cross-Section and Panel Models*, *in* CLIMATE CHANGE AND FOOD SECURITY 99–108 (David Lobell & Marshall Burke eds., 2010).

David B. Lobell, Wolfram Schlenker & Justin Costa-Roberts, *Climate Trends and Global Crop Production Since 1980*, 333 SCIENCE (80). (2011).

Olivier Deschênes & Michael Greenstone, *The Economic Impacts of Climate Change: Evidence from Agricultural Output and Random Fluctuations in Weather: Reply*, 102 AM. ECON. REV. 3761–3773 (2012).

Marshall Burke & Kyle Emerick, *Adaptation to Climate Change: Evidence from US Agriculture*, 8 AM. ECON. J. ECON. POLICY 106–140 (2016).

Christopher Severen, Christopher Costello & Olivier Deschênes, *A Forward Looking Ricardian Approach: Do Land Markets Capitalize Climate Change Forecasts?*, 22413 NBER WORK. PAP. 46 (2016).

Wolfram Schlenker, Michael J. Roberts & David B. Lobell, *US maize adaptability*, 3 NAT. CLIM. CHANG. 690–691 (2013).

Wolfram Schlenker & Michael J Roberts, *Nonlinear temperature effects indicate severe damages to U.S. crop yields under climate change.*, 106 PROC. NATL. ACAD. SCI. 15594–8 (2009).

Frances C Francis C Moore, Uris Lantz C Baldos & Thomas Hertel, *Economic impacts of climate change on agriculture: a comparison of process-based and statistical yield models*, 12 ENVIRON. RES. LETT. 1–9 (2017).

F. C. Moore et al., *New Science of Climate Change Impacts on Agriculture Implies Higher Social Cost of Carbon*, WORK. PAP. 1–43 (2017).

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[350] https://science2017.globalchange.gov/

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Forestry Damages

Christopher Guo & Christopher Costello, *The value of adaption: Climate change and timberland management*, 65 J. ENVIRON. ECON. MANAGE. 452–468 (2013).

Effects on Health and Mortality

Alan Barreca et al., *Adapting to climate change: The remarkable decline in the U.S. temperature-mortality relationship over the 20th century*, 124 NBER WORK. PAP. 46 (2016).

Garth Heutel, Nolan H Miller & David Molitor, *Adaptation and the mortality effects of temperature across U.S. climate regions*, No. 23271 NBER WORK. PAP. 58 (2017).

Jan C. Semenza et al., *Climate change and microbiological water quality at California beaches*, 9 ECOHEALTH 293–297 (2012).

Effects on Labor Productivity and Learning

Joshua Graff Zivin & Matthew MJ Neidell, *Temperature and the allocation of time: Implications for climate change*, 32 J. LABOR ECON. 1–26 (2010).

M. Donadelli et al., *Temperature Shocks and Welfare Costs*, J. ECON. DYN. CONTROL (2017).

Adam Isen & W Reed Walker, *Heat and Long-Run Human Capital Formation*, 26 (2017).

Geoffrey Heal, Jisung Park & Nan Zhong, *Labor Productivity and Temperature*, 1–33 (2017).

Joshua Graff Zivin, Solomon Hsiang & Matthew Neidell, *Temperature and human capital in the short- and long-run*, J. ASSOC. ENVIRON. RESOUR. ECON. 694177 (Forthcoming)

Sea Level Rise

Mathew E. Hauer, Jason M. Evans & Deepak R. Mishra, *Millions projected to be at risk from sea-level rise in the continental United States*, advance on NAT. CLIM. CHANG. (2016).

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RFF REPORT

The 2016 BLM Methane Waste Prevention Rule

Should It Stay or Should It Go?

Alan J. Krupnick and Isabel Echarte

RFF Report Series: *The Costs and Benefits of Eliminating or Modifying US Oil and Gas Regulations*

APRIL 2018

RESOURCES FOR THE FUTURE

The 2016 BLM Methane Waste Prevention Rule: Should It Stay or Should It Go?

Alan J. Krupnick and Isabel Echarte*

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This report is one in a series: The Costs and Benefits of Eliminating or Modifying US Oil and Gas Regulations.

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Executive Summary

The Trump administration has prioritized increasing the production of US oil and natural gas, in part through reducing federal regulatory burdens that the administration says restrict development. President Trump signed Executive Order (EO) 13783 in March 2017, requiring agencies to review existing rules, guidance documents, and policies that potentially burden the development or use of domestically produced energy resources.[1] This EO also specifically identified for review regulations applicable to the oil and gas sector, including the Bureau of Land Management's (BLM's) 2016 methane waste prevention rule.[2]

The Trump administration has also focused on reducing regulatory costs across the federal government more broadly with EO 13771, which ordered that two regulations be removed for every regulation implemented.[3] Subsequent guidance from the Office of Management and Budget (OMB)[4] for implementing EO 13771 emphasized that cost-benefit analysis is required for all major regulations being considered for elimination or modification (as has been the practice for new regulations since President Reagan's EO 12291).[5] But the OMB guidance and EO 13771 also laid out the controversial requirement that only the cost savings from repeal be considered in prioritizing rules for repeal; in other words, only cost savings (and not forgone benefits or net benefits) are to be counted when reviewing regulations under the two-for-one requirement. In a March letter to the Trump administration, 96 economists and other experts expressed concerns about this requirement.[6]

Following these actions, we sought to first catalog existing federal regulations promulgated after 2005 and non-regulatory federal activities of concern to the oil and gas industry.[7] We then turned toward assessing what the effects on industry and the public might be if some of these regulations were eliminated, modified, or delayed. To analyze these impacts, we updated the parameters used by each agency in their original Regulatory Impact Analyses (RIAs) and assessed the cost savings and forgone benefits of repealing and modifying the following rules:

- the BLM's "Waste Prevention, Production Subject Royalties, and Resource Conservation" rule;

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[1] Executive Office of the President. 2017. Executive Order 13783: Promoting Energy Independence and Economic Growth. *Federal Register* 82(61): 16093, March 28. https://www.federalregister.gov/documents/2017/03/31/2017-06576/promoting-energy-independence-and-economic-growth.

[2] US Bureau of Land Management (BLM). 2016. Final Rule: Waste Prevention, Production Subject to Royalties, and Resource Conservation. *Federal Register* 81(223): 83008, November 18. https://www.gpo.gov/fdsys/pkg/FR-2016-11-18/pdf/2016-27637.pdf.

[3] Executive Office of the President. 2017. Executive Order 13771: Reducing Regulation and Controlling Regulatory Costs. *Federal Register* 82(22): 9339, February 3. https://www.federalregister.gov/documents/2017/02/03/2017-02451/reducing-regulation-and-controlling-regulatory-costs.

[4] Office of Management and Budget. 2017. Guidance Implementing Executive Order 13771, Titled "Reducing Regulation and Controlling Regulatory Costs." April 5. https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2017/M-17-21-OMB.pdf.

[5] Executive Office of the President. 1981. Executive Order 12291: Federal Regulation. *Federal Register* 46: 13193, February 17. https://www.archives.gov/federal-register/codification/executive-order/12291.html.

[6] Linn, Joshua, and Alan J. Krupnick et al. 2017. Ninety-Six Regulatory Experts Express Concerns about Trump Administration Reforms. Washington, DC: Resources for the Future, May 24.http://www.rff.org/blog/2017/ninety-six-regulatory-experts-express-concerns-about-trump-administration-reforms.

[7] Information about this catalog will be included in a forthcoming report summarizing the results of the project.

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- the Environmental Protection Agency's (EPA's) "Oil and Natural Gas Sector: Emissions Standards for New, Reconstructed, and Modified Sources New Source Performance Standards" rule;
- the Bureau of Safety and Environmental Enforcement's (BSEE's) "Oil and Gas and Sulfur Operations in the Outer Continental Shelf-Blowout Preventer Systems and Well Control Rule";
- the Pipeline and Hazardous Materials Safety Administration's (PHMSA's) "Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains" rule;
- BSEE's and Bureau of Ocean Energy Management's (BOEM's) "Oil and Gas and Sulphur Operations on the Outer Continental Shelf—Requirements for Exploratory Drilling on the Arctic Outer Continental Shelf" rule; and
- PHMSA's "Pipeline Safety: Integrity Management Program for Gas Distribution Pipelines" rule.

This report analyzes the first rule listed: the Obama administration's 2016 BLM methane waste prevention rule (herein referred to as the 2016 rule)—and the Trump administration's proposed repeal of the rule.[8]

BLM's 2016 rule sought to regulate methane emissions from existing sources in upstream oil and gas production on federal lands, with the stated purpose of reducing the waste of natural gas resources. This rule differs from EPA's rule on methane emissions, which covers all new or modified oil and gas sources on federal and non-federal lands. For the 2016 rule, BLM's RIA calculated that implementing the rule would result in $898 million to $1.2 billion in net benefits over 10 years (in 2012 dollars at a 3 percent discount rate).[9] The 2018 RIA for the proposed repeal of the rule, however, estimates that enforcing the same 2016 rule would result in net costs to society of $581 million to $945 million over 10 years (in 2012 dollars at a 3 percent discount rate), thereby allowing BLM to estimate that repealing the 2016 rule would result in net benefits of a similar amount.[10] The main discrepancy between these two estimates is the Trump administration's decision to change how agencies calculate the social costs of greenhouse gas emissions. In its RIA for the 2018 proposed repeal of the rule, BLM used a domestic social cost of methane (SC-CH_4), which the administration has termed its "interim" domestic SC-CH_4. This estimate aims to measure the climate damages from methane emissions to the United States alone. In contrast, the RIA for BLM's 2016 rule used a peer-reviewed global estimate of SC-CH_4, which measures those damages to the United States as well as the rest of the world.

In the analysis we provide below, we use the global social cost of methane in our baseline, a decision outlined further where we discuss benefits adjustment scenarios in Section 5 of this report. Our baseline also adopts three assumptions from the 2018 RIA:

[8] BLM. 2018. Proposed Rule: Waste Prevention, Production Subject to Royalties, and Resource Conservation; Rescission or Revision of Certain Requirements. *Federal Register* 83: 9724, February 22. https://www.federalregister.gov/documents/2018/02/22/2018-03144/waste-prevention-production-subject-to-royalties-and-resource-conservation-rescission-or-revision-of.

[9] BLM. 2016. Regulatory Impact Analysis for: Revisions to 43 CFR 3100 (Onshore Oil and Gas Leasing) and 43 CFR 3600 (Onshore Oil and Gas Operations), Additions of 43 CFR 3178 (Royalty-Free Use of Lease Production) and 43 CF 3179 (Waste Prevention and Resource Conservation). https://www.regulations.gov/document?D=BLM-2016-0001-9127.

[10] BLM. 2018. Regulatory Impact Analysis for the Proposed Rule to Rescind or Revise Certain Requirements of the 2016 Waste Prevention Rule. https://www.regulations.gov/document?D=BLM-2018-0001-0002.

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higher compliance cost estimates for administrative burdens, compliance beginning in 2019, and the same discounting methods. We discuss our decision process in creating this baseline in the body of this report. We also create a scenario using the domestic social cost of methane, functioning as a sensitivity analysis and an attempt to replicate the 2018 RIA's results.[11]

Table 1 shows the estimated costs and benefits from keeping or repealing the 2016 rule using assumptions from BLM's 2016 RIA, our baseline using the global SC-CH_4, our attempt to replicate BLM's 2018 RIA using the domestic SC-CH_4, and BLM's 2018 RIA.[12] A range of estimates (for high- and low-cost scenarios) is provided for costs and net benefits due to variation in the potential cost for the flaring requirement. In all scenarios, the costs from enforcing the 2016 rule would be private costs borne by the oil and gas industry. The benefits of keeping the 2016 rule are largely external benefits from reducing methane (CH_4) emissions, though some benefits accrue to industry from the capture and sale of additional gas.

TABLE 1. TOTAL 10-YEAR NET BENEFITS, NET PRESENT VALUE AT 3% DISCOUNT RATE (MILLION 2012$)*

	High-Cost Scenario			Low-Cost Scenario		
KEEPING RULE						
	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Obama Administration 2016 RIA (Global SC-CH_4)**	1,780	2,678	898	1,464	2,678	1,214
RFF Baseline (Global SC-CH_4)	1,901	2,712	812	1,535	2,712	1,177
RFF Sensitivity Analysis (Domestic SC-CH_4)	1,901	1,037	(863)	1,535	1,037	(498)
Trump Administration 2018 RIA (Domestic SC-CH_4)	2,028	1,083	(945)	1,664	1,083	(581)
REPEALING RULE						
	Costs Avoided	Benefits Forgone	Net Benefits of Repeal	Costs Avoided	Benefits Forgone	Net Benefits of Repeal
Obama Administration 2016 RIA (Global SC-CH_4)	1,780	2,678	(898)	1,464	2,678	(1,214)
RFF Repeal Baseline (Global SC-CH_4)	1,898	2,712	(814)	1,532	2,712	(1,180)
RFF Sensitivity Analysis (Domestic SC-CH_4)	1,898	1,037	860	1,532	1,037	495
Trump Administration 2018 RIA (Domestic SC-CH_4)	2,025	1,083	942	1,661	1,083	578

*Throughout the body of this report, "RFF Baseline" is referred to as "Baseline" and "RFF Repeal Baseline is referred to as "Repeal Baseline." In Table 7, "RFF Sensitivity Analysis" refers to "Domestic SC-CH_4 and SCC."

**The 2016 RIA seems to have a typo regarding the net benefits as presented in its table on page 112 reflecting the 3%, high-cost net present value, stating that the net benefits are $889 million—though subtracting the benefits and costs in that scenario results in net benefits of $898 million.

[11] Our replication of the 2016 RIA differs by 1–3% from the original analysis, mainly because of slight differences in the benefits calculation. Our replication of the 2018 RIA differs by 4–14%. The reasons for this difference are outlined in the body of this report, under "5.2 Corrections to Generate a Baseline."

[12] In this document, we produce only the 3% discount rate results. The 7% discount rate results can be found in Appendix A.

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The analysis below illustrates that using the global SC-CH_4 produces vastly different results than the domestic SC-CH_4. Our baseline is slightly lower than the RIA estimates for the 2016 rule, due to delayed compliance resulting from actions by the Trump administration to postpone the rule. On one hand, our baseline for repealing the rule estimates that doing so would result in net costs of $814 million to $1.2 billion (at a 3 percent discount rate and in 2012 dollars). Our scenario using the domestic SC-CH_4, on the other hand, estimates that repealing the rule would result in $495 million to $860 million in net benefits—figures that are about $100 million smaller than those estimated by the Trump administration in its 2018 RIA. This discrepancy is likely due to slight methodological differences—an issue discussed further in the body of this report.

These results illustrate how the estimated impacts of repealing the BLM 2016 rule are extremely sensitive to the SC-CH_4 estimate used in the analysis. The results using the global estimate strongly support keeping the rule; results using the domestic estimate strongly support repealing or revising the rule.

In the following sections, we present estimates of the cost avoided and benefits forgone from repealing the regulation, after correcting the baseline for more recent natural gas price estimates and other factors. We also perform several analyses based on varying assumptions used to calculate costs and benefits in the original analysis:

- cost estimates for leak detection and repair (LDAR) from the American Petroleum Institute (API), a trade association;
- LDAR cost estimates from Carbon Limits, a research group;
- cost estimates for the liquids unloading requirements from ICF, a consulting firm;
- a lower estimate for SC-CH_4 (the Trump administration's domestic estimate); and
- a higher estimate for SC-CH_4 (the peer-reviewed global estimate that is higher than those generally used in RIAs).

For repealing the regulation, using the domestic SC-CH_4 is the only scenario showing net benefits (between $498 million and $863 million at a 3 percent discount rate). The rest of the analyses show net costs from repealing the rule (from $814 million to $1.7 billion at a 3 percent discount rate). The scenario using API's higher LDAR costs results in $152 million in net costs (under the low-cost scenario) to $213 million in net benefits (under the high-cost scenario) at the same discount rate.

Additionally, we look at the costs and benefits of keeping with certain modifications, either increasing or decreasing the stringency of the rule:

- reducing the frequency of LDAR inspections from semiannual to annual inspections,
- increasing the emissions threshold for storage requirements,
- removing the flaring requirement,
- combining all three of the above actions, and
- increasing the frequency of LDAR inspections.

For the modification analyses, one change reduces net benefits (reducing LDAR inspection frequency) and one change significantly increases net benefits (removing the flaring requirement under the high-cost scenario, where the reduction in costs outweighs the reduction in net benefits).

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1. Introduction

The Trump administration has identified increasing oil and natural gas production as a priority for the United States, in part through reducing federal regulatory burdens that the administration says restrict development. President Trump signed Executive Order (EO) 13783 in March 2017, requiring agencies to review existing rules, policies, guidance documents, and related materials that potentially burden the development or use of domestically produced energy resources.[13] This EO also specifically identified for review regulations applicable to the oil and gas sector.

The Trump administration has also focused on reducing regulatory costs across the federal government more broadly under EO 13771, which ordered that two regulations be removed for every regulation implemented.[14] Subsequent guidance from the Office of Management and Budget (OMB)[15] for implementing EO 13771 emphasized that cost-benefit analysis is required for all major regulations being considered for elimination or modification (as well as for new regulations). But it also laid out the controversial requirement that only the cost savings from repeal be considered in prioritizing rules for repeal as well as in scoring against the costs imposed by new regulations.[16]

2. Objectives

The goals of our project were to catalog the regulations that may be reviewed by the Trump administration[17] and select several for in-depth assessments, including cost-benefit analyses to estimate the potential impacts on industry and the public if the regulations are eliminated, modified, or delayed. These impacts include cost savings and forgone benefits from changes to regulations (as costs and benefits are defined in Circular A-4),[18] and the effects on industry costs as well as any changes to environmental and health outcomes. This project includes two main products: the first is the forthcoming catalog, which inventories existing federal regulations promulgated after 2005 and other federal activities of concern to industry (e.g., permitting) relevant to the development and transportation of oil and gas resources. The second product is a report series that present our analyses of the cost savings and forgone benefits of the repeal or modification of six major regulations affecting the oil and gas sector (these are outlined in the executive summary; this report is the first in the series).[19]

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[13] Executive Office of the President. 2017. Executive Order 13783: Promoting Energy Independence and Economic Growth. *Federal Register* 82(61): 16093, March 28. https://www.federalregister.gov/documents/2017/03/31/2017-06576/promoting-energy-independence-and-economic-growth.

[14] Executive Office of the President. 2017. Executive Order 13771: Reducing Regulation and Controlling Regulatory Costs. *Federal Register* 82(22): 9339, February 3. https://www.federalregister.gov/documents/2017/02/03/2017-02451/reducing-regulation-and-controlling-regulatory-costs.

[15] Office of Management and Budget. 2017. Guidance Implementing Executive Order 13771, Titled "Reducing Regulation and Controlling Regulatory Costs." April 5. https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2017/M-17-21-OMB.pdf.

[16] Executive Office of the President. 2017. Executive Order 13771: Reducing Regulation and Controlling Regulatory Costs. *Federal Register* 82(22): 9339, February 3. https://www.federalregister.gov/documents/2017/02/03/2017-02451/reducing-regulation-and-controlling-regulatory-costs.

[17] We will discuss this catalog in a forthcoming summary report.

[18] Office of Management and Budget. 2003. Circular A-4, Regulatory Analysis. *Federal Register* 68: 58366, October 9. https://www.federalregister.gov/documents/2003/10/09/03-25606/circular-a-4-regulatory-analysis.

[19] As defined by EO 12866, a "'significant regulatory action' means any regulatory action that is likely to result in a rule that may: (1) Have an annual effect on the economy of $100 million or more", among other criteria.

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The six rules were chosen to cover a wide range of types of rules and are not meant to suggest relative importance or that any are most targeted by the Trump administration. They illustrate the technical challenges and opportunities presented in performing cost-benefit analyses to support the repeal or modification of the rules. This report covers the 2016 BLM methane rule[20] as well as the 2018 proposed repeal. [21] A forthcoming summary report will include cross-cutting analyses to compare the results of these six analyses—in particular, ranking the results by net benefits (preferred by economists) and also cost savings, the metric emphasized by OMB's guidance related to EO 13771.

3. Methods

The objective of each cost-benefit analysis was to calculate the cost savings and forgone benefits associated with repeal (also referred to as elimination) and modification of the rule or, in certain cases, delay of the rule. To meet this objective, we carefully read each proposed and final rule and its associated regulatory impact analysis (RIA), as well as any technical support documentation available for the rule. We also noted stakeholder comments and concerns as addressed in the *Federal Register* notice for the final rule (the agency's formal response to commenters) as well as any text in the final rule addressing comments. We also searched for any parallel industry analyses and subsequent industry comments gathered as part of the Trump administration's regulatory reform initiative. Table 2 defines key terminology used in this report and across the series.

TABLE 2. DEFINITIONS OF KEY TERMINOLOGY

Term	Definition
Cost Savings or Avoided Costs	The amount saved by eliminating or modifying the rule (i.e., the opposite of the costs of implementing a rule).
Benefits Forgone	Benefits that would not be realized by eliminating or modifying the rule (i.e., the opposite of the benefits of implementing a rule).
Net Benefits of Repeal or Elimination	The cost savings of a rule minus the benefits forgone with a positive result, meaning eliminating the rule has a positive net welfare effect on society. Net benefits can be negative, in which case they could be termed net costs to society.
Replication	Re-created original RIA and changed nomenclature to put into rule elimination terms: defining costs as cost savings, benefits as benefits forgone and net benefits (costs) as net benefits (costs) of repeal or elimination.
Corrections	Changes to underlying assumptions to bring the replication up to date and comparable across different rules
Baseline	The result of corrections to the replication. All subsequent scenarios are compared to the baseline.
Repeal Baseline	The result of subtracting forgone benefits from costs saved (the inverse of the baseline).
Costs Adjustment Scenarios	Sensitivity analyses using changes to underlying cost parameters/assumptions in the original RIA
Benefits Adjustment Scenarios	Sensitivity analyses using changes to underlying benefit parameters/assumptions in the original RIA
Rule Modification	Changes to the requirements of rule itself (i.e., sources covered, frequency of surveying, as opposed to changes in parameters/assumptions used in the RIA)

[20] US Bureau of Land Management (BLM). 2016. Final Rule: Waste Prevention, Production Subject to Royalties, and Resource Conservation. *Federal Register* 81(223): 83008, November 18. https://www.gpo.gov/fdsys/pkg/FR-2016-11-18/pdf/2016-27637.pdf.

[21] BLM. 2018. Proposed Rule: Waste Prevention, Production Subject to Royalties, and Resource Conservation; Rescission or Revision of Certain Requirements. *Federal Register* 83: 9724, February 22. https://www.federalregister.gov/documents/2018/02/22/2018-03144/waste-prevention-production-subject-to-royalties-and-resource-conservation-rescission-or-revision-of.

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We took the following steps to conduct our analyses, for this report on BLM's methane rule and across the report series: Each discussion of a rule begins with background on the purpose of the rule, its history, and its current status (e.g., has it been repealed, or is it slated for repeal or modification). Next, we summarize the rule with details to provide context about the consequences of repeal or modification of all or some of its parts. We then replicated the cost-benefit analysis presented in the final RIA by creating a series of spreadsheets of extracted data and other information. We were able to replicate the analyses with only very minor differences.

3.1. Corrections to Generate a Baseline

In order to ensure that the cost savings, forgone benefits, and net benefits of elimination reflect the most accurate, currently available information, we changed some of the underlying assumptions of the RIA (and refer to these changes as "corrections"). We also made corrections where we could to address compliance issues for calculating the costs and benefits of repealing a regulation. These issues are explained below.

First, we updated data where possible, mainly based on the US Energy Information Administration's (EIA's) oil and gas price estimates released in the *Annual Energy Outlook* each year. Second, if an RIA originally subtracted cost savings from costs, we added cost savings to the benefits side of the equation (and made corresponding adjustments to the RIA cost estimates) so that our analyses remain consistent with recent guidance from the OMB guidance for EO 13771. Third, we also made some further accounting corrections for comparability across rules, including the start and end year analyzed (and, implicitly, the period analyzed). As regulations often have an indefinite lifetime, the endpoint for an analysis can be arbitrary. In comparing rules, those with longer periods analyzed will have greater net present values of both benefits and costs, other things equal. BLM's methane rule, for example, uses a 10-year period of analysis—whereas PHMSA' tank car rule for hazardous materials uses a 20-year period of analysis and EPA's methane rule uses the years 2020 and 2025 alone. To address this issue, in our forthcoming summary report, we will compare the net present values of costs, benefits, and net benefits over 10 years.

Once we updated and corrected the baseline, we created our "repeal baseline," which we use to assess the cost savings and benefits forgone of repealing a regulation. We subtract the benefits forgone (i.e., a cost of repealing a rule) from the costs avoided (i.e., the benefit of repealing a rule) to calculate the net benefits of repeal. The first equation below illustrates the benefits of keeping the rule (termed "baseline"). Scenarios that modify the rule are compared against the baseline for keeping the rule rather than against the repeal baseline, as we do not believe the administration would modify the rule only to later repeal it. The second equation below describes the calculation of the net benefits of repeal, which we use to calculate the repeal baseline. Both baselines include the corrections outlined above.

BASELINE

Net benefits (of keeping or modifying the rule)
= Benefits – Costs

REPEAL BASELINE

Net benefits (of repeal)
= Costs avoided – Benefits forgone

The regulated entities may have already begun to comply with the regulation after its passage, until its repeal or until a plan to repeal or modify the rule is publicized. Capital expenditures spent to comply with a regulation are sunk costs, so they should not be counted as cost savings if a regulation is eliminated. Future operating costs, however, would count as costs saved if a regulation is eliminated. To the extent that compliance has already

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occurred, cost savings and forgone benefits would be lower. Where the RIA provided a clear schedule for compliance (as in this case for BLM's methane rule), an adjustment was made, though that is not always the case.

RIAs often account for overlapping or duplicative state regulations, for instance, by not counting costs and benefits from compliance in states with existing regulations. In between the time a regulation is finalized and eliminated, however, additional states may pass overlapping or duplicative regulations. Thus, if a federal regulation is eliminated, state regulations will still be in force and there will be less or no associated cost-savings from repeal in those states depending on the stringency of their regulations. One could also argue that states' proposed regulations should also be taken into account.[22]

3.2. Cost Adjustment Scenarios

Working from the repeal baseline, we build scenarios that change the underlying assumptions of the RIA to assess any changes to the costs of the rule if the compliance costs of certain provisions were more or less expensive.

First, we searched the RIA for alternative cost assumptions. Second, we searched the rule's docket for comments that provided enough information for us to use an alternative cost assumption. If we found compelling evidence in either source, we recalculated the cost savings, benefits forgone, and net benefits of repeal to account for this input. The comments we used were submitted by stakeholders including API, the Independent Petroleum Association of America (IPAA), Western Energy Alliance, Sierra Club, Environmental Defense Fund, Pew Charitable Trust, and others. We also searched for comments submitted to the agencies in the spring of 2017, when they requested public input on the Trump administration's regulatory reform efforts.

3.3. Benefits Adjustment Scenarios

In addition to cost adjustments, we made adjustments to the benefits, using the same process described above and also making what we considered reasonable changes to various assumptions, such as using alternative estimates for the social cost of carbon (SCC) or a range of potential risk reduction levels.

Benefits measurements were often subject to large uncertainties, so for several rules we conducted break-even analyses, a method often employed in RIAs. Break-even analysis in the context of repealing a rule calculates what the uncertain parameter would have to be to equate forgone benefits to cost savings. If decisionmakers think the real value of this parameter is likely to be larger than the break-even parameter estimate, then repeal would not be warranted (in terms of economic efficiency). Symmetrically, if they think the parameter is lower, it may be economically efficient to repeal the rule. Of course, in the face of large uncertainty, a risk averse regulator may choose not to repeal a regulation when it is unclear whether the parameter is lower or higher than the break-even estimate.

Under guidance from the Trump administration, agencies are increasingly questioning the valuation of ancillary benefits (co-benefits) of various rules. These refer to benefits that come along with efforts aimed at addressing another pollutant or activity, such as the climate benefits of reducing mercury pollution, for example. Agencies sometimes forgo the valuation of ancillary benefits, particularly when benefits exceed costs by a wide margin. Agencies may choose to do so because they find it difficult or impossible to

[22] It may be a step too far to assume that some states will be incentivized to pass legislation offsetting the effect of eliminating a federal regulation.

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quantify, and doing so in cases of large uncertainty may complicate interpretation of the results.

The Trump administration critiqued the inclusion of ancillary benefits in RIAs, arguing that they mask the "true net costs" of rulemakings (EPA 2017). When looking at the forgone benefits of repeal, however, ignoring forgone ancillary benefits is not justifiable because they still would have accrued to society regardless of whether these benefits were the target of a regulation. Counting these ancillary benefits ensures that an analysis accurately describes the true net costs of a rulemaking (Krupnick and Keyes 2017). Nevertheless, in this project we were not able to account for ancillary benefits if they were missing from the original RIA.

3.4. Rule Modification Scenarios

There are innumerable ways any given rule can be modified, including changes to the sources covered or the frequency of monitoring and reporting, for instance. We limited the possibilities for modification to what was quantifiable based on agency estimates for alternative requirements, quantitative estimates provided by industry or other stakeholder comments, and our judgment about what would make for an enlightening modification. Coming from industry, the requested modifications would generally lower the costs of a rule but may also lower the benefits. Symmetrically, the requested modifications coming from environmental groups would generally increase the benefits of a rule but may also increase the costs. Because the modifications are highly specific to individual rules, we address them in turn—in detail in the respective reports in this series describing our analysis of each rule's RIA.

3.5. Discussion and Conclusions

After presenting the multiple cost-benefit analyses for repeal and modification of each rule, we provide a qualitative discussion of aspects of repealing or modifying a rule that we could not quantify. These were often driven by comments that criticize some aspect of a rule but provide no basis for empirical analysis of how the costs and benefits would change if the rule were altered to address the comment. We also tracked the agency's response to comments as well as the non-monetized effects of the rules (often indirect or distributional), such as impacts on jobs or commodity prices.

We conclude each report by summarizing the rule-specific analyses and generalize about whether certain types of modifications or repeal make sense from an economic efficiency (net benefit) perspective. We do not compare our results across rules in each individual report. A forthcoming summary report will include cross-cutting analyses and comparisons.

4. Background: BLM's 2016 Methane Rule

4.1. Purpose

BLM's stated motivation in promulgating this regulation under the Obama administration was to control the loss of natural gas on federal and American Indian lands. The venting and flaring of natural gas leads to the waste of gas that could otherwise be captured and sold, in addition to contributing to climate change. A 2010 Government Accountability Office (GAO) report estimated that the economically recoverable share of the gas that was being lost represented about $23 million in federal royalties. In addition, when a resource is wasted, "society loses the opportunity to use the resource and social benefits are not maximized" (BLM 2016, 2).

The Obama administration also noted large benefits from reducing emissions of methane and volatile organic compounds (VOCs). Natural gas is mainly made up of methane, a powerful greenhouse gas with a global warming potential 34 times that of carbon dioxide (CO_2). In addition, a small fraction of

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flared and vented gas consists of conventional air pollutants (such as VOCs and other hazardous air pollutants) that contribute to localized air pollution and related health issues. Reducing the amount of natural gas vented or flared during oil and gas production prevents this pollution.

The Trump administration, however, argues that enforcing the 2016 rule would exceed BLM's authority and would impose burdensome costs. It furthermore argues that the rule overlaps with state and EPA regulations, and that the rule would constrain energy development.

4.2. Regulatory History and Current Status

In February 2018, BLM published a proposed rule to rescind most of the requirements of the Obama administration's 2016 rule. This move follows multiple actions taken by the Trump administration to delay and postpone a number of requirements, as well as a failed attempt by Congress to repeal the rule under the Congressional Review Act. Most significantly, in December 2017, BLM published a final rule delaying compliance dates for many of the rule's requirements until 2019.[23] However, a court found that BLM failed to justify its decision to delay the 2016 rule and ordered that the agency enforce the rule.[24] The decision has created much uncertainty regarding compliance and enforcement as companies await the finalization of the 2018 proposed repeal, an issue which complicates our analysis. (We discuss this further in Section 5.2. Corrections to Generate a Baseline.)

These actions were part of the US Department of the Interior's (DOI's) efforts to comply with President Trump's energy independence executive order, which requires suspending, revising, or rescinding regulations that are a "burden" to energy producers and names BLM's 2016 methane waste prevention rule specifically.[25] In a court case challenging the initial implementation of the 2016 rule, the US District Court of Wyoming denied a request by industry groups and some states to block the 2016 rule before it was scheduled to go into effect in January 2017.[26] At issue in this ongoing litigation is whether the rule can be "independently justified as waste prevention measures," as BLM can promulgate rules that have ancillary benefits (including air quality improvements) as long as the intended or primary purpose of the rule is waste prevention. [27] The court's decision to deny the above request reads: "The rub here, however, is whether the Rule, or at least certain provisions

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[23] BLM. 2017. Final Rule: Waste Prevention, Production Subject to Royalties, and Resource Conservation; Delay and Suspension of Certain Requirements. *Federal Register* 82(235): 58050, December 8. https://www.gpo.gov/fdsys/pkg/FR-2017-12-08/pdf/2017-26389.pdf.

[24] See *State of California et al. v. Bureau of Land Managament et al.* (17-cv-07186-WHO) and *Sierra Club et al. v. Ryan Zinke et al.* (17-cv-07187-WHO). https://www.eenews.net/assets/2018/02/23/document_ew_04.pdf.

[25] Executive Office of the President. 2017. Executive Order 13783: Promoting Energy Independence and Economic Growth. *Federal Register* 82(61): 16093, March 28. https://www.federalregister.gov/documents/2017/03/31/2017-06576/promoting-energy-independence-and-economic-growth.

[26] See *State of Wyoming et al. v. US Department of the Interior et al.* (2:16-cv-00285) and *Western Energy Alliance et al. v. Jewell et al.* (2:16-cv-00280) in the US District Court of Wyoming. https://www.gpo.gov/fdsys/pkg/USCOURTS-wyd-2_16-cv-00280/pdf/USCOURTS-wyd-2_16-cv-00280-0.pdf.

[27] See *State of Wyoming et al. v. US Department of the Interior et al.* (2:16-cv-00285) and *Western Energy Alliance et al. v. Jewell et al.* (2:16-cv-00280) in the US District Court of Wyoming, 19.

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of the Rule, was promulgated *for the prevention of waste* or instead for the *protection of air quality*." [28] The latter charge (air quality protection) is under EPA's jurisdiction. As discussed further below, the majority of the rule's monetized benefits are from preventing climate change. The benefits from increases in federal royalties (the focus of this regulation), however, are not counted in the RIAs, as such actions are considered transfer payments and are not counted in cost-benefit analyses more broadly.[29]

4.3. Rule Summary

The rule, as written when it was finalized in November 2016, focuses on reducing venting and flaring of natural gas through a number of measures. Under this rule, operators are required to do the following:

- Flare gas—i.e., burn it and convert it into CO_2—rather than vent it, releasing it into the atmosphere, except in a few situations (referred to as "Flare Measurement" in the RIA).
- Avoid "wasteful" flaring of gas, requiring the capture of this gas for use or sale, with capture targets increasing from 85 percent of total gas production each month in 2017 to 98 percent in 2026 (referred to as "Capture Target" in the RIA). Operators are also allowed to "exempt" a certain amount of production at each well, which decreases over time.
- Implement LDAR programs with semiannual inspections using specified equipment.
- Replace high-bleed pneumatic controllers with lower-emitting controllers.
- Replace certain pneumatic pumps with zero emissions pump or route gas to capture, with some exceptions.
- Capture, flare, use, or reinject gas produced during well drilling and well completions (referred to as "Well Drillings, Completions, and Maintenance" in the RIA).
- Capture or combust emissions from storage vessels with the potential to emit 6 tons per year (tpy) of VOCs or more (referred to as "Storage Tanks" in this analysis).
- Minimize gas vented to unload liquids while optimizing plunger lifts or automated well control systems to minimize gas losses for wells with those systems, assessing methods for liquids unloading aside from manual well purging, and complying with procedures and documentation for venting during manual well purging if necessary (referred to as "Liquids Unloading" in the RIA).

The rule also limits the amount of gas that may be vented (emitted) without royalties during well testing and defines when emitted or lost oil and gas may be subject to royalties, with the following distinction: unavoidably lost oil and gas is royalty-free, whereas avoidably lost oil and gas is not. The rule aligns with EPA's methane rule (by applying similar regulations to existing sources of methane on federal lands while EPA's rule covers all new sources) and allows for differing regulations under states and tribes if those regulations perform at least as well as BLM's regulations. In this analysis, we focus on the net benefits of the rule as a whole. The net benefits of each of these requirements (by year) as

[28] Ibid., 15.

[29] The intuition behind not including a transfer payment in a cost-benefit analysis is that such payments do not add or subtract from overall social welfare; they just affect its distribution. For example, a royalty payment costs industry *X* amount and benefits government *X* amount, canceling its net impact.

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estimated in our baseline scenario are presented in Appendix B.

The 2018 proposed rule would effectively repeal all of these provisions and largely return to the previous royalty framework.[30] Some of the liquids unloading requirements (those that BLM says would not place additional costs on producers) would be maintained under the 2018 proposed repeal. The measuring and reporting requirements would likewise be maintained with modifications so that producers would not incur additional costs.

5. Analysis

Here we describe our adjustments to the original RIA in order to generate a baseline as well as a number of scenarios and sensitivity analyses. All of these results are provided as total costs, total benefits, and total net benefits over a 10-year period, in net present value at a 3 percent discount rate in 2012$. Results using a 7 percent discount rate are presented in Appendix A. We followed BLM's methodology and use a 10-year period for analysis.

5.1. Replication

In all, we were able to replicate BLM's results for its 2016 RIA, though we report slightly larger benefits estimates (see Table 3). These differences likely result from rounding or slight methodological differences. The benefits differ by only 1 percent, with net benefits differing by 2 percent to 3 percent as a result.

Though not displayed in Table 3, it is important to note that our attempts to replicate the 2018 RIA were less successful (see Table 1 in the executive summary). The 2018 RIA is less transparent—it states that it uses the same assumptions as the 2016 RIA, but because it did not provide the costs and benefits of each provision by year, we were unable to check why the total costs and benefits over the 10-year period do not match.[31]

5.2. Corrections to Generate a Baseline

We make two primary corrections in order to generate the baseline: updating natural gas prices and using a more precise social cost of methane.

Natural Gas Prices. First, we update natural gas prices to those reported in EIA's *Annual Energy Outlook* (AEO) 2017 from the numbers used in AEO 2016. The updated prices provide slightly smaller estimates of the total net benefits, as the more recent estimates project lower gas prices throughout the 10-year period analyzed (EIA 2017). These prices were published in 2016$, so we discount their value to 2012$ to match the dollar year used in our analysis.

We then calculate the cost savings to operators from capturing gas using the same method as BLM: by discounting the gas prices for processing and transportation costs (the value of recovered gas is 75 percent of the market price. See Appendix C for details on the natural gas prices used in this analysis.) Like BLM in its 2016 analysis, we maintained cost savings on the benefits side of the equation (i.e., we add cost savings to the benefits estimates, as opposed to subtracting from costs).

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[30] BLM. 1980. Notice to Lessees and Operators of Onshore Federal and Indian Oil and Gas Leases (NTL-4A). https://www.blm.gov/sites/blm.gov/files/energy_noticetolessee4a.pdf.

[31] Our domestic SC-CH_4 scenario (which replicates the 2018 RIA) estimated costs that were lower by 6–8%, benefits lower by 4%, and net benefits lower by 9–14% compared with the estimates reported in the 2018 RIA. The difference in cost estimates mostly results from the 2018 RIA reporting much larger costs for the gas capture requirements, even adjusting compliance dates. The source of the difference in benefits estimates is less clear. Discounting at the beginning of the year instead of end of the year does not account for the entirety of these discrepancies, and we made sue to account for changes in dollar-year.

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TABLE 3. GENERATING A BASELINE, NET PRESENT VALUE AT 3% DISCOUNT RATE (MILLION 2012$)

KEEPING RULE						
	High-Cost Scenario			Low-Cost Scenario		
	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Obama Administration 2016 RIA	1,780	2,669	889	1,464	2,678	1,214
Replication	1,781	2,702	921	1,466	2,702	1,237
% difference[*]	*0%*	*1%*	*3%*	*0%*	*1%*	*2%*
Updated gas prices in 2012$	1,781	2,613	831	1,466	2,613	1,147
% difference[†]	*0%*	*-3%*	*-10%*	*0%*	*-3%*	*-7%*
More precise SC-CH_4, SCC	1,781	2,692	910	1,466	2,692	1,226
% difference[†]	*0%*	*0%*	*-1%*	*0%*	*0%*	*-1%*
Delay in Compliance[‡]	1,761	2,718	957	1,454	2,718	1,263
% difference[†]	*0%*	*3%*	*8%*	*1%*	*3%*	*5%*
Baseline [§]	**1,901**	**2,712**	**812**	**1,535**	**2,712**	**1,177**
% difference[†]	*8%*	*3%*	*-8%*	*7%*	*3%*	*-2%*
REPEALING RULE						
	Costs Avoided	Benefits Forgone	Net Benefits of Repeal	Costs Avoided	Benefits Forgone	Net Benefits of Repeal
Repeal baseline[‖]	**1,898**	**2,712**	**(814)**	**1,532**	**2,712**	**(1,180)**
% difference[†]	*8%*	*3%*	*-192%*	*7%*	*3%*	*-198%*

[*]Percentage difference from original
[†]Percentage difference from replication
[‡]Here, we use the assumptions used in the 2018 BLM RIA: first, that compliance will not occur until 2019 (with discounting relative to 2018), and second that the administrative burdens were more than double those estimated in the 2016 RIA.
[§]Baseline combines AEO 2017 natural gas prices and more precise SC-CH_4 and SCC
Repeal Baseline first flips the sign of the net benefits (per equation below) and then subtracts $3 million from the costs avoided, as the 2018 BLM rule rescinding the 2016 rule maintains $3 million in costs over the next 10 years.

Social Cost of Methane. BLM rounded its SC-CH_4 figures slightly in 2016 and also used values that adjust every two to three years (an average in between the five-year estimates reported by the Interagency Working Group on the Social Cost of Greenhouse Gases [IWG 2016a] instead of using values that adjust each year). We correct these figures so that they adjust on a yearly basis, as opposed to every two to three years, as shown in Appendix C. The Trump administration likewise used an SC-CH_4 that varied each year

State Regulations. To account for existing state regulations, BLM subtracted the share of affected operations in states already regulating methane. The agency subtracted only the share of wells on federal lands where the jurisdiction has requirements in place that are at least as strict as BLM's.[32] Although BLM was aware of regulations in Alaska, Colorado, Montana, North Dakota, Utah, and Wyoming, the rule was published prior to the publication of California's and Ohio's final methane rules. Making adjustments for these states is beyond the scope

[32] Flare measurement requirements: removed North Dakota, as operations are already equipped to measure the gas-to-oil ratio. Pneumatic pumps: reduced the share of covered pumps in Wyoming's Upper Green River Basin (UGRB). LDAR: removed operations covered in Wyoming's UGRB and Colorado. Pneumatic controllers: removed controllers required in Wyoming's UGRB and Colorado. Storage tanks: BLM used EPA's methane rule estimates.

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of this project but would reduce both costs and benefits of the federal rule, and is an issue that should be considered when BLM finalizes the 2018 RIA.

Compliance. The Trump administration's efforts to delay and repeal the 2016 rule have created significant regulatory uncertainty, making compliance and enforcement requirements murky in some cases. Prior to the Trump administration's efforts to roll back this rule, companies may have begun to comply with the 2016 requirements. Currently at issue is the Trump administration's 2017 rule delaying the compliance dates for the 2016 rule. BLM has been ordered to enforce the 2016 rule despite publishing its 2018 proposed rule to repeal the regulation, meaning companies may be required to comply with the regulation for just a few months. To the extent that companies have complied with certain provisions of the 2016 rule to date, the baseline costs and benefits will be lower with any sunk costs. The cost savings and benefits forgone if the rule is repealed will likewise be lower.

Due to data limitations, we were unable to assess how compliance may have affected the baseline costs and benefits of the rule. When finalizing the RIA for the 2018 repeal, BLM should assess the extent to which companies have complied and should adjust the baseline accordingly. In the 2018 RIA, BLM assumed in its baseline for keeping the rule that compliance would not begin until 2019. This assumption may no longer hold given the February court decision striking down the delay.[33] In our analysis, we maintained the 2019 compliance date given the lack of clarity regarding enforcement and the fact that this court decision may be appealed.

Our baseline figures show greater costs compared with the analysis used for the original rule. This change largely results from the compliance date change for the gas capture requirement—the original rule required compliance beginning in the second year of implementing the rule, but the Trump administration's delay would have the requirement begin at the same time as the others, effectively adding one year of additional costs for the RIA. The cost estimates are also higher because we included larger estimates for administrative burdens, which were revised upward in the 2018 RIA. The benefits are slightly larger because benefits related to the gas capture provision begin to accrue earlier under these assumptions about the compliance date as well. It is important to note that our estimated compliance costs are $100 million lower than those in the 2018 RIA, which we discuss further in Section 5.1.

Table 3 shows that our baseline has net benefits that are about $40 million to $70 million lower than the original RIA. In the end, the total net benefits of the rule are still large—between $812 million and $1.2 billion.

We then use the results for keeping the rule to calculate our baseline for repealing the rule (see Table 3). We do so by flipping the sign of the net benefits (or costs) of repeal, as can be seen in the equation discussed in Section 3 (Methods). Instead of subtracting $1.9 billion in costs from $2.7 billion in benefits to calculate $812 million in net benefits when implementing the rule, we do the opposite and subtract $2.7 billion in benefits forgone from $1.9 billion in cost savings to get *net costs* of repealing the rule of $814 million (i.e., negative net benefits totaling $814 million; see Table 3). As depicted in Table 3, the costs avoided differ slightly, as the 2018 rule maintains a few administrative burdens from the 2016 rule (totaling $3 million over 10 years), so those costs are not considered "avoided." So, the costs and net benefits of repeal in the repeal baseline case differ from

[33] *State of California et al. v. Bureau of Land Management et al.* and *Sierra Club et al. v. Zinke.* https://www.eenews.net/assets/2018/02/23/document_ew_04.pdf.

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the costs and net benefits in the baseline scenario by $3 million. The benefits, though, have the same value as the benefits forgone in Table 3.

5.3. Cost Adjustment Scenarios

As stated earlier, industry bears the costs of the rule. These include onetime costs (such as purchasing new equipment), recurring operational costs, and administrative costs. Furthermore, there are very small costs associated with additional CO_2 produced when methane is captured and burned at another location. In general, industry believes that BLM's estimated costs are too low, whereas environmental and research groups generally do not agree. We use LDAR costs from API, a trade association representing the oil and gas industry, and Carbon Limits, a research group. The costs from API are far higher than BLM's, whereas the costs from Carbon Limits are far lower, though a number of reports from other research groups likewise support lower LDAR estimates (as described in the 2016 RIA). We also use slightly lower costs for liquids unloading from ICF International, a consulting firm. In all three scenarios, the cost adjustments relate to cost estimate assumptions and therefore do not affect the benefits of the rule.

API LDAR Costs. When including cost estimates from industry, repealing the rule provides net benefits in most cases. Based on the results of an API survey of producers, LDAR costs were reported to be much larger than BLM's estimates (the former being $5,436 and the latter being $2,265 annualized at 3 percent).[34, 35] As can be seen in Table 4, API's LDAR cost estimates increase the avoided costs when repealing the rule by 57 to 69 percent. In the high-cost scenario, the net benefits of eliminating the rule are $149 million; in the low-cost scenario, the net costs of eliminating the rule are $216 million.

TABLE 4. RESULTS OF COSTS ADJUSTMENTS, NET PRESENT VALUE AT 3% DISCOUNT RATE (MILLION 2012$)

	REPEALING RULE					
	High-Cost Scenario			Low-Cost Scenario		
	Costs Avoided	Benefits Forgone	Net Benefits of Repeal	Costs Avoided	Benefits Forgone	Net Benefits of Repeal
Repeal baseline	**1,898**	**2,712**	**(814)**	**1,532**	**2,712**	**(1,180)**
API LDAR	2,861	2,712	149	2,496	2,712	(216)
*% difference**	*51%*	*0%*	*118%*	*63%*	*0%*	*82%*
Carbon Limits LDAR costs	1,365	2,712	(1,347)	1,000	2,712	(1,712)
*% difference**	*-28%*	*0%*	*-65%*	*-35%*	*0%*	*-45%*
ICF Liquids unloading costs	1,886	2,712	(826)	1,521	2,712	(1,191)
*% difference**	*-1%*	*0%*	*-1%*	*-1%*	*0%*	*-1%*

*Percentage difference from baseline.

[34] API's analysis in Attachment A of its comments to BLM reports capital costs and recurring costs for in-house and outsourced LDAR programs (2016). We choose the more expensive in-house figures for the sensitivity analysis and annualize those figures at 3% and 7% for 10 years of costs.

[35] API (2016) also argued that the costs of BLM's flaring measurement requirements were underestimated. However, we did not include these figures, as API did not provide an adequate explanation for its estimates, and it appears BLM made some adjustments to the requirement and analysis after the proposed rule.

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Carbon Limits LDAR Costs. Carbon Limits conducted its own survey of almost 4,300 oil and gas facilities in the United States and Canada and assessed emissions rates, repair costs, and repair lifetimes for almost 60,000 components (Carbon Limits 2014). This analysis reports net present value costs using a 7 percent discount rate for both the monitoring program and repairs for well site and batteries in terms of US$ per ton of carbon dioxide equivalent (CO_2e). We found the annualized cost of LDAR to be around $513.[36] While this figure is significantly smaller than the figures from both BLM and API, a number of companies that provide LDAR services commented on the proposed rule and submitted cost figures that were lower than those of Carbon Limits. This change increases the net costs of repealing the rule by 50 to 70 percent. Eliminating the rule results in net costs of $1.3 billion to $1.7 billion over 10 years.

ICF International Liquids Unloading Costs. ICF International's estimates of liquids unloading costs are only slightly smaller than BLM's, the former being $2,345 and the latter being $3,150 (annualized at 3 percent) (ICF International 2014). The overall effect of this change is minimal, with net costs from repealing the rule just 1 percent larger.

5.4. Benefits Adjustment Scenarios

We conducted two sensitivity analyses to assess the degree to which differing SC-CH_4 estimates affect the benefits forgone when repealing the rule. First, we use the Trump administration's interim domestic SC-CH_4 and SCC estimates to create a scenario comparable to the 2018 RIA analysis. The Trump administration produced preliminary estimates of the domestic SCC and SC-CH_4 (quantifying the impacts to the United States only) for the RIAs for the review of the Clean Power Plan, the proposed rulemaking delaying and later repealing BLM's 2016 methane rule, and the proposed rulemaking to delay EPA's methane rule.[37, 38, 39] The resulting figures are 4 percent to 14 percent of the Obama administration's global SC-CH_4 and 2 percent to 13 percent of the Obama administration's global SCC.

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[36] We contacted Carbon Limits to obtain the costs without cost savings from gas sales and learned that the costs of LDAR programs for well sites and well batteries were $9 per ton of CO_2e reduced. We multiply that value times BLM's estimates for methane reduced (in terms of CO_2e) from the LDAR program to determine the estimated cost for each year of the program. The Carbon Limits (2014) report does not state the dollar year of these figures, so we assume they were in 2014$ and use the implicit price deflator to convert them to 2012$. The result has room for error in that the report may assume different levels of emissions reductions from a well site than BLM's RIA, and the types of LDAR programs it assesses may differ from those required by BLM. Furthermore, we do not have the values for a 3% discount rate and use the 7% discount rate values for both columns (though alone, that decision creates a small difference unlikely to affect the overall results of the analysis).

[37] EPA (US Environmetnal Protection Agency). 2017. "Regulatory Impact Analysis for the Review of the Clean Power Plan: Proposal." https://www.epa.gov/sites/production/files/2017-10/documents/ria_proposed-cpp-repeal_2017-10.pdf;

[38] BLM (US Bureau of Land Management). 2017. "Regulatory Impact Analysis for Proposed Rule to Suspend or Delay Certain Requirements of the 2016 Waste Prevention Rule." https://www.regulations.gov/document?D=BLM-2017-0002-0002.

[39] EPA (US Environmental Protection Agency). 2017. "Estimated Cost Savings and Forgone Benefits Associated with the Proposed Rule, 'Oil and Natural Gas: Emission Standards for New, Reconstructed, and Modified Sources: Stay of Certain Requirements.'" October 17. https://www.epa.gov/sites/production/files/2017-11/documents/oilgas_memo_proposed-stay_2017-10.pdf.

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One notable aspect of the Trump administration's SCC and SC-CH_4 estimates is its use of a 7 percent discount rate. A 3 percent discount rate had previously been used to calculate the social cost of greenhouse gases, with sensitivity analyses of 2.5 percent and 5 percent discount rates, and the researchers who modeled these social costs do not employ discount rates as high as 7 percent (Cropper et al. 2017). A 7 percent discount rate, while in line with OMB's Circular A-4 guidance,[40] is thought by economists to be inappropriate for calculating the SC-CH_4 and SCC for several reasons (Cropper et al. 2017).[41] Industry endorses the 7 percent discount rate, and using it significantly lowers the social costs of methane and carbon. The Trump administration's SC-CH_4 falls from $164 per ton of methane at a 3 percent discount rate to $50 at a 7 percent discount in the year 2020. The Trump administration's SCC falls from $5 at a 3 percent discount rate to $1 at a 7 percent discount rate in the year 2020. (Appendix A details our results using a 7 percent discount rate).

We use the domestic SC-CH_4 as a sensitivity analysis, as opposed to a baseline, because we chose to align our analysis with the original RIA for the 2016 rule.[42] (Across the other reports in this series, we likewise align our baseline with the RIAs for the original rules). Furthermore, assessing scenarios that adjust costs (such as higher LDAR costs) or modification scenarios provides similar information regardless of the SC-CH_4 used: cost scenarios that lower costs for the global SC-CH_4 baseline case would also lower costs under the domestic SC-CH_4 scenario as well. We include a detailed discussion of the pros and cons of using a domestic SC-CH_4 in cost-benefit analyses in Appendix D.

Table 5 shows the results of these two sensitivity analyses. Using the Trump administration's domestic SCC and SC-CH_4 sharply reduces the forgone benefits of the rule. On one hand, repealing the rule in this scenario has large net benefits of $495 million to $860 million over the 10-year analysis period. On the other hand, using the higher SCC and SC-CH_4 estimates results in larger forgone benefits and significantly larger net costs of repealing the rule, of $1.4 billion to $1.7 billion. Certain provisions of the rule, however, maintain positive net benefits (and net costs of repeal), regardless of the SC-CH_4 used. Table 6 shows that in all scenarios using the domestic SC-CH_4, keeping the pneumatic controllers and liquids unloading requirements results in net benefits. And depending on the discount rate, the pneumatic pump requirement also results in net benefits. However, the Trump administration's proposed rule repeals these provisions in addition to the others listed in Table 6.

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[40] Circular A-4, https://obamawhitehouse.archives.gov/omb/circulars_a004_a-4/.

[41] As Cropper et al. (2017) argues, "From a purely practical standpoint, the models used to generate the SCC estimates report their output in terms of what are called 'consumption-equivalent' impacts, which is intended to reflect the effective impact on people's consumption. Standard economic practice is to discount consumption equivalents at the 'consumption rate of interest', which according to OMB's current guidance is a 3 percent discount rate. It is clearly inappropriate, therefore, to use such modeling results with OMB's 7 percent discount rate, which is intended to represent the historical before-tax return on private capital. None of the researchers whose model results were used employs a discount rate as high as 7 percent in their work. This is a case where unconsidered adherence to the letter of OMB's simplified discounting approach yields results that are inconsistent with and ungrounded from good economics."

[42] We did include the Trump administration's updated cost estimates for the administrative burdens, as BLM states it adjusted these estimates after review. We do not consider this change to vary substantially from the methdology of the original RIA and therefore chose to incorporate it.

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TABLE 5. RESULTS OF BENEFITS ADJUSTMENTS, NET PRESENT VALUE AT 3% DISCOUNT RATE (MILLION 2012$)

REPEALING RULE						
	High-Cost Scenario			Low-Cost Scenario		
	Costs Avoided	Benefits Forgone	Net Benefits of Repeal	Costs Avoided	Benefits Forgone	Net Benefits of Repeal
Repeal baseline	**1,898**	**2,712**	**(814)**	**1,532**	**2,712**	**(1,180)**
Domestic SC-CH_4 and SCC	1,898	1,037	860	1,532	1,037	495
*% difference**	*0%*	*-62%*	*206%*	*0%*	*-62%*	*142%*
Higher global SC-CH_4, SCC	1,898	3,270	(1,372)	1,532	3,270	(1,737)
*% difference**	*0%*	*21%*	*68%*	*0%*	*21%*	*47%*

*Percentage difference from baseline

TABLE 6. NET BENEFITS OF REQUIREMENTS, NET PRESENT VALUE WITH DOMESTIC SCC AND SC-CH_4 (MILLION 2012$)

KEEPING RULE				
	3% Discount		7% Discount	
Requirement	High-Cost Scenario	Low-Cost Scenario	High-Cost Scenario	Low-Cost Scenario
Capture target	(366)	(1)	(278)	(3)
Flare measurement	(38)	(38)	(34)	(34)
Pneumatic controllers	40	40	16	16
Pneumatic pumps	28	28	(2)	(2)
Liquids unloading	62	62	18	18
Storage tanks	(49)	(49)	(48)	(48)
LDAR	(426)	(426)	(409)	(409)
Administrative burden	(116)	(116)	(92)	(92)
Total	(863)	(498)	(829)	(553)

5.5. Rule Modification Scenarios

Because BLM's 2016 RIA estimated the costs and benefits of alternative regulatory options for some requirements, we can test how a less-stringent regulation might change the net benefits of keeping the rule (in Table 7, the results are listed as the net benefits of keeping the rule). Modifications of some rule requirements based on industry comments will reduce both the costs and the benefits, while modifications suggested by environmental groups will increases both the costs and the benefits. We compare potential modifications with our baseline for keeping the rule in Table 7, and develop five scenarios to assess these changes: [43]

Annual Frequency for LDAR Inspection. First, we reduce LDAR inspections from semiannual to annual. Industry had requested a lower inspection frequency in its comments to BLM (API 2016)—however, as the results below show, the benefits of semiannual inspections (compared to annual inspections) are quite large. Reducing the frequency decreases net benefits by about $73 million compared to the baseline.

Regulatory Threshold for Emissions from Storage Tanks Increased to 30 Tons per Year. Second, we increase the threshold of emissions from storage tanks to be regulated from 6 tpy of VOCs to 30 tpy—a less stringent measure meaning fewer storage tanks would be covered

[43] To keep the accounting straight, we are using "baseline" as our point of comparison when modifying the rule, as we would not expect the administration to modify and repeal the rule. The previous tables assessed the rule's repeal and used the "repeal baseline."

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TABLE 7. RESULTS OF RULE MODIFICATIONS, NET PRESENT VALUE AT 3% DISCOUNT RATE (MILLION 2012$)

	KEEPING RULE					
	High-Cost Scenario			Low-Cost Scenario		
	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Baseline	**1,901**	**2,712**	**812**	**1,535**	**2,712**	**1,177**
LDAR to annual inspection*	1,604	2,344	739	1,239	2,344	1,105
*% difference***	*-16%*	*-14%*	*-9%*	*-19%*	*-14%*	*-6%*
30 tpy storage†	1,860	2,701	841	1,494	2,701	1,206
*% difference***	*-2%*	*0%*	*4%*	*-3%*	*0%*	*3%*
No flaring requirement‡	945	2,163	1,218	945	2,163	1,218
*% difference***	*-50%*	*-20%*	*50%*	*-38%*	*-20%*	*4%*
All three above actions	613	1,783	1,170	613	1,783	1,170
*% difference***	*-68%*	*-34%*	*44%*	*-60%*	*-34%*	*-1%*
LDAR to quarterly inspection*	2,485	3,077	592	2,119	3,077	958
*% difference***	*31%*	*13%*	*-27%*	*38%*	*13%*	*-19%*

*From semiannual
**Percentage difference from baseline
†From 6 tpy VOC emissions as threshold for storage tank replacement
‡From including the flaring requirement as-is

by the rule. These cost estimates are reported in the 2016 BLM RIA. Though industry groups have supported such a measure, BLM estimates that this modification provides only a 2 percent reduction in costs and a small increase in net benefits of $29 million.

Flaring Requirement Removed. Third, we remove the flaring requirement by subtracting the costs and benefits of this requirement. Uncertainty in the costs of this requirement is what creates the high- and low-cost scenarios (i.e., the costs of this provision could be quite high—or they could be much smaller). Removing the flaring requirement under the high-cost scenario therefore results in significantly larger benefits than removing the requirement under the lower-cost scenario. The flaring requirement results in net costs on its own, so removing it would facilitate the greatest increase in net benefits (particularly in the high-cost scenario).

Based on BLM's estimates, removing the flaring requirement reduces costs by roughly $590 million to $956 million (38 percent to 50 percent) and reduces benefits by $549 million (20 percent). The result is an increase in the rule's net benefits of 4 percent to 50 percent. According to API's 2016 cost-benefit analysis, removing the flaring requirement (which in its analysis has a net cost of $302 million each year) likewise gives the rule positive net benefits. Although we do not know the technical aspects of this requirement and can only comment on its costs and benefits, this requirement appears to be economically inefficient, indicating that its removal would be a net benefit.

All of the Above. In this scenario, we combine all three of the above changes: annual LDAR inspections, 30 tpy storage, and no flaring requirement. This scenario actually provides lower net benefits than simply removing the flaring requirement in the high-cost scenario, as the other changes can lower net benefits (as discussed earlier).

Quarterly LDAR Inspection Frequency. Finally, we assess the value, using BLM's cost assumptions, of more frequent LDAR inspections, which have been suggested by some environmental groups. Some groups argue that quarterly LDAR inspections are less costly than BLM assumes. We use BLM's cost

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estimates here. The results in Table 7 show that such a requirement would increase costs more than benefits, resulting in net benefits of $592 million to $958 million, figures lower than the net benefits in the baseline.

6. Discussion

6.1. Public Comments

As noted above, BLM adjusted the final 2016 rule in response to comments in a number of ways, often because of new information, such as technical and safety requirements of some of the regulated equipment and processes. BLM clarified when certain methane emissions are allowed and expanded certain flaring exemptions. The agency also extended the phase-in time for its routine flaring requirements and lowered the final capture target (to 98 percent instead of 100 percent) in response to comments. Furthermore, the final rule allowed operators to average gas capture rates over a county or state to make compliance more flexible. The final rule also made a number of other changes not listed here, most of which seek to make meeting the requirements more feasible (e.g., exemptions, clarifications, greater compliance flexibility, and alignment with state and EPA regulations).

However, BLM maintained some of the requirements of the proposed rule when industry favored certain changes. The agency, for example, did not remove requirements for marginal wells (those producing 15 barrels of oil equivalent or less per day), because the available data did not support the exemption and because 85 percent of the wells on BLM lands would classify as marginal.

6.2. Non-monetary Impacts

The 2016 rule, if enforced, would have a number of impacts that are difficult to monetize and therefore are not reflected in these cost-benefit analyses. First, the rule will greatly reduce emissions of volatile organic compounds (VOCs) emissions. Addressing methane leaks will invariably capture a large amount of VOCs. VOCs contribute to air pollution that affects human health and degrades the environment (e.g., ambient ozone and fine, inhalable particulate matter concentrations). Some VOCs are likewise known or suspected carcinogens.

There are no comprehensive estimates for the monetary benefit of reducing emissions of VOCs. Though EPA has published such estimates for $PM_{2.5}$ effects alone, using its BenMAP model and applying a national benefits estimate of $2,800 per ton, these estimates assume that exposed populations are denser, on average, than populations living near oil and gas development activities, which are primarily rural. Nevertheless, $PM_{2.5}$ plumes can extend hundreds of miles, potentially affecting populations in urban areas. Estimating the costs and benefits of these changes in VOCs is therefore incredibly difficult with a rule that reduces VOC emissions across a broad and largely rural area. For illustrative purposes, one might multiply the total number of VOC emissions estimated to be reduced by implementing BLM's 2016 rule (2.59 million tons) by the $2,800 per ton estimate to see potential benefits of $7.2 billion over 10 years. The non-monetized forgone benefits from repealing the 2016 rule could therefore be quite large (or at least close enough to the potential cost savings that repealing the rule may not result in net benefits).

Second, BLM notes the potential for a slight decrease in drilling on federal lands, as the 2016 rule includes two requirements addressing new liquids unloading and new oil wells flaring not covered by EPA's methane rule. Though BLM does not believe new drilling would shift away from federal and American Indian lands, there is a concern that the rule could "discourage developmental wells in regions lacking any means for capturing and transporting gas to market" (BLM 2016, 121).

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The agency also notes that increased costs could affect marginal wells but mentions that these wells "are highly unlikely" to have emissions or flaring large enough to require control (2016, 123).

Third, in terms of employment, BLM believes "the rule would not alter the investment or employment decisions of firms or significantly or adversely impact employment" (2016, 119). We could not find mention of the potential for job losses in API's comment. However, API also stated that a "significant number" of wells were at risk of shut-in, meaning operators would choose not to produce at wells that are capable of producing due to costs (API 2016, A-6). A number of trade associations dispute BLM's assessment and say the rule could result in the loss of 1,780 direct jobs in oil and gas companies in western states (IPAA et al. 2016).

Fourth, the 2016 RIA also notes that the rule might cause a slight increase in natural gas production (of 0.03 to 0.15 percent of total US production) and a slight decrease in crude oil production (of up to 0.07 percent of total US production), but BLM does not believe such a change would affect prices, supply, or distribution. Some of the oil and gas that would have been produced by a certain date may be deferred to a later date to meet flaring requirements, though these production changes are more uncertain. API notes that deferring production may impose large costs on producers (2016).

Finally, BLM, in its 2016 RIA, expected increased royalties of $3 million to $10 million per year as a result of the rule, as it would increase natural gas production (because the gas would be captured rather than emitted as methane). This impact is not included in the benefit-cost analysis above, as royalties are considered transfer payments (an issue discussed earlier). The operators pay these fees to the government, so the costs equal the benefits from society's perspective. It is important to note, however, that this cost is borne by industry, and while it is not part of the cost-benefit analysis, it is an important factor in the rule's impacts on producers.

7. Conclusion

The Trump administration has made its case in favor of repealing BLM's 2016 methane rule in large part because it has argued that keeping the rule would result in large net costs to society. The cost-benefit analysis presented here shows that enforcing the 2016 rule provides significant net benefits when using a global estimate for SC-CH_4, though it provides significant net costs when using a domestic estimate for SC-CH_4. In its RIA accompanying the 2018 proposed repeal, the Trump administration focused solely on the domestic SC-CH_4, thereby arguing that repealing the rule results in net benefits.

Because of issues with the Trump administration's interim domestic social cost figures (outlined in the body of this document and in Appendix D), we believe BLM should at least include both the peer-reviewed global estimate produced by the IWG (2016a, 2016b) and the interim domestic figure to provide a range of estimates in the RIA. That range could inform readers and decisionmakers of a possible range of climate impacts to the United States as a result of repealing the rule. Furthermore, other considerations beyond the 10-year net benefits of the rule should be taken into account. For example, certain provisions remain cost-effective regardless of the SC-CH_4 used, and non-monetized benefits from reductions of VOC emissions have the potential to be very large.

Our analysis shows that repealing the 2016 BLM methane rule could result in large net costs or large net benefits. We summed up our main takeaway as follows in a brief article

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published shortly ahead of this report:[44] In deciding whether the rule should be repealed, the Trump administration should take into account that its goal of reducing regulatory burdens has the potential to result in large net costs to society. Even if the administration believes that large net costs are unlikely, it should explicitly consider whether its goal—reducing compliance burdens for industry—warrants even the possibility of these large net costs.

[44] Krupnick, Alan J., and Isabel Echarte. 2018. "Does Repealing BLM's 2016 Methane Rule Pass a Cost–Benefit Test?" *Resources* 197 (Spring). Washington, DC: Resources for the Future. http://www.rff.org/research/publications/does-repealing-blm-s-2016-methane-rule-pass-cost-benefit-test

ED_002246_00000117-00024

References

API (American Petroleum Institute). 2016. "Re: Bureau of Land Management's 'Waste Prevention, Production Subject to Royalties, and Resource Conservation' Proposed Rule at 81 FR 6616 (February 8, 2016)." https://www.regulations.gov/document?D=BLM-2016-0001-9073.

BLM (US Bureau of Land Management). 2016. "Regulatory Impact Analysis for: Revisions to 43 CF 3100 (Onshore Oil and Gas Leasing) and 43 CFR 3600 (Onshore Oil and Gas Operations), Additions of 43 CFR 3178 (Royalty-Free Use of Lease Production) and 43 CFR 3179 (Waste Prevention and Resource Conservation)." https://www.blm.gov/download/file/fid/6588

Carbon Limits. 2014. "Quantifying cost-effectiveness of systematic leak detection and repair programs using infrared cameras." CL report CL-13-27. http://www.carbonlimits.no/wp-content/uploads/2015/06/Carbon_Limits_LDAR.pdf.

CEA (Council of Economic Advisers). 2017. "Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate." https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf.

Council of Economic Advisers (CEA). 2017. Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate. https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf.

Cropper, Maureen, Robert Kopp, Richard Newell, William A. Pizer, Kevin Rennert, Casey Wichman. 2017. "Comments on 'Waste Prevention, Production Subject to Royalties, and Resource Conservation; Delay and Suspension of Certain Requirements.'" https://www.regulations.gov/document?D=BLM-2017-0002-17257.

EIA (US Energy Information Administration). 2017. "Annual Energy Outlook 2017." https://www.eia.gov/outlooks/aeo/.

EPA (US Environmental Protection Agency). 2017. "EPA Takes Another Step to Advance President Trump's America First Strategy, Proposes Repeal of 'Clean Power Plan.'" October 10. News Release. https://www.epa.gov/newsreleases/epa-takes-another-step-advance-president-trumps-america-first-strategy-proposes-repeal.

Fraas, Art, Randall Lutter, Susan Dudley, Ted Gayer, John Graham, Jason F. Shogren, and W. Kip Viscusi. 2016. "Social cost of carbon: Domestic duty." *Science* 351(6273): 569-569. DOI: 10.1126/science.351.6273.569-b.

GAO (US Government Accountability Office). 2010. "Federal Oil and Gas Leases: Opportunities Exist to Capture Vented and Flared Natural Gas, Which Would Increase Royalty Payments and Reduce Greenhouse Gases." GAO-11-34. October. http://www.gao.gov/new.items/d1134.pdf.

Gayer, T. and W. K. Viscusi. 2014. "Determining the proper scope of climate change benefits" (Brookings Institution, Washington, DC. https://www.brookings.edu/wp-content/uploads/2016/06/04_determining_proper_scope_climate_change_benefits.pdf.

ICF International. 2014. "Economic Analysis of Methane Emissions Reduction Opportunities in the US Onshore Oil and

ED_002246_00000117-00025

Natural Gas Industries." https://www.edf.org/sites/default/files/methane_cost_curve_report.pdf.

Independent Petroleum Association of American (IPAA), the Western Energy Alliance, the American Exploration and Production Council, and the US Oil and Gas Association. 2016. "Re: RIN 1004-AE14: Waste Prevention, Production Subject to Royalties, and Resource Conservation, Proposed Rule Published in the Federal Register on February 8, 2016 (81 Fed. Reg. 6616)." https://www.regulations.gov/document?D=BLM-2016-0001-8313.

IWG (US Government Interagency Working Group on Social Cost of Greenhouse Gases). 2010. "Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866." https://www.epa.gov/sites/production/files/2016-12/documents/scc_tsd_2010.pdf.

———. 2016a. "Addendum to Technical Support Document on Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866: Application of the Methodology to Estimate the Social Cost of Methane and Social Cost of Nitrous Oxide." https://www.epa.gov/sites/production/files/2016-12/documents/addendum_to_sc-ghg_tsd_august_2016.pdf.

———. 2016b. "Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis—under Executive Order 12866." https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf.

King, Pamela. 2017. "Interior to Rewrite BLM Rule." *EnergyWire*. June 21. https://www.eenews.net/stories/1060056315.

Krupnick., Alan J., and Amelia Keyes. 2017. "Hazy Treatment of Health Benefits: The Case of the Clean Power Plan." Resources for the Future Blog Post. http://www.rff.org/blog/2017/hazy-treatment-health-benefits-case-clean-power-plan.

Moore, Frances C., Uris Baldos, Thomas Hertel, and Delavane Diaz. 2017. "New Science of Climate Change Impacts on Agriculture Implies Higher Social Cost of Carbon." *Nature Communications* 8 (1): 1607. https://doi.org/10.1038/s41467-017-01792-x.

Newell, Richard. 2017. "Unpacking the Administration's Revised Social Cost of Carbon." *Common Resources* (blog). Resources for the Future. http://www.rff.org/blog/2017/unpacking-administration-s-revised-social-cost-carbon.

US District Court of Wyoming. 2017. "Order on Motions for Preliminary Injunction." *State of Wyoming et al. v. US Department of the Interior et al.* Case 2:16-cv-00280-SWS. January 16. https://www.gpo.gov/fdsys/pkg/USCOURTS-wyd-2_16-cv-00280/pdf/USCOURTS-wyd-2_16-cv-00280-0.pdf.

US Office of Management and Budget (OMB). 2003. "Circular A-4." https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf.

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Appendix A. 7% Discount Rate Results

TABLE A-1. TOTAL 10-YEAR NET BENEFITS, NET PRESENT VALUE (MILLION 2012$)

	High-Cost Scenario			Low-Cost Scenario		
	KEEPING RULE					
	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Obama Administration 2016 RIA (Global SC-CH_4)	1,484	2,224	740	1,241	2,224	983
RFF Baseline (Global SC-CH_4)	1,498	2,111	613	1,222	2,111	889
Sensitivity Analysis (Domestic SC-CH_4)	1498	669	(829)	1222	669	(553)
Trump Administration 2018 RIA (Domestic SC-CH_4)	1598	695	(903)	1323	695	(628)
	REPEALING RULE					
	Costs Avoided	Benefits Forgone	Net Benefits of Repeal	Costs Avoided	Benefits Forgone	Net Benefits of Repeal
Obama Administration 2016 RIA (Global SC-CH_4)	1,484	2,224	(740)	1,241	2,224	(983)
RFF Baseline (Global SC-CH_4)	1495	2111	(615)	1219	2111	(891)
Sensitivity Analysis (Domestic SC-CH_4)	1496	669	827	1220	669	551
Trump Administration 2018 RIA (Domestic SC-CH_4)	1596	695	901	1321	695	626

TABLE A-2. GENERATING A BASELINE FOR REPEAL, NET PRESENT VALUE AT 7% DISCOUNT RATE (MILLION 2012$)

	KEEPING RULE					
	High-Cost Scenario			Low-Cost Scenario		
	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Original	1,484	2,224	740	1,241	2,224	983
Replication	1,427	2,123	696	1,184	2,123	939
% difference[*]	*-4%*	*-5%*	*-6%*	*-5%*	*-5%*	*-4%*
Updated gas prices in 2012$	1,427	2,056	629	1,184	2,056	872
% difference[†]	*0%*	*-3%*	*-10%*	*0%*	*-3%*	*-7%*
More precise SC-CH_4, SCC	1,427	2,112	685	1,184	2,112	928
% difference[†]	*0%*	*-1%*	*-2%*	*0%*	*-1%*	*-1%*
Delay in Compliance[‡]	1,381	2,109	729	1,153	2,109	956
% difference[†]	*-3%*	*-1%*	*5%*	*-3%*	*-1%*	*2%*
Baseline, keeping rule[§]	**1,498**	**2,111**	**613**	**1,222**	**2,111**	**889**
% difference[†]	*5%*	*-1%*	*-12%*	*3%*	*-1%*	*-5%*
	REPEALING RULE					
	Costs Avoided	Benefits Forgone	Net Benefits of Repeal	Costs Avoided	Benefits Forgone	Net Benefits of Repeal
Baseline, repealing rule[‖]	**1,495**	**2,111**	**(615)**	**1,219**	**2,111**	**(891)**
% difference[†]	*5%*	*-1%*	*-188%*	*3%*	*-1%*	*-195%*

[*]Percentage difference from original
[†]Percentage difference from replication
[‡]Here, we use the assumptions used in the 2018 BLM RIA: first, that compliance will not occur until 2019 (with discounting relative to 2018), and second that the administrative burdens were more than double those estimated in the 2016 RIA.
[§]Baseline combines AEO 2017 natural gas prices and more precise SC-CH_4 and SCC
Repeal Baseline first flips the sign of the net benefits (per equation below) and then subtracts $3 million from the costs avoided, as the 2018 BLM rule rescinding the 2016 rule maintains $3 million in costs over the next 10 years.

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TABLE A-3. RESULTS OF COSTS ADJUSTMENTS, NET PRESENT VALUE AT 7% DISCOUNT RATE (MILLION 2012$)

REPEALING RULE						
	High-Cost Scenario			Low-Cost Scenario		
	Costs Avoided	Benefits Forgone	Net Benefits of Repeal	Costs Avoided	Benefits Forgone	Net Benefits of Repeal
Repeal baseline	**1,495**	**2,111**	**(615)**	**1,219**	**2,111**	**(891)**
API LDAR costs	2,347	2,111	236	2,071	2,111	(40)
*% difference**	*57%*	*0%*	*138%*	*70%*	*0%*	*96%*
Carbon Limits LDAR costs	1,068	2,111	(1,043)	792	2,111	(1,319)
*% difference**	*-29%*	*0%*	*-69%*	*-35%*	*0%*	*-48%*
ICF liquids unloading costs	1,487	2,111	(623)	1,212	2,111	(899)
*% difference**	*-1%*	*0%*	*-1%*	*-1%*	*0%*	*-1%*

*Percentage difference from baseline

TABLE A-4. RESULTS OF BENEFITS ADJUSTMENTS, NET PRESENT VALUE AT 7% DISCOUNT RATE (MILLION 2012$)

REPEALING RULE						
	High-Cost Scenario			Low-Cost Scenario		
	Costs Avoided	Benefits Forgone	Net Benefits of Repeal	Costs Avoided	Benefits Forgone	Net Benefits of Repeal
Repeal baseline	**1,495**	**2,111**	**(615)**	**1,219**	**2,111**	**(891)**
Domestic SC-CH_4 and SCC	1,495	669	826	1,219	669	550
*% difference**	*0%*	*-68%*	*234%*	*0%*	*-68%*	*162%*
Higher SC-CH_4, SCC	1,495	3,270	(1,060)	1,219	3,270	(1,336)
% difference	*0%*	*55%*	*72%*	*0%*	*55%*	*50%*

*Percentage difference from baseline

TABLE A-5. RESULTS OF RULE MODIFICATIONS, NET PRESENT VALUE AT 7% DISCOUNT RATE (MILLION 2012$)

KEEPING RULE						
	High-Cost Scenario			Low-Cost Scenario		
	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Baseline	**1,498**	**2,111**	**613**	**1,222**	**2,111**	**889**
LDAR to annual inspection*	1,262	1,821	559	986	1,821	835
*% difference***	*-16%*	*-14%*	*-9%*	*-19%*	*-14%*	*-6%*
30 tpy storage†	1,461	2,102	641	1,185	2,102	917
*% difference***	*-2%*	*0%*	*5%*	*-3%*	*0%*	*3%*
No flaring requirement‡	770	1,698	928	770	1,698	928
*% difference***	*-49%*	*-20%*	*51%*	*-37%*	*-20%*	*4%*
All three above actions	503	1,399	896	503	1,399	896
*% difference***	*-66%*	*-34%*	*46%*	*-59%*	*-34%*	*1%*
LDAR to quarterly inspection*	1,961	2,397	436	1,685	2,397	712
*% change***	*31%*	*14%*	*-29%*	*38%*	*14%*	*-20%*

*From semiannual; **Percentage change from baseline; †From 6 tpy VOC emissions as threshold for storage tank replacement; ‡From including the flaring requirement as-is

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Appendix B. Baseline Costs and Benefits by Requirement

TABLE B-1. BASELINE COSTS AND BENEFITS OVER 10 YEARS BY REQUIREMENT AT 3% DISCOUNT RATE (MILLION 2012$)

	KEEPING RULE					
	High-Cost Scenario			Low-Cost Scenario		
Requirement	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Capture target	915	549	(366)	549	549	(1)
Flare measurement	38	0	(38)	38	0	(38)
Pneumatic controllers	13	222	210	13	222	210
Pneumatic pumps	30	310	281	30	310	281
Liquids unloading	44	447	403	44	447	403
Storage tanks	58	78	20	58	78	20
LDAR	688	1106	417	688	1106	417
Administrative burden	116	0	(116)	116	0	(116)
Total	1901	2712	812	1535	2712	1177

TABLE B-2. BASELINE COSTS AND BENEFITS OVER 10 YEARS BY REQUIREMENT AT 7% DISCOUNT RATE (MILLION 2012$)

	KEEPING RULE					
	High-Cost Scenario			Low-Cost Scenario		
Requirement	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Capture target	691	412	(278)	415	412	(3)
Flare measurement	34	0	(34)	34	0	(34)
Pneumatic controllers	12	174	163	12	174	163
Pneumatic pumps	29	244	215	29	244	215
Liquids unloading	38	349	311	38	349	311
Storage tanks	51	61	10	51	61	10
LDAR	550	869	318	550	869	318
Administrative burden	92	0	(92)	92	0	(92)
Total	1498	2111	613	1222	2111	889

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Appendix C. Parameters and Assumptions

Table C-1 displays the adjusted natural gas prices used in our analysis. In Tables C-2 and C-3, IWG refers to the estimates published in IWG (2016a, 2016b), which list figures for only every five years. The RFF figures are those we extrapolate to fill in the years between (in equal steps between each IWG estimate). The original RIA figures are those BLM used in 2016. The domestic figures are those published by the Trump administration in 2017. The IWG estimates will differ from those reported in the IWG document because those reports use 2007 as the dollar year, whereas we use 2012.

Table C-1. Adjusted Natural Gas Prices (2012$)

Year	Original RIA Values Using AEO 2016 ($/Mcf)	AEO 2017 Adjusted Value ($/Mcf)
2017	2.39	2.32
2018	2.80	2.48
2019	3.11	2.89
2020	3.43	3.30
2021	3.35	3.21
2022	3.37	3.11
2023	3.67	3.13
2024	3.87	3.22
2025	3.97	3.30
2026	3.86	3.39
2027	3.83	3.47
2028	3.87	3.55

Note: Values in both columns are 75 percent of AEO reported values to reflect amount recovered by operators.

Table C-2. Social Costs of Methane, Discount Rates in Parenthesis (2012$ per metric ton)

Year	IWG (3%)	Original RIA (3%)	RFF Global (3%)	RFF Global (2.5%)	Domestic (3%)	Domestic (7%)
2017		1,189	1,130	1,600	153	47
2018		1,189	1,186	1,643	159	49
2019		1,297	1,243	1,686	164	50
2020	1,300	1,297	1,300	1,730	170	52
2021		1,297	1,343	1,773	174	54
2022		1,405	1,385	1,816	178	57
2023		1,405	1,428	1,859	181	59
2024		1,513	1,470	1,902	185	62
2025	1,513	1,513	1,513	1,946	189	64
2026		1,513	1,556	1,989	195	67

Table C-3. Social Costs of Carbon, Discount Rate in Parenthesis (2012$ per metric ton)

Year	IWG (3%)	Original RIA (3%)	RFF Global (3%)	RFF Global (2.5%)	Domestic (3%)	Domestic (7%)
2017		42	42	63	5	1
2018		43	43	64	5	1
2019		44	44	66	5	1
2020	45	45	45	67	6	1
2021		45	46	68	6	1
2022		46	47	70	6	1
2023		48	48	71	6	1
2024		49	49	72	6	1
2025	50	50	50	74	7	1
2026		51	51	75	7	1

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Appendix D. Issues in Using a Domestic or Global Social Cost of Methane (SC-CH_4) and CO_2 (SCC)

Economists, policymakers, and others have been debating the appropriate metric for counting the benefits from reducing greenhouse gas emissions. These debates surround whether the global or domestic social costs of greenhouse gas reductions should be used in RIAs accompanying regulations, as well as how large those costs might be given uncertainties in measuring both global and domestic social costs. Whether one uses a global or domestic social cost is highly consequential as most of the damages from global warming will fall on more vulnerable, poorer nations. Some models even show the US benefitting, at least partly, from global warming, particularly in agriculture.

The argument for a domestic SCC and SC-CH_4 is that the use of global estimates may conflict with long-standing federal regulatory policy: Circular A-4 directs agencies to "focus on benefits and costs that accrue to citizens and residents of the United States. Where you choose to evaluate a regulation that is likely to have effects beyond the borders of the United States, these effects should be report separately" (OMB 2003, 15). Based on this policy, Fraas et al. (2016) argue that "A decision to issue a regulation with substantial domestic costs based on a finding that benefits to foreigners 'justify' such costs would be irregular at best" (569).

The main argument for using a global SCC and SC-CH_4 is that greenhouse gasses are global pollutants—damages occur in the US and abroad, and furthermore some impacts occurring abroad can affect the US through the global economy (Cropper et al. 2017). Cropper et al. 2017 note that using a domestic SCC would ignore 86 percent of the costs. Further, as Cropper et al. (2017) states, the choice to use a domestic figure while it "is consistent with a narrow application of prior regulatory analysis practice under OMB's Circular A-4, it is unnecessarily and unreasonably constrained for addressing inherently global pollutants such as greenhouse gases" (4). (There are other reasons for and against using domestic SCC and SC-CH_4 figures. Readers are encouraged to consult the congressional testimony of Ted Gayer[45] for arguments in favor of a domestic social cost, and Howard and Schwartz (2017)[46] for arguments in favor of a global social cost.)

A practical middle ground is to calculate benefits of regulations using each measure, without indicating a preference or weight, so decisionmakers can see a range of potential impacts.

But even if all agree that a domestic SCC and SC-CH_4 should be used in an RIA, there is still a question about what domestic value should be used (indeed, the same question can be asked of the global estimates – see below). In particular, several RFF researchers have taken issue with the Trump administration's interim domestic estimates specifically due to the methodology used to calculate those figures (Cropper et al. 2017). The Trump administration's interim figure makes use of a 7 percent discount rate, which many economists find to be inappropriate for use in the SCC or SC-CH_4. Cropper et al. (2017) outline the issues with using a 7 percent discount rate in their comments to BLM:

> "Though the addition of an estimate calculated using a 7 percent discount rate

[45] US House of Representatives, Committee on Science, Space, and Technology. 2017. Joint Hearing: At What Cost? Examining the Social Cost of Carbon. Serial No. 115-04. Witness statement: Ted Gayer. https://www.gpo.gov/fdsys/pkg/CHRG-115hhrg24670/pdf/CHRG-115hhrg24670.pdf; pg. 24–33.

[46] Howard, Peter, and Jason Schwartz. 2017. "Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon." *Columbia Journal of Environmental Law* 42: 203-294.

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> is consistent with past regulatory guidance under OMB Circular A-4, it is inappropriate for use in estimating the SC-CH_4 through BLM's methodology. The integrated assessment models used to generate the estimates report their output in terms of "consumption-equivalent" impacts, which is intended to reflect the effective impact on people's consumption (as opposed to investment). Standard economic practice is to discount consumption equivalents at the "consumption rate of interest", which according to OMB's current guidance is a 3 percent discount rate. It is therefore inappropriate to use such modeling results with OMB's 7 percent discount rate, which is intended to represent the historical before-tax return on private capital. None of the researchers whose model results were used to generate the interim values employs a discount rate as high as 7 percent in their work" (5).

Cropper et al. (2017) also point to a recent Council of Economic Advisers study that suggests using a 2 percent consumption rate of interest at most given historical trends (2017).

For the reasons outlined above, the Trump administration's domestic estimate is likely to underestimate impacts to the US from greenhouse gas emissions. Furthermore, both the global and domestic social costs are likely underestimates, as the models used to calculate both values rely on older research, particularly with respect to agricultural damages (Moore et al. 2017). For now, presenting both the global and interim domestic figures together, but using a 3 percent rather than 7 percent discount rate, as suggested by Cropper et al. (2017), provides the most informative results.

ED_002246_00000117-00032

Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 5/1/2018 7:52:41 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]
CC: Adam Stern [adam_stern@ios.doi.gov]
Subject: Re: [EXTERNAL] using the same social cost language as the NODA

Hi Lisa,
Wondering if you can quickly clarify a couple questions. Sorry if you've addressed these before.

1. Under the current NSPS OOOOa requirements, how would an existing site become covered under the LDAR requirements? I seem to recall that you would consider it a new, modified, or reconstructed source if there were modifications made to the well that increased production, e.g., a recompletion, well-stimulation, or workover?

2. In clarifying that you are using the same social cost language as in the NODA, does that include the calculation of net benefits using the global SCC? I believe you had that in the appendix and listed as a sensitivity analysis.

On Wed, Apr 25, 2018 at 11:06 AM, Tichenor, James <jtichenor@blm.gov> wrote:

> Hi Lisa,
>
> Just as an FYI. We're receiving (still going through them) a large number of comments regarding SCCO2 and SCCH4. I'm attaching one comment from a joint env group submission. And I believe I sent you the RFF counter analysis to our rule (which we found online, but not yet in our comment docket) as an FYI.
>
> On Wed, Apr 18, 2018 at 7:58 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:
>
>> Lisa Thompson
>>
>> Fuels and Incineration Group
>>
>> Office of Air Quality Planning and Standards
>>
>> U.S. Environmental Protection Agency
>>
>> 919-541-9775

--
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Message

From: Thompson, Lisa [Thompson.Lisa@epa.gov]
Sent: 5/14/2018 5:55:14 PM
To: 'Tichenor, James' [jtichenor@blm.gov]
CC: 'Adam Stern' [adam_stern@ios.doi.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]
Subject: RE: [EXTERNAL] using the same social cost language as the NODA

Hi James,

I apologize for the long delay! Please see our response below.

Also, I wanted to let you know that I'm starting a detail through the end of the year working on the power sector rules at EPA. Amy will continue to lead the Oil and Gas work at EPA, so please reach out to her with any additional questions.

Thanks,
Lisa

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Tuesday, May 1, 2018 3:53 PM
To: Thompson, Lisa
Cc: Adam Stern
Subject: Re: [EXTERNAL] using the same social cost language as the NODA

Hi Lisa,
Wondering if you can quickly clarify a couple questions. Sorry if you've addressed these before.

1. Under the current NSPS OOOOa requirements, how would an existing site become covered under the LDAR requirements? I seem to recall that you would consider it a new, modified, or reconstructed source if there were modifications made to the well that increased production, e.g., a recompletion, well-stimulation, or workover?

40 CFR 60.5365a(i) [Note, this is the rule as it stands today, please see the interagency package for proposed changes]

(3) For purposes of §60.5397a, a "modification" to a well site occurs when:

(i) A new well is drilled at an existing well site;

(ii) A well at an existing well site is hydraulically fractured; or

(iii) A well at an existing well site is hydraulically refractured.

2. In clarifying that you are using the same social cost language as in the NODA, does that include the calculation of net benefits using the global SCC? I believe you had that in the appendix and listed as a sensitivity analysis.

We use the domestic SCC, but include the global SCC in an appendix.

On Wed, Apr 25, 2018 at 11:06 AM, Tichenor, James <jtichenor@blm.gov> wrote:

> Hi Lisa,
>
> Just as an FYI. We're receiving (still going through them) a large number of comments regarding SCCO2 and SCCH4. I'm attaching one comment from a joint env group submission. And I believe I sent you the RFF counter analysis to our rule (which we found online, but not yet in our comment docket) as an FYI.

On Wed, Apr 18, 2018 at 7:58 AM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

Lisa Thompson

Fuels and Incineration Group

Office of Air Quality Planning and Standards

U.S. Environmental Protection Agency

919-541-9775

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Message

From: Thompson, Lisa [Thompson.Lisa@epa.gov]
Sent: 2/22/2018 11:03:22 PM
To: 'Tichenor, James' [jtichenor@blm.gov]
Subject: RE: Update: Waste Prevention Proposed Rule is Officially Published

Yes, we used them in the Notices of Data Availability that went out in November: https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/epa-issues-notices-data-availability-proposed

Cost memo here: https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0505-12364

No final action on these yet.

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, February 22, 2018 5:07 PM
To: Thompson, Lisa
Subject: Re: Update: Waste Prevention Proposed Rule is Officially Published

Hi Lisa,
Quick question. Have you all used the interim domestic SC-CO2 or SC-CH4 values yet? Published reports or proposed rules, etc.

On Thu, Feb 22, 2018 at 12:37 PM, Thompson, Lisa <Thompson.Lisa@epa.gov> wrote:

Thanks James! I hope you can get some time off now! ☺ Thanks again for keeping us in the loop.

From: Tichenor, James [mailto:jtichenor@blm.gov]
Sent: Thursday, February 22, 2018 3:34 PM
To: Thompson, Lisa <Thompson.Lisa@epa.gov>; Hambrick, Amy <Hambrick.Amy@epa.gov>; Waltzer, Suzanne <Waltzer.Suzanne@epa.gov>; Weitz, Melissa <Weitz.Melissa@epa.gov>
Subject: Update: Waste Prevention Proposed Rule is Officially Published

Colleagues:

The FR Notice is available through this link:

https://www.federalregister.gov/documents/2018/02/22/2018-03144/waste-prevention-production-subject-to-royalties-and-resource-conservation-rescission-or-revision-of

Also, here is the link to the regulations.gov docket with the rule, supporting materials, and vehicle for public comment.

https://www.regulations.gov/document?D=BLM-2018-0001-0001

Happy reading!

--

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Message

From: Weitz, Melissa [Weitz.Melissa@epa.gov]
Sent: 2/14/2018 3:53:25 PM
To: Tichenor, James [jtichenor@blm.gov]
CC: Thompson, Lisa [Thompson.Lisa@epa.gov]
Subject: Re: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)

https://www.eenews.net/stories/1060073843

From: Tichenor, James
Sent: Wednesday, February 14, 2018 10:42 AM
To: Weitz, Melissa
Cc: Thompson, Lisa
Subject: Re: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)
Hi sorry, it's not on my calendar. Let's call in and have a quick call and we can at least get on the same page about scheduling. I'll call in now and sit tight.

On Wed, Feb 14, 2018 at 7:37 AM, Weitz, Melissa <Weitz.Melissa@epa.gov> wrote:

Hi James--

Lisa and I were on the line earlier but we think this meeting may have been cancelled? Let us know if we should call back in.

Thanks!
Melissa

From: jtichenor@blm.gov
Sent: Monday, November 20, 2017 10:50 AM
To: jtichenor@blm.gov; Thompson, Lisa; Hambrick, Amy; jabernathy@blm.gov; epionke@blm.gov
Cc: Waltzer, Suzanne; Weitz, Melissa
Subject: Updated invitation: EPA/BLM Call re Regs; Ex. 6 Personal Privacy @ Monthly from 7:30am to 8:30am on the second Wednesday (PST) (weitz.melissa@epa.gov)
When: Wednesday, February 14, 2018 10:30 AM-11:30 AM.
Where:

This event has been changed.

more details »

Changed: EPA/BLM Call re Regs; Ex. 6 Personal Privacy

When	Changed: Monthly from 7:30am to 8:30am on the second Wednesday Pacific Time
Video call	https://plus.google.com/hangouts/_/doi.gov/jtichenor
Calendar	weitz.melissa@epa.gov
Who	• jtichenor@blm.gov - organizer

- thompson.lisa@epa.gov
- hambrick.amy@epa.gov
- jabernathy@blm.gov
- epionke@blm.gov
- waltzer.suzanne@epa.gov - optional
- weitz.melissa@epa.gov - optional

Your attendance is **optional**.
Going? All events in this series: **Yes** - **Maybe** - **No** more options »

Invitation from Google Calendar
You are receiving this courtesy email at the account weitz.melissa@epa.gov because you are an attendee of this event.
To stop receiving future updates for this event, decline this event. Alternatively you can sign up for a Google account at https://www.google.com/calendar/ and control your notification settings for your entire calendar.
Forwarding this invitation could allow any recipient to modify your RSVP response. Learn More.

--
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Message

From: Tichenor, James [jtichenor@blm.gov]
Sent: 2/22/2018 8:33:40 PM
To: Thompson, Lisa [Thompson.Lisa@epa.gov]; Hambrick, Amy [Hambrick.Amy@epa.gov]; Waltzer, Suzanne [Waltzer.Suzanne@epa.gov]; Weitz, Melissa [Weitz.Melissa@epa.gov]
Subject: Update: Waste Prevention Proposed Rule is Officially Published

Colleagues:

The FR Notice is available through this link:
https://www.federalregister.gov/documents/2018/02/22/2018-03144/waste-prevention-production-subject-to-royalties-and-resource-conservation-rescission-or-revision-of

Also, here is the link to the regulations.gov docket with the rule, supporting materials, and vehicle for public comment.
https://www.regulations.gov/document?D=BLM-2018-0001-0001

Happy reading!

--
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