Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 1/5/2022 1:51:00 PM
To: Lewis, Josh [Lewis.Josh@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]; Arroyo, Victoria [Arroyo.Victoria@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
Subject: RE: TPs for OIRA Call

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Lewis, Josh <Lewis.Josh@epa.gov>
Sent: Wednesday, January 5, 2022 8:48 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>; Arroyo, Victoria <Arroyo.Victoria@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Subject: RE: TPs for OIRA Call

Thank you. I see MATS schedule/timing is on the list, which is one that Vicki wanted to raise w/ OMB as well.

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Wednesday, January 5, 2022 8:37 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Arroyo, Victoria <Arroyo.Victoria@epa.gov>; Lewis, Josh <Lewis.Josh@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Subject: RE: TPs for OIRA Call

Thanks, Ann. Am going ahead and copying Vicki and Josh.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 4, 2022 4:50 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Subject: TPs for OIRA Call

Joe, below are the proposed TPs for tomorrow's OIRA call. Please let me know if you have any questions or comments. If none, I will send to OP for Vicki's awareness.

Ex. 5 Deliberative Process (DP)

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

Message

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Sent: 1/5/2022 5:49:43 PM
To: Dunham, Sarah (Dunham.Sarah@epa.gov) [Dunham.Sarah@epa.gov]; Grundler, Christopher [grundler.christopher@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Alejandra Nunez (Nunez.Alejandra@epa.gov) [Nunez.Alejandra@epa.gov]; Peter Tsirigotis (Tsirigotis.Peter@epa.gov) [Tsirigotis.Peter@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]
Subject: FW: NYT: Biden 'Over-Promised and Under-Delivered' on Climate. Now, Trouble Looms in 2022.

Please take a bow!

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Sent: Wednesday, January 5, 2022 10:35 AM
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Alison L. Cassady
Deputy Chief of Staff for Policy
U.S. Environmental Protection Agency
Cell: (202) 941-6036

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Just making sure folks are aware of this piece in The Times this morning.

Biden 'Over-Promised and Under-Delivered' on Climate. Now, Trouble Looms in 2022.
Mounting challenges will make the coming months critical for the president's environmental agenda, analysts say.
By Lisa Friedman
Jan. 5, 2022
https://www.nytimes.com/2022/01/04/climate/biden-climate-change.html

WASHINGTON — As the new year opens, President Biden faces an increasingly narrow path to fulfill his ambitious goal of slashing the greenhouse gases generated by the United States that are helping to warm the planet to dangerous levels.

His Build Back Better Act, which contains $555 billion in proposed climate action, is in limbo on Capitol Hill. The Supreme Court is set to hear a pivotal case in February that could significantly restrict his authority to regulate the carbon dioxide that spews from power plants and is driving climate change. And the midterm elections loom in November, threatening his party's control of Congress. Since Republicans have shown little appetite for climate action, a Republican takeover of one or both chambers could freeze movement for years.

The mounting challenges make the next few months critical to secure the safety of the planet as well as Mr. Biden's climate legacy, analysts said.

"If they can't pull this off, then we failed; the country has failed the climate test," said John Podesta, a former senior counselor to President Barack Obama and founder of the Center for American Progress, a left-leaning think tank.

Mr. Podesta praised the Biden administration for making global warming a priority, creating a White House office of domestic climate policy, appointing an international climate envoy to reassert U.S. leadership on the global stage, moving forward a handful of regulations and proposing major investments in clean energy.

The planet has already warmed an average of about 1.1 degrees Celsius compared with temperatures before the Industrial Revolution. If temperatures continue to rise past 1.5 degrees Celsius, the likelihood of increasingly deadly wildfires, floods, heat waves and other disasters becomes unavoidable, scientists have warned. Countries must immediately and drastically reduce greenhouse gases caused by burning oil, gas and coal if the world is to avert the most catastrophic impacts, experts have said.

At international climate talks in Glasgow last year, Mr. Biden pledged that the United States, the world's biggest polluter in historical terms, would cut its emissions at least 50 percent below 2005 levels by the end of this decade. He urged other countries to take similar steps. But that will be a hard sell if the United States fails to act by the time countries gather for the next climate talks in Egypt in November.

"If you can't meet the goal, you've lost credibility internationally," Mr. Podesta said, adding that he would grade Mr. Biden's first year on climate policy as "an incomplete."

When he entered the White House, Mr. Biden identified climate change as one of four priorities, along with battling the coronavirus pandemic, strengthening the economy and addressing racial inequity.

It was a dramatic reversal after the tenure of President Donald J. Trump, who frequently mocked climate science, sought to expand oil and gas drilling and loosened a raft of environmental regulations, including those governing greenhouse gas emissions.

"The most important thing he did was to draw a sharp contrast with his predecessor within the first days of his presidency," said Senator Chris Coons, Democrat of Delaware, who has close ties to Mr. Biden.

Mr. Biden immediately rejoined the 2015 Paris climate agreement, in which nearly 200 countries pledged to try to hold temperature rise "well below" 2 degrees Celsius. He canceled permits for the Keystone XL pipeline, which would have run 1,209 miles from the Canadian oil sands to Nebraska. He paused new leases for oil and gas drilling on public lands and in federal waters, and called for increasing renewable energy production, with the goal of doubling offshore wind power by 2030.

On Capitol Hill, Mr. Biden led passage of a $1 trillion bipartisan infrastructure bill that included billions for clean energy research and making communities more resilient to disasters, although it will do little to reduce emissions.

But cracks in Mr. Biden's agenda quickly appeared.

In June, a federal judge in Louisiana sided with Republican attorneys general from 13 states who argued that Mr. Biden lacked the legal authority to pause new oil and gas leases. As gasoline prices surged in the summer and fall, the White House sought to increase oil production, even as Mr. Biden implored world leaders to stop burning fossil fuels.

Just days after the Glasgow climate talks, the administration auctioned off nearly 80 million acres in the Gulf of Mexico, a record for that location, for offshore drilling, despite a campaign promise by Mr. Biden that he would end drilling on federal lands and waters.

White House officials said they were legally compelled to hold the lease sale, which the Interior Department said had the potential to yield 1.12 billion barrels of oil and 4.4 trillion cubic feet of natural gas over the life of the 50-year leases. But environmental groups, joined by several Democratic lawmakers, argue that the administration could have done more to prevent the sale and are suing the administration to stop it.

Most notably, Mr. Biden failed to persuade the single Democratic holdout, Senator Joe Manchin III of West Virginia, to vote for his $1.7 trillion Build Back Better bill, placing its future in jeopardy in an evenly split Senate. The House passed the package in November.

In negotiations with the White House, Mr. Manchin insisted that the Biden administration strip out the most muscular part of the bill, a clean electricity program that would have rewarded electric utilities that stopped burning fossil fuels in favor of wind, solar and other clean energy, and penalized those that did not. Mr. Manchin also scuttled a provision that would have prohibited most offshore oil drilling.

The legislation still contains about $555 billion for other climate provisions, including $320 billion in tax incentives for producers and purchasers of wind, solar and nuclear power, inducements intended to speed up a transition away from oil, gas and coal. Analysts say it would help the United States to get at least halfway to Mr. Biden's climate goals. The future of the legislation remains uncertain, although Senate Democrats said on Tuesday they were determined to see some version of it pass this year.

"Objectively, he over-promised and under-delivered," said Kevin Book, managing director of ClearView Energy Partners, a Washington-based research firm.

Still, Mr. Book said while the administration did not do as much as Mr. Biden promised, it has taken significant first steps.

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Gina McCarthy, Mr. Biden's climate change adviser, said in a statement that the administration's climate efforts were "just getting started."

"After a year of overseeing a whole-of-government effort to put our country on a path to tackle the climate crisis, I have never been more optimistic, more hopeful or more confident that our country is leading the charge," Ms. McCarthy said.

But many activists said they were disenchanted with the president.

"Joe Biden started strong with the executive actions back in January and since then he has really been a disappointment," said Ellen Sciales, a spokeswoman for the Sunrise Movement, a youth-led environmental group that helped spur a jump in young voters concerned about climate in 2020. She said she feared it would be difficult to turn out those voters again in November.

"He made a lot of promises on cutting emissions, and we question whether or not that's on track," she said, adding that it "was a slap in the face" to environmentalists when Mr. Biden went to Glasgow to declare the United States a climate leader only to quickly lease millions of acres in the Gulf to oil and gas companies for drilling.

Meanwhile, the administration has been slow to make progress on major new environmental regulations, in part because agencies were hollowed out during the Trump administration, leaving a crush of work to fewer people. The Biden administration also has intentionally slowed some regulatory action so as not to antagonize industry or lawmakers from fossil fuel states before a vote is held on the Build Back Better Act, according to three people close to the administration. The Environmental Protection Agency said it was working on tough new tailpipe emissions rules that would impact vehicles in the model year 2027 and was also designing new regulations for electric utilities. Rules that had been expected regarding limits on mercury emissions from power plants and regulations around wastewater from coal plants are also still in progress.

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"I think this Supreme Court case is going to establish really firmly the limits of E.P.A.'s authority," said Jeffrey Holmstead, a lawyer at Bracewell LLP who served in the Environmental Protection Agency during both Bush administrations.

Manish Bapna, president of the Natural Resources Defense Council, an environmental group, said he saw 2022 as a make-or-break year.

"Most of the hard work remains ahead of us," Mr. Bapna said.

Nick Conger
Press Secretary

Environmental Protection Agency
202-941-1116 (mobile)
Newsroom

Message

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Sent: 1/5/2022 5:55:29 PM
To: Joseph Goffman [joegoffman@gmail.com]
Subject: FW: NYT: Biden 'Over-Promised and Under-Delivered' on Climate. Now, Trouble Looms in 2022.

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Jan. 5, 2022
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Just making sure folks are aware of this piece in The Times this morning.

Biden 'Over-Promised and Under-Delivered' on Climate. Now, Trouble Looms in 2022.
Mounting challenges will make the coming months critical for the president's environmental agenda, analysts say.
By Lisa Friedman
Jan. 5, 2022
https://www.nytimes.com/2022/01/04/climate/biden-climate-change.html

WASHINGTON — As the new year opens, President Biden faces an increasingly narrow path to fulfill his ambitious goal of slashing the greenhouse gases generated by the United States that are helping to warm the planet to dangerous levels.

His Build Back Better Act, which contains $555 billion in proposed climate action, is in limbo on Capitol Hill. The Supreme Court is set to hear a pivotal case in February that could significantly restrict his authority to regulate the carbon dioxide that spews from power plants and is driving climate change. And the midterm elections loom in November, threatening his party's control of Congress. Since Republicans have shown little appetite for climate action, a Republican takeover of one or both chambers could freeze movement for years.

The mounting challenges make the next few months critical to secure the safety of the planet as well as Mr. Biden's climate legacy, analysts said.

"If they can't pull this off, then we failed; the country has failed the climate test," said John Podesta, a former senior counselor to President Barack Obama and founder of the Center for American Progress, a left-leaning think tank.

Mr. Podesta praised the Biden administration for making global warming a priority, creating a White House office of domestic climate policy, appointing an international climate envoy to reassert U.S. leadership on the global stage, moving forward a handful of regulations and proposing major investments in clean energy.

The planet has already warmed an average of about 1.1 degrees Celsius compared with temperatures before the Industrial Revolution. If temperatures continue to rise past 1.5 degrees Celsius, the likelihood of increasingly deadly wildfires, floods, heat waves and other disasters becomes unavoidable, scientists have warned. Countries must immediately and drastically reduce greenhouse gases caused by burning oil, gas and coal if the world is to avert the most catastrophic impacts, experts have said.

At international climate talks in Glasgow last year, Mr. Biden pledged that the United States, the world's biggest polluter in historical terms, would cut its emissions at least 50 percent below 2005 levels by the end of this decade. He urged other countries to take similar steps. But that will be a hard sell if the United States fails to act by the time countries gather for the next climate talks in Egypt in November.

"If you can't meet the goal, you've lost credibility internationally," Mr. Podesta said, adding that he would grade Mr. Biden's first year on climate policy as "an incomplete."

When he entered the White House, Mr. Biden identified climate change as one of four priorities, along with battling the coronavirus pandemic, strengthening the economy and addressing racial inequity.

It was a dramatic reversal after the tenure of President Donald J. Trump, who frequently mocked climate science, sought to expand oil and gas drilling and loosened a raft of environmental regulations, including those governing greenhouse gas emissions.

"The most important thing he did was to draw a sharp contrast with his predecessor within the first days of his presidency," said Senator Chris Coons, Democrat of Delaware, who has close ties to Mr. Biden.

Mr. Biden immediately rejoined the 2015 Paris climate agreement, in which nearly 200 countries pledged to try to hold temperature rise "well below" 2 degrees Celsius. He canceled permits for the Keystone XL pipeline, which would have

run 1,209 miles from the Canadian oil sands to Nebraska. He paused new leases for oil and gas drilling on public lands and in federal waters, and called for increasing renewable energy production, with the goal of doubling offshore wind power by 2030.

On Capitol Hill, Mr. Biden led passage of a $1 trillion bipartisan infrastructure bill that included billions for clean energy research and making communities more resilient to disasters, although it will do little to reduce emissions.

But cracks in Mr. Biden's agenda quickly appeared.

In June, a federal judge in Louisiana sided with Republican attorneys general from 13 states who argued that Mr. Biden lacked the legal authority to pause new oil and gas leases. As gasoline prices surged in the summer and fall, the White House sought to increase oil production, even as Mr. Biden implored world leaders to stop burning fossil fuels.

Just days after the Glasgow climate talks, the administration auctioned off nearly 80 million acres in the Gulf of Mexico, a record for that location, for offshore drilling, despite a campaign promise by Mr. Biden that he would end drilling on federal lands and waters.

White House officials said they were legally compelled to hold the lease sale, which the Interior Department said had the potential to yield 1.12 billion barrels of oil and 4.4 trillion cubic feet of natural gas over the life of the 50-year leases. But environmental groups, joined by several Democratic lawmakers, argue that the administration could have done more to prevent the sale and are suing the administration to stop it.

Most notably, Mr. Biden failed to persuade the single Democratic holdout, Senator Joe Manchin III of West Virginia, to vote for his $1.7 trillion Build Back Better bill, placing its future in jeopardy in an evenly split Senate. The House passed the package in November.

In negotiations with the White House, Mr. Manchin insisted that the Biden administration strip out the most muscular part of the bill, a clean electricity program that would have rewarded electric utilities that stopped burning fossil fuels in favor of wind, solar and other clean energy, and penalized those that did not. Mr. Manchin also scuttled a provision that would have prohibited most offshore oil drilling.

The legislation still contains about $555 billion for other climate provisions, including $320 billion in tax incentives for producers and purchasers of wind, solar and nuclear power, inducements intended to speed up a transition away from oil, gas and coal. Analysts say it would help the United States to get at least halfway to Mr. Biden's climate goals. The future of the legislation remains uncertain, although Senate Democrats said on Tuesday they were determined to see some version of it pass this year.

"Objectively, he over-promised and under-delivered," said Kevin Book, managing director of ClearView Energy Partners, a Washington-based research firm.

Still, Mr. Book said while the administration did not do as much as Mr. Biden promised, it has taken significant first steps.

"The world without Build Back Better may not be as green as Biden campaigned on but it's likely to be greener still than anyone expected," he said.

White House officials said they were proud of their accomplishments. The administration finalized a rule to tighten vehicle tailpipe pollution for vehicles in the model year 2023, set regulations to phase out hydrofluorocarbons, planet-warming chemicals used in air-conditioning and refrigeration; and imposed new rules to reduce the federal government's carbon footprint.

The administration also has started work on other regulations governing emissions of methane, another powerful greenhouse gas, and new requirements that publicly traded companies disclose climate-related financial risks. At the

summit in Glasgow, the United States persuaded other countries to agree to intensify their efforts to fight climate change.

Gina McCarthy, Mr. Biden's climate change adviser, said in a statement that the administration's climate efforts were "just getting started."

"After a year of overseeing a whole-of-government effort to put our country on a path to tackle the climate crisis, I have never been more optimistic, more hopeful or more confident that our country is leading the charge," Ms. McCarthy said.

But many activists said they were disenchanted with the president.

"Joe Biden started strong with the executive actions back in January and since then he has really been a disappointment," said Ellen Sciales, a spokeswoman for the Sunrise Movement, a youth-led environmental group that helped spur a jump in young voters concerned about climate in 2020. She said she feared it would be difficult to turn out those voters again in November.

"He made a lot of promises on cutting emissions, and we question whether or not that's on track," she said, adding that it "was a slap in the face" to environmentalists when Mr. Biden went to Glasgow to declare the United States a climate leader only to quickly lease millions of acres in the Gulf to oil and gas companies for drilling.

Meanwhile, the administration has been slow to make progress on major new environmental regulations, in part because agencies were hollowed out during the Trump administration, leaving a crush of work to fewer people. The Biden administration also has intentionally slowed some regulatory action so as not to antagonize industry or lawmakers from fossil fuel states before a vote is held on the Build Back Better Act, according to three people close to the administration. The Environmental Protection Agency said it was working on tough new tailpipe emissions rules that would impact vehicles in the model year 2027 and was also designing new regulations for electric utilities. Rules that had been expected regarding limits on mercury emissions from power plants and regulations around wastewater from coal plants are also still in progress.

"While it's important to do things quickly, it's also important to do a good job," said Richard Revesz, a professor of environmental law at New York University. He noted that the Trump administration moved rapidly to undo former President Barack Obama's policies and most of those efforts were considered rushed and sloppy, leading to a high rate of decisions being overturned by courts.

But Mr. Revesz noted that the process of writing regulations is time consuming, and rules that are not finalized early in a presidential term can be more easily undone by a future administration. "If they haven't moved by the end of next year the administration will have missed a significant opportunity," he said.

Legal experts also warn that the administration can't count on regulatory efforts. This year the Supreme Court will hear a case brought by Republican-led states and coal companies to limit the E.P.A.'s ability to cut emissions.

"I think this Supreme Court case is going to establish really firmly the limits of E.P.A.'s authority," said Jeffrey Holmstead, a lawyer at Bracewell LLP who served in the Environmental Protection Agency during both Bush administrations.

Manish Bapna, president of the Natural Resources Defense Council, an environmental group, said he saw 2022 as a make-or-break year.

"Most of the hard work remains ahead of us," Mr. Bapna said.

Nick Conger
Press Secretary
Environmental Protection Agency
202-941-1116 (mobile)
Newsroom

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 1/12/2022 10:53:14 PM
To: Campbell, Ann [Campbell.Ann@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Millett, John [Millett.John@epa.gov]
Subject: RE: FOR YOUR REVIEW: WaPo Response

Importance: High

Sorry!! I thought I was replying to the NY Times Waste Coal piece. I just opened this document and already have a few questions.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Goffman, Joseph
Sent: Wednesday, January 12, 2022 5:47 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: RE: FOR YOUR REVIEW: WaPo Response

Thanks, Ann. These responses look good to me. Nicely done, in fact.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Wednesday, January 12, 2022 5:34 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: FOR YOUR REVIEW: WaPo Response

Joe, et. al., please find attached OAR's response to the WaPo request below for your review. There is one response outstanding still but I did not want to delay beginning your review until I received it – I will simply send it along once I have it.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Lewis, Josh <Lewis.Josh@epa.gov>
Sent: Monday, January 10, 2022 4:51 PM

To: Campbell, Ann <Campbell.Ann@epa.gov>; Hilosky, Nick <Hilosky.Nick@epa.gov>; Brooks, Becky <Brooks.Becky@epa.gov>; Goldberg, Ruby <Goldberg.Ruby@epa.gov>; Tyler, Tom <Tyler.Tom@epa.gov>; Aguirre, Janita <Aguirre.Janita@epa.gov>
Cc: Conger, Nick <Conger.Nick@epa.gov>; Carroll, Timothy <Carroll.Timothy@epa.gov>
Subject: WaPo inquiry due COB Wednesday: questions related to our environmental regulatory tracker

Hi all – we have a request in from Washington Post. More background in the email at the bottom of this chain. Immediately below, I've sorted the actions by AAship. Assuming I've done this correctly, what I need from each of you is to review the actions w/in your office and answer the following:
(1) Is this an action EPA is reviewing? Yes/No/Decision pending
(2) Explanation: (if necessary):

Please provide the information directly under each action (similar to what I started for the OAR actions), and please use publicly available information (e.g., from the semiannual reg agenda, etc). Please provide this information by COB Wednesday (or sooner, if you have it ready before then). And obviously feel free to delegate this w/in your office, but whatever you send back should be cleared through your IO. OP and OPA will then review, and once finalized OPA will send the responses to the Post.

Thanks. Please call if you have any questions.

OAR:

Changing New Source Review guidance
https://www.epa.gov/nsr/forms/draft-guidance-interpretation-begin-actual-construction-under-new-source-review [epa.gov]
(1) Is this an action EPA is reviewing? Yes/No/Decision pending
(2) Explanation: (if necessary):

Imposing EPA cost-benefit rule
https://www.epa.gov/sites/production/files/2018-06/documents/epa_frdoc_0001-22431.pdf [epa.gov]
(1) Is this an action EPA is reviewing? Yes/No/Decision pending
(2) Explanation: (if necessary):

Reversing leak detection and repair rules for hydrofluorcarbons
https://www.epa.gov/section608/stationary-refrigeration-leak-repair-requirements [epa.gov]
(1) Is this an action EPA is reviewing? Yes/No/Decision pending
(2) Explanation: (if necessary):

Weakening the regional haze rule
https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_- [epa.gov]

Revising commercial and industrial solid waste standards
https://www.epa.gov/stationary-sources-air-pollution/commercial-and-industrial-solid-waste- [epa.gov]

Finalizing ozone National Ambient Air Quality Standards
https://www.govinfo.gov/content/pkg/FR-2017-06-28/pdf/2017-13437.pdf [gcc02.safelinks.protection.outlook.com]
Is this an action EPA is reviewing: Yes
Explanation (if necessary): More information here: https://www.epa.gov/ground-level-ozone-pollution/epa-reconsider-previous-administrations-decision-retain-2015-ozone

Changing cross-state air pollution requirements

https://www.epa.gov/csapr [epa.gov]
Adopting petroleum refinery sector rule
https://www.epa.gov/stationary-sources-air-pollution/petroleum-refinery-sector-rule-risk-and-technology-review-and-
new#:~:text=Rule%20Summary&text=When%20fully%20implemented%20in%202018,volatile%20organic%20compounds%20(VOC). [epa.gov]
Denying Clean Air Act Section 126 petitions
https://eelp.law.harvard.edu/2020/01/clean-air-act-section-126-petitions/ [gcc02.safelinks.protection.outlook.com]
Setting emissions standards for major industries
https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous [epa.gov]
Reversing sewage treatment air pollutant standards
https://www.federalregister.gov/documents/2017/10/26/2017-23067/national-emission-standards-for-hazardous-air-pollutants-publicly-owned-treatment-works-residual [gcc02.safelinks.protection.outlook.com]
Testing for heavy-duty vehicles and engines
https://www.federalregister.gov/documents/2020/05/12/2020-05963/improvements-for-heavy-duty-engine-and-vehicle-test-procedures-and-other-technical-amendments [gcc02.safelinks.protection.outlook.com]

Reducing power plant mercury and air toxics standards
https://www.epa.gov/mats/regulatory-actions-final-mercury-and-air-toxics-standards-mats-power-plants [epa.gov]
Is this an action EPA is reviewing: Yes
Explanation (if necessary): Proposed rule at OMB for E.O. 12866 review

Creating self-audit program for oil and gas facilities
https://www.epa.gov/enforcement/existing-owner-clean-air-act-audit-program-oil-and-natural-gas-exploration-and#:~:text=EPA%20is%20making%20this%20self,Reducing%20Excess%20Emissi [epa.gov]
Creating new power plant emissions accounting
https://www.epa.gov/sites/production/files/2019-08/documents/projectemissionsaccountingfactsheet_07032019.pdf [epa.gov]
Collecting oil and natural gas industry emissions data
https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/withdrawal-2016-information-request-oil-and [epa.gov]

OW:
Dumping PFAS chemicals on a temporary basis
https://www.epa.gov/pfas/interim-strategy-and-polyfluoroalkyl-substances-federally-issued-national-pollutant-discharge [epa.gov]
Creating a loophole in water pollution discharge rules
https://www.epa.gov/newsreleases/epa-issues-draft-guidance-clarifying-wastewater-permit-requirements-under-maui-decision [epa.gov]
Changing the Clean Water Act's criminal negligence standard
https://www.federalregister.gov/documents/2020/12/14/2020-26777/criminal-negligence-standard-for-state-clean-water-act-402-and-404-programs [gcc02.safelinks.protection.outlook.com]

OLEM
Rolling back coal ash standards, Phase 2
https://www.epa.gov/coalash/coal-ash-rule [epa.gov]
Delaying the chemical disaster rule
https://www.washingtonpost.com/climate-environment/2019/11/21/trump-reverses-safety- [gcc02.safelinks.protection.outlook.com]
Weakening industry cleanup requirements

https://www.epa.gov/newsreleases/epa-finds-existing-requirements-effectively-address-financial-risks-three-industries [epa.gov]

Granting federal coal waste permits

https://www.epa.gov/coalash/permit-programs-coal-combustion-residual-disposal-units [epa.gov]

(may be more appropriate for R6):

Removing copper filter cake from hazardout materials list

https://www.federalregister.gov/documents/2017/10/02/2017-21112/hazardous-waste-management-system-identification-and-listing-of-hazardous-waste [gcc02.safelinks.protection.outlook.com]

OCSPP:

Changing pyrethroid pesticide approval process

https://www.federalregister.gov/documents/2019/11/12/2019-24514/pesticide-registration-review-proposed-interim-decisions-for-several-pyrethroids-notice-of [gcc02.safelinks.protection.outlook.com]

Implementing the pesticide applicators rule

https://www.epa.gov/pesticide-worker-safety/agricultural-worker-protection-standard-wps [epa.gov]

Banning N-methylpyrrolidone (NMP)

https://public-inspection.federalregister.gov/2021-00115.pdf [gcc02.safelinks.protection.outlook.com]

Revising pesticide rules for endangered species

This one apparently revised how the government gauges pesticide effects on endangered species – we don't have a link.

Not EPA:

CEQ:

Changing endangered species pesticide consultations

https://www.govinfo.gov/content/pkg/FR-2020-01-10/pdf/2019-28106.pdf [gcc02.safelinks.protection.outlook.com]

NRC:

Easing uranium mines groundwater protections

https://www.federalregister.gov/documents/2019/01/31/2019-00435/ground-water-protection-at-uranium-in-situ-recovery-facilities [gcc02.safelinks.protection.outlook.com]

On Jan 6, 2022, at 6:56 PM, Eilperin, Juliet <Juliet.Eilperin@washpost.com> wrote:

Dear Nick and Tim,

We're updating our environmental tracker [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com] so we can assess what has changed in national environmental policy since Biden took office, and we just wanted to run something by you. We have several dozen Trump-era policies where it appears the Biden administration has not targeted. We want to just double check that this is accurate. In some cases, it is likely because the policies were not finalized. But in some cases, Trump officials did weaken environmental regulation, and we want to make sure these policies are not being reassessed. Would you mind taking a look, and letting us know by early next week if EPA has taken action on any of these items?

Thanks so much, and we are including the titles we've given these rollbacks and a relevant link with each entry (in all cases but one):

Changing New Source Review guidance

https://www.epa.gov/nsr/forms/draft-guidance-interpretation-begin-actual-construction-under-new-source-review [epa.gov] [gcc02.safelinks.protection.outlook.com]

Rolling back coal ash standards, Phase 2

https://www.epa.gov/coalash/coal-ash-rule [epa.gov] [gcc02.safelinks.protection.outlook.com]

Imposing EPA cost-benefit rule

https://www.epa.gov/sites/production/files/2018-06/documents/epa_frdoc_0001-22431.pdf [epa.gov] [gcc02.safelinks.protection.outlook.com]

Changing endangered species pesticide consultations

https://www.govinfo.gov/content/pkg/FR-2020-01-10/pdf/2019-28106.pdf [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Changing pyrethroid pesticide approval process

https://www.federalregister.gov/documents/2019/11/12/2019-24514/pesticide-registration-review-proposed-interim-decisions-for-several-pyrethroids-notice-of [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Implementing the pesticide applicators rule

https://www.epa.gov/pesticide-worker-safety/agricultural-worker-protection-standard-wps [epa.gov] [gcc02.safelinks.protection.outlook.com]

Reversing leak detection and repair rules for hydrofluorcarbons

https://www.epa.gov/section608/stationary-refrigeration-leak-repair-requirements [epa.gov] [gcc02.safelinks.protection.outlook.com]

Delaying the chemical disaster rule

https://www.washingtonpost.com/climate-environment/2019/11/21/trump-reverses-safety- [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Weakening the regional haze rule

https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_- [epa.gov] [gcc02.safelinks.protection.outlook.com]

Revising commercial and industrial solid waste standards

https://www.epa.gov/stationary-sources-air-pollution/commercial-and-industrial-solid-waste- [epa.gov] [gcc02.safelinks.protection.outlook.com]

Easing uranium mines groundwater protections

https://www.federalregister.gov/documents/2019/01/31/2019-00435/ground-water-protection-at-uranium-in-situ-recovery-facilities [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Finalizing ozone National Ambient Air Quality Standards

https://www.govinfo.gov/content/pkg/FR-2017-06-28/pdf/2017-13437.pdf [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Changing cross-state air pollution requirements

https://www.epa.gov/csapr [epa.gov] [gcc02.safelinks.protection.outlook.com]

Adopting petroleum refinery sector rule

https://www.epa.gov/stationary-sources-air-pollution/petroleum-refinery-sector-rule-risk-and-technology-review-and-new#:~:text=Rule%20Summary&text=When%20fully%20implemented%20in%202018,volatile%20organic%20compounds%20(VOC). [epa.gov] [gcc02.safelinks.protection.outlook.com]

Denying Clean Air Act Section 126 petitions

https://eelp.law.harvard.edu/2020/01/clean-air-act-section-126-petitions/ [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Setting emissions standards for major industries

https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous [epa.gov] [gcc02.safelinks.protection.outlook.com]

Reversing sewage treatment air pollutant standards

https://www.federalregister.gov/documents/2017/10/26/2017-23067/national-emission-standards-for-hazardous-air-pollutants-publicly-owned-treatment-works-residual [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Removing copper filter cake from hazardout materials list
https://www.federalregister.gov/documents/2017/10/02/2017-21112/hazardous-waste-management-system-identification-and-listing-of-hazardous-waste [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]
Collecting oil and natural gas industry emissions data
https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/withdrawal-2016-information-request-oil-and [epa.gov] [gcc02.safelinks.protection.outlook.com]
Weakening industry cleanup requirements
https://www.epa.gov/newsreleases/epa-finds-existing-requirements-effectively-address-financial-risks-three-industries [epa.gov] [gcc02.safelinks.protection.outlook.com]
Dumping PFAS chemicals on a temporary basis
https://www.epa.gov/pfas/interim-strategy-and-polyfluoroalkyl-substances-federally-issued-national-pollutant-discharge [epa.gov] [gcc02.safelinks.protection.outlook.com]
Creating a loophole in water pollution discharge rules
https://www.epa.gov/newsreleases/epa-issues-draft-guidance-clarifying-wastewater-permit-requirements-under-maui-decision [epa.gov] [gcc02.safelinks.protection.outlook.com]
Testing for heavy-duty vehicles and engines
https://www.federalregister.gov/documents/2020/05/12/2020-05963/improvements-for-heavy-duty-engine-and-vehicle-test-procedures-and-other-technical-amendments [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]
Reducing power plant mercury and air toxics standards
https://www.epa.gov/mats/regulatory-actions-final-mercury-and-air-toxics-standards-mats-power-plants [epa.gov] [gcc02.safelinks.protection.outlook.com]
Creating self-audit program for oil and gas facilities
https://www.epa.gov/enforcement/existing-owner-clean-air-act-audit-program-oil-and-natural-gas-exploration-and#:~:text=EPA%20is%20making%20this%20self,Reducing%20Excess%20Emissi [epa.gov] [gcc02.safelinks.protection.outlook.com]
Creating new power plant emissions accounting
https://www.epa.gov/sites/production/files/2019-08/documents/projectemissionsaccountingfactsheet_07032019.pdf [epa.gov] [gcc02.safelinks.protection.outlook.com]
Granting federal coal waste permits
https://www.epa.gov/coalash/permit-programs-coal-combustion-residual-disposal-units [epa.gov] [gcc02.safelinks.protection.outlook.com]
Banning N-methylpyrrolidone (NMP)
https://public-inspection.federalregister.gov/2021-00115.pdf [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]
Changing the Clean Water Act's criminal negligence standard
https://www.federalregister.gov/documents/2020/12/14/2020-26777/criminal-negligence-standard-for-state-clean-water-act-402-and-404-programs [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]
Revising pesticide rules for endangered species
This one apparently revised how the government gauges pesticide effects on endangered species – we don't have a link.

Thanks so much for this,
Juliet

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 1/24/2022 1:20:50 PM
To: Mike Koerber (Koerber.Mike@epa.gov) [Koerber.Mike@epa.gov]
CC: Peter Tsirigotis (Tsirigotis.Peter@epa.gov) [Tsirigotis.Peter@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]
Subject: FW: NPCA, Sierra Club, Earthjustice ltr re Regional Haze Round 2 SIP Submission Shortcomings and Recommendations
Attachments: NPCA Sierra Club Ltr to EPA RH 01.21.2022.FINAL.pdf

Let's discuss at the Weekly if there is time. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Stephanie Kodish <skodish@npca.org>
Sent: Friday, January 21, 2022 3:57 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: McCabe, Janet <McCabe.Janet@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Koeber.Mike@epa.gov; Srinivasan, Gautam <Srinivasan.Gautam@epa.gov>; Marks, Matthew <Marks.Matthew@epa.gov>; Daly, Carl <Daly.Carl@epa.gov>; Freeman, Caroline <Freeman.Caroline@epa.gov>; Hamjian, Lynne <Hamjian.Lynne@epa.gov>; Ruvo, Richard <Ruvo.Richard@epa.gov>; Fernandez, Cristina <Fernandez.Cristina@epa.gov>; Mooney, John <Mooney.John@epa.gov>; Garcia, David <Garcia.David@epa.gov>; Skelley, Dana <Skelley.Dana@epa.gov>; Lakin, Matt <Lakin.Matthew@epa.gov>; Viswanathan, Krishna <Viswanathan.Krishna@epa.gov>
Subject: NPCA, Sierra Club, Earthjustice ltr re Regional Haze Round 2 SIP Submission Shortcomings and Recommendations

Dear Principal Deputy Assistant Administrator Goffman,

On behalf of National Parks Conservation Association, Earthjustice and Sierra Club please accept the attached letter discussing how the regional haze SIPs submitted to EPA to date widely miss the mark of satisfying federal obligations to reduce haze causing emissions and our recommendations for addressing these shortcomings. While implementation of the regional haze program has resulted in significant progress to date, our nation's treasured Class I areas from Great Smoky Mountains to Yosemite National Park continue to be marred by air pollution.

Accountability to cut continued, avoidable emissions from hundreds of fossil fuel-fired power plants, oil refineries, cement kilns, and other sources is on the line. Also at risk are fenceline communities downwind of pollution, along with the vistas and ecosystems of our public lands set aside for posterity. Our organizations demand that EPA prioritize acting on state haze plans immediately to deliver on this 45 year-old Congressional mandate without delay. We see timely emissions reductions through regional haze implementation plans as being of paramount importance.

Should you have any questions or wish to discuss, please do not hesitate to contact me or the other signatories to this letter.

Sincerely,
Stephanie

Stephanie Kodish (she/her/hers)
Senior Director & Counsel, Clean Air and Climate Programs

National Parks Conservation Association
P: 865.964.1774 | skodish@npca.org | **npca.org**

Preserving Our Past. Protecting Our Future.

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 1/25/2022 1:28:29 PM
To: Peter Tsirigotis (Tsirigotis.Peter@epa.gov) [Tsirigotis.Peter@epa.gov]; Mike Koerber (Koerber.Mike@epa.gov) [Koerber.Mike@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]
Subject: FW: WSJ: New EPA Rules to Target Power Plant Pollution

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Conger, Nick <Conger.Nick@epa.gov>
Sent: Tuesday, January 25, 2022 8:12 AM
To: Adm16.Michael.Regan <adm16.michael.regan@epa.gov>
Cc: Utech, Dan <Utech.Dan@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Hamilton, Lindsay <Hamilton.Lindsay@epa.gov>; Lamy, Kendra <Lamy.Kendra@epa.gov>; Lucey, John <Lucey.John.D@epa.gov>
Subject: WSJ: New EPA Rules to Target Power Plant Pollution

New EPA Rules to Target Power Plant Pollution

Administrator Michael Regan says agency expects to propose tighter regulations on air and water emissions from electric utility plants

By
Jan. 25, 2022 7:00 am ET

The proposed rules could lead to the closing of some older coal-fired power plants.

Photo: Paul Hennessy/SOPA Images/Zuma Press

WASHINGTON—The Environmental Protection Agency is preparing to advance tougher regulations on power plants in coming months as part of President Biden's plan to cut greenhouse-gas emissions.

The agency wants to impose stricter air-quality standards for mercury and other toxic pollutants, as well as new restrictions on wastewater generated by power plants, EPA Administrator Michael Regan said in an interview.

Mr. Regan said the EPA is looking to roll out new proposals in a more coordinated approach to regulate the power sector, using the agency's broad array of powers to oversee air and water pollution as well as wastewater disposal.

"We don't have to overly rely on any one rule," Mr. Regan said. "It's looking at the full suite of authorities to maximize our ability to protect communities and public health."

EPA Administrator Michael Regan says the proposed rules are aimed at shielding poor and minority neighborhoods that often bear the brunt of power plant pollution.

Photo: Jose Luis Magana/Associated Press

Tom Kuhn, president of the Edison Electric Institute, an industry group that represents major utilities, said a coordinated approach "can help to provide a regulatory framework that supports these investments and accelerates the clean energy transition." But an industry group that represents smaller and rural power-plant owners expressed concern.

An onslaught of new rules could raise the cost of power to business and consumers if it isn't implemented carefully, and the cost of compliance could also force older plants powered by coal, oil and natural gas to close, said Louis Finkel, senior vice president of government relations for the National Rural Electric Cooperative Association.

"If the ambition is to create death by a thousand cuts, to make it more difficult to operate, yes—that's wildly problematic," Mr. Finkel said.

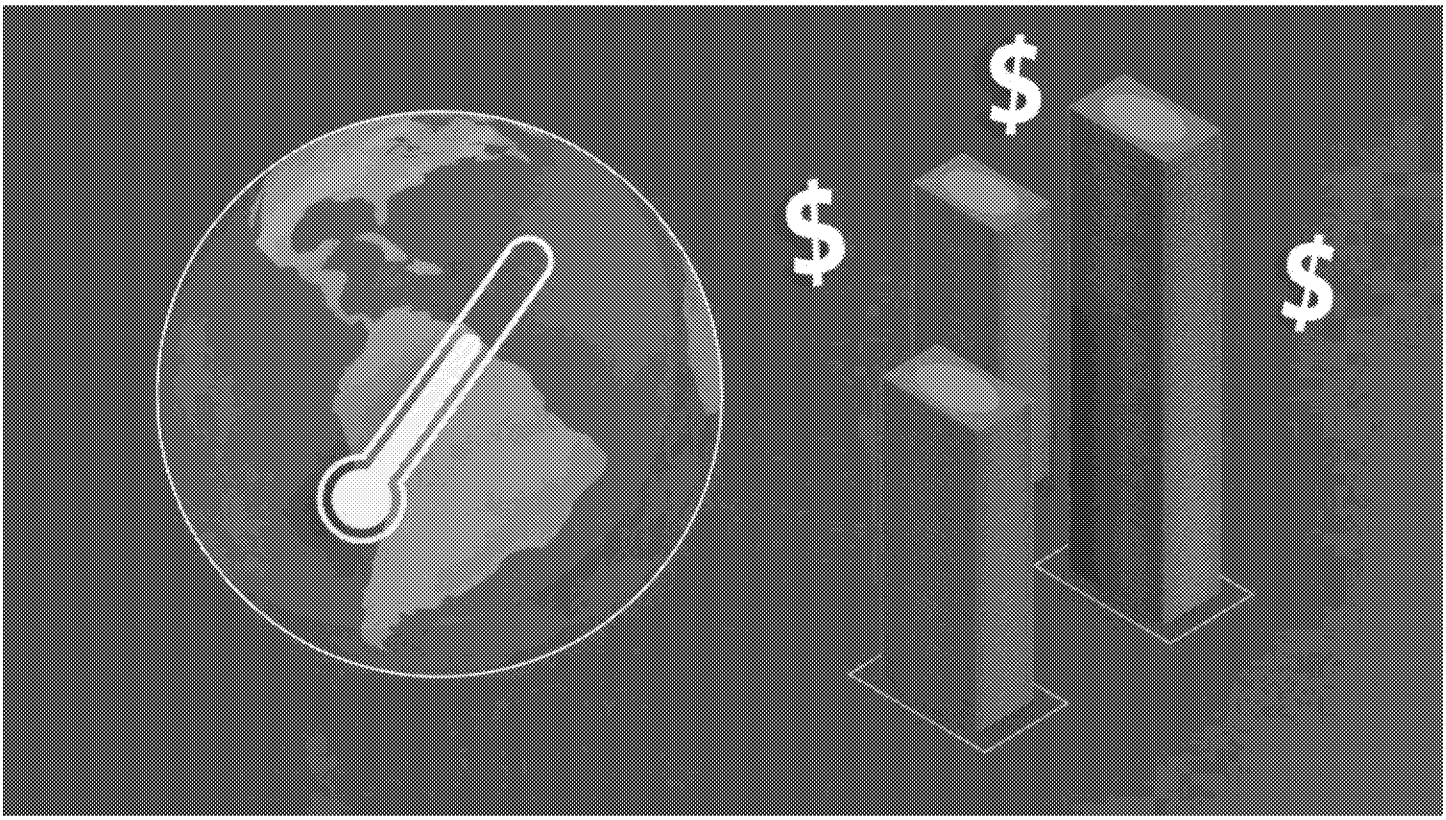
Mr. Finkel said the idea of a coordinated approach isn't by itself a big concern but he would be eager to hear more details from Mr. Regan about how exactly the EPA might implement the strategy.

He said environmentalists in the past have advocated for such a strategy as a way to target and close coal-fired power plants, which many states will see as a threat to low prices and reliable power.

Mr. Regan and agency officials wouldn't detail specific plans for each rule change. Mr. Regan said the proposed rules are aimed at shielding poor and minority neighborhoods that often get the brunt of power plant pollution, along with cutting greenhouse-gas emissions.

How Much Would It Cost to Reduce Global Warming? $131 Trillion Is One Answer

0:00 / 4:38



How Much Would It Cost to Reduce Global Warming? $131 Trillion Is One Answer

Money is a sticking point in climate-change negotiations around the world. As economists warn that limiting global warming to 1.5 degrees Celsius will cost many more trillions than anticipated, WSJ looks at how the funds could be spent, and who would pay. Illustration: Preston Jessee/WSJ

In addition to toxic pollutants such as mercury, the EPA also plans to propose tougher standards to reduce visible air pollution, or haze, generated by power plants.

Congress in 1977 required the EPA to improve air clarity in national parks and wilderness areas, primarily in the West. Advocates credit the Regional Haze Program for leading to the closure of several coal-fired power plants.

The EPA adopted its Mercury and Air Toxics Standards for power plants in 2012, but the Republican Trump administration revised those and other regulations, saying that they were too burdensome.

The White House is reviewing an EPA draft proposal to effectively reinstate the mercury rule and strengthen its limits on toxic emissions.

The EPA also announced last summer it would revisit changes made in 2020 to Effluent Guidelines for power-plant wastewater. It plans to issue a proposal by this fall to strengthen discharge limits.

More stringent power-plant regulations were relatively rare from the Biden administration in its first year. The EPA, under Mr. Regan, has finished rules that limit the use of coolant chemicals that are potent greenhouse gases, and rules to lower emissions from passenger carsand trucks. The agency also has announced preliminary steps to limit greenhouse-gas emissions from the oil and gas industry.

Similar climate rules that Mr. Biden promised for power plants, however, haven't moved forward. The EPA so far has taken a back seat on the issue to Congress, which for months debated new clean-energy standards for power plants.

But late last year lawmakers dropped the idea under opposition from coal-state Sen. Joe Manchin (D., W.Va.).

And now, broader attempts to boost federal funding for cleaner electricity are also at risk of failing to get Mr. Manchin's likely essential vote to pass the Senate.

It would be a safe fallback for the EPA to pursue tighter regulations on other emissions more traditionally thought of as pollutants, said Jonathan Skinner-Thompson, a former EPA lawyer now a law professor at the University of Colorado.

The EPA has more explicit, direct authority from Congress to do things like reduce haze or lower mercury pollution, he said. And regulations to address those problems often end up addressing climate change, too, most significantly by encouraging the industry to replace old, fossil-fuel burning plants with new, more efficient, wind or solar units.

"If we make [coal-fired plants] more expensive from other pollutants, rather than spend money to retrofit, it may just be better for them to shut down," Mr. Skinner-Thompson said. "Then you get the climate benefits without necessarily having to directly regulate greenhouse gas emissions."

Mr. Regan said he isn't deploying the strategy because he sees any limits to the agency's authority to address climate change directly. He calls a "holistic approach" for power-plant regulation a better way to spur reductions from across the broad list of pollutants that come from these plants, while also expediting cuts to carbon dioxide and other greenhouse gases.

"It's much more than just a carbon strategy," Mr. Regan said. "I'm convinced if we're going to protect people and communities and the environment and the planet, we have to do all of the above."

—Katy Stech Ferek contributed to this article.

Write to Timothy Puko at

Nick Conger
EPA Press Secretary
202-941-1116

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 1/26/2022 2:39:37 PM
To: Shaw, Betsy [Shaw.Betsy@epa.gov]; Peter Tsirigotis (Tsirigotis.Peter@epa.gov) [Tsirigotis.Peter@epa.gov]; Grundler, Christopher [grundler.christopher@epa.gov]; Dunham, Sarah (Dunham.Sarah@epa.gov) [Dunham.Sarah@epa.gov]
CC: Edwards, Jonathan [Edwards.Jonathan@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Alejandra Nunez (Nunez.Alejandra@epa.gov) [Nunez.Alejandra@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
Subject: FW: Notes for ADD call
Attachments: OAR Climate Activities -- discussions with Regions.docx

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Sent: Monday, January 24, 2022 8:34 PM
To: OAR Briefings <OAR_Briefings@epa.gov>
Subject: Notes for ADD call

Hi Joe,
Here's something else for you for tomorrow (I'm sorry to get this to you so late in the day). Attached are some potential talkers for the ADDs call tomorrow. I tried to capture key items in each bucket (key rulemakings, partnership programs, info/education/resources for states, and regional input).
This is longer and more detailed than you will want to use, but has the nuggets you were looking for, and this set perhaps can be refined for the RA call in February.

Thanks,
Isabel

Isabel DeLuca
Deputy Communications Director
Office of Air and Radiation, US EPA
Phone 202-343-9247

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 1/26/2022 11:00:55 PM
To: Culligan, Kevin [Culligan.Kevin@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
Subject: Re: Best for you to call Jason re: timing on MATS clearance

Got it. Thanks

Sent from my iPhone

On Jan 26, 2022, at 5:58 PM, Culligan, Kevin <Culligan.Kevin@epa.gov> wrote:

Ex. 5 Deliberative Process (DP)

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 1/27/2022 2:31:06 AM
To: Kim, Eunjung [Kim.Eun@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]
CC: Shoaff, John [Shoaff.John@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]; Shaw, Betsy [Shaw.Betsy@epa.gov]
Subject: RE: REVIEW - White House Gender Strategy

MATS?

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Kim, Eunjung <Kim.Eun@epa.gov>
Sent: Wednesday, January 26, 2022 5:01 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>
Cc: Shoaff, John <Shoaff.John@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>; Shaw, Betsy <Shaw.Betsy@epa.gov>
Subject: REVIEW - White House Gender Strategy

Hello Joe, Tomas, and Ale,

Ex. 5 Deliberative Process (DP)

Please review by 9am tomorrow.

EPA is limited to 3-5 line items, so OP will be merging some items (for example, combing all lead-related work into 1 line).

Thanks!

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 1/28/2022 1:05:20 PM
To: Hooper, Daniel [hooper.daniel@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]
Subject: Re: Proposal Signature Package: MATS A&N - Reconsideration (SAN 6716.2)
Attachments: Untitled Attachment

Will do after AM RT. Thanks

Sent from my iPhone

On Jan 28, 2022, at 8:02 AM, Hooper, Daniel <hooper.daniel@epa.gov> wrote:

Hi Joe,

Please see the MATS package attached for your review and concurrence. Tomas made a few suggested edits to the Action Memo (attached), and I also updated your title. Once you concur, please sign the Action Memo, and I can clean it up and send it on.

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Thursday, January 27, 2022 10:33 PM
To: Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: Proposal Signature Package: MATS A&N - Reconsideration (SAN 6716.2)

Thank you Dan. I concur, and have offered a few suggested edits to the Action Memo here. Best,

Tomás

From: Hooper, Daniel <hooper.daniel@epa.gov>
Sent: Thursday, January 27, 2022 1:02 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: FW: Proposal Signature Package: MATS A&N - Reconsideration (SAN 6716.2)
Importance: High

Tomas,

Please see the attached documents for your review and concurrence regarding MATS. Once you concur, I will send on to Joe.

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Morgan, Ruthw <morgan.ruthw@epa.gov>
Sent: Thursday, January 27, 2022 11:40 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Lubetsky, Jonathan <Lubetsky.Jonathan@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Chang, Alice <Chang.Alice@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>; OAPREGPROCESSING <OAPREGPROCESSING@epa.gov>
Subject: Proposal Signature Package: MATS A&N - Reconsideration (SAN 6716.2)
Importance: High

SAN 6716.2

TO: THE IMMEDIATE OFFICE FOR REVIEW AND CONCURRENCE FOR THE ADMINISTRATOR'S SIGNATURE.

Attached files for the MATS A&N (SAN 6716.2) (Proposed rule). **Please forward to OAR for expedited review. OGC concurred on 9/21/21.**

CMS # is OAR-22-000-2062.

POC: Amber Iglesias
202-564-3175

Thanks!

Ruthw Morgan, Program Analyst
OAR
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460
(202) 564-1326
Morgan.Ruthw@epa.gov

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 1/28/2022 5:54:30 PM
To: Hooper, Daniel [hooper.daniel@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]
Subject: RE: Proposal Signature Package: MATS A&N - Reconsideration (SAN 6716.2)
Attachments: Action Memo_MATS AN Proposal_OAR Letterhead_1262022 JG.docx

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Hooper, Daniel <hooper.daniel@epa.gov>
Sent: Friday, January 28, 2022 8:02 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Subject: FW: Proposal Signature Package: MATS A&N - Reconsideration (SAN 6716.2)

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Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Thursday, January 27, 2022 10:33 PM
To: Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: Proposal Signature Package: MATS A&N - Reconsideration (SAN 6716.2)

Thank you Dan. I concur, and have offered a few suggested edits to the Action Memo here. Best,

Tomás

From: Hooper, Daniel <hooper.daniel@epa.gov>
Sent: Thursday, January 27, 2022 1:02 PM

To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: FW: Proposal Signature Package: MATS A&N - Reconsideration (SAN 6716.2)
Importance: High

Tomas,

Please see the attached documents for your review and concurrence regarding MATS. Once you concur, I will send on to Joe.

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Morgan, Ruthw <morgan.ruthw@epa.gov>
Sent: Thursday, January 27, 2022 11:40 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Lubetsky, Jonathan <Lubetsky.Jonathan@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Chang, Alice <Chang.Alice@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>; OAPREGPROCESSING <OAPREGPROCESSING@epa.gov>
Subject: Proposal Signature Package: MATS A&N - Reconsideration (SAN 6716.2)
Importance: High

SAN 6716.2

TO: THE IMMEDIATE OFFICE FOR REVIEW AND CONCURRENCE FOR THE ADMINISTRATOR'S SIGNATURE.

Attached files for the MATS A&N (SAN 6716.2) (Proposed rule). **Please forward to OAR for expedited review. OGC concurred on 9/21/21.**

CMS # is OAR-22-000-2062.

POC: Amber Iglesias
202-564-3175

Thanks!

Ruthw Morgan, Program Analyst
OAR
U.S. Environmental Protection Agency

1200 Pennsylvania Ave., NW
Washington, DC 20460
(202) 564-1326
Morgan.Ruthw@epa.gov

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 2/1/2022 3:46:02 PM
To: Joseph Goffman [joegoffman@gmail.com]
Subject: FW: MATS Clips

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Adm16.Michael.Regan <Ex. 6 Personal Privacy (PP)@epa.gov>
Sent: Tuesday, February 1, 2022 10:37 AM
To: Hamilton, Lindsay <Hamilton.Lindsay@epa.gov>
Cc: Utech, Dan <Utech.Dan@epa.gov>; Cassady, Alison <Cassady.Alison@epa.gov>; McCabe, Janet <McCabe.Janet@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Lucey, John <Lucey.John.D@epa.gov>; Lamy, Kendra <Lamy.Kendra@epa.gov>
Subject: Re: MATS Clips

Thank you … great job everyone, especially to Joe for giving us something to celebrate. Good day for EPA and clean air.

Sent from my iPhone

On Feb 1, 2022, at 9:51 AM, Hamilton, Lindsay <Hamilton.Lindsay@epa.gov> wrote:

MATS clips roundup.

AP: EPA restores rule to limit power-plant mercury emissions
https://apnews.com/article/business-health-environment-and-nature-donald-trump-environment-3155202c643bbece7e0854a5e13d257c

Bloomberg: Power Plant Mercury Limits Get Legal Underpinnings Restored
https://news.bloomberglaw.com/environment-and-energy/mercury-air-rules-get-restored-legal-boost-under-epa-proposal

CNN: EPA to bring back mercury pollution rules that were nixed under Trump administration
https://www.cnn.com/2022/01/31/politics/epa-mercury-pollution-coal-plants-climate/index.html

E&E News: Biden admin moves to slash air toxics, boost clean energy
https://www.eenews.net/articles/biden-admin-moves-to-slash-air-toxics-boost-clean-energy/

Law360: EPA Floats Stabilizing Mercury Emissions Rule
https://www.law360.com/articles/1460408/epa-floats-stabilizing-mercury-emissions-rule

Reuters: U.S. EPA moves to advance mercury and air toxics rule
https://www.reuters.com/world/us/us-epa-moves-advance-mercury-air-toxics-rule-2022-01-31/

The Hill: Biden administration proposes restoration of power plant rules undermined by Trump
https://thehill.com/policy/energy-environment/592133-biden-administration-proposes-to-restore-legal-basis-for-power

NYT: Biden Administration to Reinstate Mercury Pollution Rules Weakened Under Trump
https://www.nytimes.com/2022/01/31/climate/epa-mercury-pollution-coal.html

WaPo: EPA affirms its right to limit mercury from power plants, as part of Biden's broader push to curb climate pollution
https://www.washingtonpost.com/climate-environment/2022/01/31/mercury-power-plants-epa-climate/

WSJ: EPA Moves to Restore Obama-Era Rules on Power Plants
https://www.wsj.com/articles/epa-moves-to-restore-obama-era-rules-on-power-plants-11643664569

++++

AP: EPA restores rule to limit power-plant mercury emissions
https://apnews.com/article/business-health-environment-and-nature-donald-trump-environment-3155202c643bbece7e0854a5e13d257c
By Matthew Daly

WASHINGTON (AP) — In yet another reversal of a Trump-era action, the Environmental Protection Agency said Monday it will resume enforcement of a rule that limits power plant emissions of mercury and other hazardous pollutants.

The EPA action restores a 2012 rule imposed under President Barack Obama that was credited with curbing mercury's devastating neurological damage to children and prevented thousands of premature deaths while reducing the risk of heart attacks and cancer, among other public health benefits.

"Sound science makes it clear that we need to limit mercury and toxins in the air to protect children and vulnerable communities from dangerous pollution," EPA Administrator Michael Regan said in a statement. "EPA is committed to aggressively reducing pollution from the power sector so that all people, regardless of ZIP code or amount of money in their pocket, can breathe clean air and live healthy and productive lives."

The action is another example of the Biden administration reinstating environmental protections loosened under President Donald Trump.

President Joe Biden has set a goal to make the U.S. electricity sector carbon-neutral by 2035, but a sweeping, $555 billion plan to promote clean energy such as wind and solar power remains stalled in Congress, following an objection by Sen. Joe Manchin, D-W.Va.

Even without legislation, Biden can pursue his climate agenda through rules and regulations. But those can be undone by subsequent presidents, as demonstrated by the mercury rule and other environmental actions taken under Trump.

The EPA has announced a series of regulatory actions under Regan, including a plan to impose stronger limits on tailpipe emissions from cars and trucks and tighten restrictions on emissions of methane, a leading contributor to global warming.

The Interior Department also has announced approval of large-scale solar projects in California and other states and backed major offshore wind projects along the East Coast.

Still, Biden's agenda remains at risk and could be jeopardized further by a Supreme Court case scheduled to be heard in late February. Justices will hear arguments in a case brought by West Virginia that could undercut EPA's ability to regulate greenhouse gas emissions from coal-fired power plants under the Clean Air Act.

The Trump administration gutted the mercury rule on power plants in 2020, saying the earlier rule amounted to regulatory overreach that imposed undue harm on the power sector. Andrew Wheeler, the former coal lobbyist who headed the EPA under Trump, said the 2020 action balanced the rule's cost to utilities with public safety.

In reversing that decision, the EPA said the Trump-era action was "based on a fundamentally flawed interpretation of the Clean Air Act that improperly ignored or undervalued vital health benefits from reducing hazardous air pollution from power plants."

Based on a thorough review of the benefits, the "reasonable costs of controls" and other factors, "EPA is proposing to reaffirm that it is appropriate and necessary to regulate emissions of hazardous air pollutants from coal- and oil-fired power plants," the agency said.

Environmental groups welcomed the change, which they had been urging for months.

"EPA has a clear authority and responsibility to protect Americans from mercury and other toxic pollution from power plants, and today's finding reflects that," said Michael Panfil, a lawyer for the Environmental Defense Fund.

The next step is to strengthen the Obama-era rule, Panfil and other environmentalists said.

"While the Mercury and Air Toxics Standards have been successful, there are still many coal plants that release significant amounts of mercury pollution and put American families at risk," he said.

The Obama-era rule led to what electric utilities say was an $18 billion cleanup of mercury and other toxins from the smokestacks of coal-fired power plants.

Most coal-fired power plants have already made the technological upgrades required by the 2012 rule. A group representing investor-owned electric companies hailed EPA's action to restore a legal determination that the mercury rule was appropriate and necessary.

"Since 2010, our industry has reduced its mercury emissions by more than 91%," said Tom Kuhn, president of the Edison Electric Institute, an industry lobbying group.

"Restoring the 'appropriate and necessary' finding enables electric companies to remain focused on getting the energy we provide as clean as we can as fast as we can," while maintaining reliability and affordability, Kuhn said.

Coal-fired power plants are the largest single manmade source of mercury pollutants, which enter the food chain through fish and other items that people consume.

Bloomberg: Power Plant Mercury Limits Get Legal Underpinnings Restored
https://news.bloomberglaw.com/environment-and-energy/mercury-air-rules-get-restored-legal-boost-under-epa-proposal
BY JENNIFER HIJAZI

The Biden administration on Monday unveiled plans to restore key language that justifies mercury and air toxics rules, establishing that emission limits for coal-fired plants are "appropriate and necessary."

That legal finding was tossed under the Trump administration in 2020, a hotly contested move that many argued weakened some of the most powerful clean air and water standards EPA has in its arsenal.

"The previous administration's attempt to undermine them was unconscionable and unlawful, and we thank EPA for today's proposal to correct it," the American Academy of Pediatrics, the American Lung Association, and other health groups said in a statement on the proposal.

The proposed rule from the Environmental Protection Agency would affirm cornerstone language of Mercury and Air Toxics Standards, or MATS.

"EPA is committed to aggressively reducing pollution from the power sector so that all people, regardless of zip code or amount of money in their pocket, can breathe clean air and live healthy and productive lives," Administrator Michael Regan said in a statement.

'Breathe a Little Easier'

The proposal doesn't suggest increasing the standards' stringency, but does leave the door open for future rulemaking. Part of the proposal calls for more information on improving costs and performance of emission control technology, the agency said.

"Fortunately, we can now breathe a little easier knowing that EPA is sticking with what most of us know to be true—clean air is integral to healthy communities and a thriving economy," Senate Environment and Public Works Committee Chairman Tom Carper (D-Del.), said in a statement.

Health groups applauded the move, and said they still want more stringent standards.

"President Biden's EPA must now strengthen the MATS rule," Patrick Drupp, Sierra Club Deputy Legislative Director for Climate and Clean Air, said in a statement. "No amount of toxic pollution is acceptable in the air we breathe, especially when there are feasible, cost effective means of protecting public health."

Since the rule's creation in 2012, power plant emissions of hazardous mercury pollution into the air and water have been reduced by 86%. The emissions can lead to issues including neurological defects and cardiovascular problems.

CNN: EPA to bring back mercury pollution rules that were nixed under Trump administration
https://www.cnn.com/2022/01/31/politics/epa-mercury-pollution-coal-plants-climate/index.html

By Ella Nilsen

(CNN) — The Environmental Protection Agency announced on Monday it intends to reaffirm its authority to regulate toxic mercury from power plant smokestacks, undoing a Trump-era rollback.

The EPA is proposing to bring back the 2012 Mercury and Air Toxics Standards rules that were first implemented during the Obama administration. The rules require power plants to reduce pollutants, including mercury and acid gases, which Biden administration officials say will improve public health.

Mercury is a neurotoxin with several health impacts, including its harmful effect on brain development in children.

"Sound science makes it clear that we need to limit mercury and toxins in the air to protect children and vulnerable communities from dangerous pollution," EPA Administrator Michael S. Regan said in a statement. "EPA is committed to aggressively reducing pollution from the power sector so that all people, regardless of zip code or amount of money in their pocket, can breathe clean air and live healthy and productive lives."

The Trump administration reversed the rules in May 2020, saying they were not "appropriate and necessary" because they were too burdensome to industry.

The EPA said it is also examining whether to make the rules more stringent.

Monday's announcement is one of several recent EPA regulations targeting toxins emitted from smokestacks and coal ash ponds. On their face, the air and wastewater rules would not regulate greenhouse gas emissions, but they could have that effect.

The agency faces a significant legal challenge at the US Supreme Court later this month in a case that questions its authority to regulate greenhouse gas emissions.
"We don't have to overly rely on any one rule," Regan told the Wall Street Journal in a recent interview. "It's looking at the full suite of authorities to maximize our ability to protect communities and public health."

The mercury rules sharply reduced mercury emissions while they were in place, according to the EPA. Compared to 2010 levels, mercury emissions from power plants were down by 86% by 2017, five years after the rules were implemented, according to a news release. Acid gas emissions were also down by 96%, and non-mercury metal emissions were down by 81%.

Senate Environment and Public Works Chair Tom Carper applauded the proposed rules change.

"Every American — no matter their zip code — deserves to live in a community that is free of mercury and other harmful air pollution," Carper said in a statement.

The EPA will take public comment on the proposal for 60 days and plans hold a virtual public hearing on the rules.

E&E News: Biden admin moves to slash air toxics, boost clean energy
https://www.eenews.net/articles/biden-admin-moves-to-slash-air-toxics-boost-clean-energy/
By Sean Reilly

For the fourth and perhaps final time, EPA today asserted its authority to regulate some of the most toxic air releases from power plants in hopes of ending a seesaw regulatory fight that has spanned decades and once reached the Supreme Court.

EPA's proposed rulemaking advances the Biden administration's climate goals and pledges to address environmental justice and efforts to boost cleaner energy.

But with the agency's ability to regulate power industry carbon emissions now at risk from another pending case before the high court, the draft rule released this afternoon could also presage a broader EPA campaign to further the Biden administration's climate goals by other means (Climatewire, Jan. 24).

"Sound science makes it clear that we need to limit mercury and toxins in the air to protect children and vulnerable communities from dangerous pollution," EPA Administrator Michael Regan said in a statement. "EPA is committed to aggressively reducing pollution from the power sector so that all people, regardless of zip code or amount of money in their pocket, can breathe clean air and live healthy and productive lives."

In the newly released draft, the agency reaffirmed the legally required finding that it is "appropriate and necessary" to limit emissions of mercury, arsenic and other hazardous pollutants from coal-fired power plants. If made final, the proposal would reverse a Trump administration decision to scrap that finding, which laid the foundation for seminal regulations issued a decade ago that have helped slash those emissions.

Because all major utilities have long since come into compliance with what are formally known as the Mercury and Air Toxics Standards, the proposal will have no immediate practical impact if made final. But it could shield the standards from a coal company lawsuit filed two years ago alleging that they should be revoked because their legal basis no longer exists. EPA is also seeking public feedback on the option of tightening the existing emissions limits based on advances in pollution control technology over the last decade.

In a flurry of news releases, environmental and public health groups — and even industry — swiftly applauded the proposal and urged further action.

"Now EPA must stay on the offensive in the fight for public health," Earthjustice attorney Neil Gormley said. "We look forward to working with the agency as it moves ahead to strengthen MATS and other essential clean air rules."

Also expressing gratitude was a top utility industry trade group that's usually not a fan of EPA. Restoration of the appropriate and necessary finding "enables electric companies to remain focused on getting the energy we provide as clean as we can as fast as we can, while maintaining the reliability and affordability that our customers value," said Tom Kuhn, president of the Edison Electric Institute.

Power companies had opposed the Trump administration's 2020 decision to revoke the finding for fear that it could imperil their ability to recoup MATS compliance costs from ratepayers.

Under the 1990 Clean Air Act amendments, EPA had to formally make that determination before issuing the standards. After the Clinton administration initially made the finding in 2000, it was revoked by the George W. Bush administration and then reaffirmed under President Obama in 2012 and 2016.

Because mercury is a neurotoxin that can affect babies' brain development, the Trump administration's decision to roll back the finding was particularly hard-fought. In justifying its decision, the Trump EPA pointed to the original cost-benefit analysis, which found that almost all the quantifiable health gains would come from "co-benefits" stemming from cuts in soot-forming pollutants that were not among those directly targeted by the standards.

The contrast with the standards' projected $9.6 billion compliance cost later caught the attention of the Supreme Court, which in a 2015 opinion allowed the emission limits to go into effect but found that EPA should have considered compliance expenses in making the appropriate and necessary finding. The agency reaffirmed the finding the following year.

Law360: EPA Floats Stabilizing Mercury Emissions Rule
https://www.law360.com/articles/1460408/epa-floats-stabilizing-mercury-emissions-rule
By Juan Carlos Rodriguez

The U.S. Environmental Protection Agency on Monday proposed reinstating an Obama-era legal finding — which had been struck down by the Trump administration — that underpinned mercury emissions standards for power plants.

EPA Administrator Michael Regan, pictured in December, said in a statement on Monday that the agency "is committed to aggressively reducing pollution from the power sector." (AP Photo/Jacquelyn Martin, File)

In yet another important regulatory flip-flop, the EPA said health benefits stemming from 2012 mercury and air toxics standards rule outweighed compliance costs. The finding restores the Obama administration's conclusion that it was "appropriate and necessary" to regulate mercury emissions for coal- and oil-fired power plants under the Clean Air Act. That finding was a prerequisite for the actual regulations.

"Sound science makes it clear that we need to limit mercury and toxins in the air to protect children and vulnerable communities from dangerous pollution," EPA Administrator Michael Regan said in a statement Monday. "EPA is committed to aggressively reducing pollution from the power sector so that all people, regardless of zip code or amount of money in their pocket, can breathe clean air and live healthy and productive lives."

The EPA under former President Donald Trump had said it was improper for the Obama administration to consider benefits from the regulation that weren't achieved by the targeted pollutants that were the subject of the rule. By leaving out the benefits of reducing particulate matter emissions, the Obama-era MATS rule cost more than it helped, officials said.

The regulations themselves have never been struck down — the Trump administration chose to revoke the "appropriate and necessary" finding but leave the rule in place. So not much will change in practice.

There were several lawsuits filed against the EPA in the wake of its decision.

Coal company Westmoreland Mining Holdings LLC used the opportunity to ask the D.C. Circuit to undo the Obama-era limits on coal-fired power plants' mercury emissions, arguing that since the legal justification for the standards had been removed, the regulations could not stand.

Blue state attorneys general and environmental advocacy groups sued the agency over the reversal itself.

And power generators including Calpine Corp. and Puget Sound Energy also filed petitions for review of the EPA's reversal at the D.C. Circuit.

All that litigation has been paused since the Biden administration took power in 2021.

The EPA's Monday announcement drew praise from several quarters.

Tom Kuhn, president of the Edison Electric Institute, an association that represents all U.S. investor-owned electric companies, noted the group's member companies have already had the MATS rule implemented for years.

"EEI's member companies, and the electric power industry collectively, have invested more than $18 billion to install pollution control technologies to meet these standards," Kuhn said in a statement. "Since 2010, our industry has reduced its mercury emissions by more than 91 percent, and we have seen a significant change in our nation's energy mix, which is getting cleaner and cleaner every day."

Patrick Drupp, the Sierra Club's deputy legislative director for climate and clean air, urged the EPA to go even further.

"President Biden's EPA must now strengthen the MATS rule," Drupp said in a statement Monday. "No amount of toxic pollution is acceptable in the air we breathe, especially when there are feasible, cost effective means of protecting public health."

And John Walke, director of the clean air program at the Natural Resources Defense Council, said the mercury emissions standards do have important effects.

"These safeguards work — and there's proof, if you look at the decrease in mortality, asthma and other health outcomes since they first took effect in 2015," Walke said in a statement Monday. "With the Biden-Harris administration clearing away the Trump EPA's attempted sabotage of these standards, now EPA needs to strengthen the standards to better protect Americans and U.S. air quality."

Reuters: U.S. EPA moves to advance mercury and air toxics rule
https://www.reuters.com/world/us/us-epa-moves-advance-mercury-air-toxics-rule-2022-01-31/
By Valerie Volcovici

WASHINGTON, Jan 31 (Reuters) - The U.S. Environmental Protection Agency on Monday revived an Obama administration-era legal finding that regulating hazardous air toxics and mercury from power plants is necessary, a key step before it can strengthen those air regulations.

The move to deem the Mercury and Air Toxics Standards (MATS) "appropriate and necessary" would pave the way for the EPA to update the power plant regulation. Power plants are the largest source of those toxic pollutants.

Former President Donald Trump's EPA had reversed that legal finding in 2020, citing flaws in the Obama EPA's cost-benefit analysis of the rule. That reversal effectively weakened the MATS rule because it opened the door to lawsuits by companies opposed to it.

“EPA is committed to aggressively reducing pollution from the power sector so that all people, regardless of zip code or amount of money in their pocket, can breathe clean air and live healthy and productive lives,” said EPA Administrator Michael Regan.

The new proposal would leave the current MATS unchanged but would begin the process to gather public health information and public input it needs to strengthen the regulation.

The Obama EPA had concluded in 2012 that controlling mercury, acid gases, and other harmful pollutants could reduce heart attacks and cancer risks and avoid neurodevelopmental delays in children justified the costs of compliance.

The calculations used at the time, however, accounted for how pollution-control equipment at coal plants would reduce emissions of particulate matter and other harmful substances that come out of smokestacks, in addition to mercury.

Trump’s EPA said it believed it was inappropriate to have included the benefits of reducing emissions other than mercury.

"The previous administration ignored science as it attempted to turn back the clock on these protections," said Democratic Senator Tom Carper.

The MATS rule has helped drive sharp reductions in air pollutants, according to the EPA. The agency estimates that by 2017, mercury emissions from power plants were reduced by 86%; acid gas emissions were reduced by 96%, and non-mercury metal emissions were reduced by 81% percent compared with pre-MATS levels in 2010.

The Hill: Biden administration proposes restoration of power plant rules undermined by Trump
https://thehill.com/policy/energy-environment/592133-biden-administration-proposes-to-restore-legal-basis-for-power
By Rachel Frazin

The Biden administration on Monday proposed restoring the legal underpinnings of power plant pollution regulations following a Trump administration rollback.

In 2020, the Trump administration undercut a regulation known as the Mercury and Air Toxics Standards (MATS) rule by changing its legal justification in a way that made it more vulnerable to lawsuits.

The MATS rule, in general, puts limits on how much of these toxic substances coal and oil power plants can release into the air. Mercury is a neurotoxin that is particularly harmful to children.

Neither the 2020 rule nor Monday's action made any changes to the Obama-era standards themselves.

Instead, the Biden administration on Monday proposed to affirm that it is "appropriate and necessary" to regulate the emissions of these pollutants from power plants, while the Trump administration had said the regulations were not appropriate and necessary.

"Sound science makes it clear that we need to limit mercury and toxins in the air to protect children and vulnerable communities from dangerous pollution," EPA Administrator Michael Regan said in a statement.

"EPA is committed to aggressively reducing pollution from the power sector so that all people, regardless of zip code or amount of money in their pocket, can breathe clean air and live healthy and productive lives," he said.

According to the EPA's website, the standards are estimated to have prevented between 4,200 and 11,000 premature deaths annually.

At the time of the rollback, critics argued that the Trump administration was working to give polluters who wanted to sue in order to eliminate the rules an advantage in court. And, following the changes, a coal company challenged the MATS rule in court.

The Trump administration had found that the billions in costs that compliance would impose on power producers annually outweighs the $4 million to $6 million in benefits that the regulation would provide. The Obama administration had found that the benefits would be worth $90 billion.

The vast discrepancy between the potential benefits came down to how they were calculated and specifically the Trump administration's exclusion of "co-benefits" — or indirect benefits gleaned from the rules' impact on pollutants that are not strictly "targeted" by the rule.

Meanwhile, Monday's proposal also indicated the Biden administration will take a second look at possibly implementing additional regulations.

It said that it would review the Trump administration's finding that with the current standards in place, there aren't remaining risks from the power plants' emissions of the substances in question. The outcome will be announced in a separate action.

WaPo: EPA affirms its right to limit mercury from power plants, as part of Biden's broader push to curb climate pollution

https://www.washingtonpost.com/climate-environment/2022/01/31/mercury-power-plants-epa-climate/

By Dino Grandoni

Biden administration officials are kicking off a crackdown on power plant pollution, aiming to shift the nation's electricity supply to cleaner energy in the face of congressional resistance and a Supreme Court that could limit the federal government's ability to tighten public health standards.

On Monday, the Environmental Protection Agency affirmed its authority to curb mercury from smokestacks, reversing a 2020 Trump administration policy. The move signals a broader effort by the administration to cut greenhouse gases and other pollutants from U.S. power plants, which rank as the nation's second-biggest contributorto global warming.

President Biden has pledged to make the U.S. electricity sector carbon-neutral by 2035, but his deputies may have to rely on their existing federal authority now that Sen. Joe Manchin III (D-W.Va.) has blocked the president's plan to provide utilities with incentives to transition faster to clean energy. And in late February, the Supreme Court will hear arguments in a case brought by West Virginia that may undercut EPA's ability to regulate greenhouse gas emissions from coal-fired power plants in the future.

But EPA can pressure the nation's dirtiest coal plants to shut down through other means, and the administration is beginning to exercise its leverage.

"Regulations to require power producers to bear the costs of their own pollution are decades overdue," said Thom Cmar, an attorney with the law firm AltmanNewman who represents environmental groups.

The agency determined Monday that it is "appropriate and necessary" to limit mercury and other toxic air pollutants from power plants. Exposure to the heavy metal — which wafts into the air from coal plants and settles in lakes and streams and enters the food chain after being absorbed by fish — can harm brain development in babies and cause heart disease in adults.

"Sound science makes it clear that we need to limit mercury and toxins in the air to protect children and vulnerable communities from dangerous pollution," EPA Administrator Michael Regan said in a statement.

The proposed legal finding does not change mercury control requirements adopted under Barack Obama, but it abolishes a Trump-era determination that said these limits were unnecessary and that threatened to narrow the health benefits EPA would consider when crafting clean air rules. And it lays the groundwork for tightening mercury controls in the future, which Biden officials may pursue.

Environmental Defense Fund general counsel Vickie Patton said "it's urgent" to update those standards, arguing that many coal plants still emit far too much mercury.

"Those standards, they're out of date," she said. "They need to be modernized to protect people from the most toxic contaminants that are discharged from coal plants."

With expensive "scrubber" technology already installed across power plants nationwide, many utilities support restoring the underlying legal basis for limits on air toxins. Edison Electric Institute President Tom Kuhn, whose group represents investor-owned electricity providers, said his members, "and the electric power industry collectively, have invested more than $18 billion to install pollution control technologies to meet these standards."

But to meet the president's ambitious goal to decarbonize the power sector, his team must do much more.

Later this year, the EPA plans to outline new standards for greenhouse gas emissions from existing fossil fuel plants, which would replace the Obama-era Clean Power Plan. The Supreme Court blocked that regulation from taking effect in 2016, and the U.S. Court of Appeals for the District of Columbia Circuit struck down Trump's replacement rule a day before Biden took office.

But the agency will strain to craft a rule that can withstand scrutiny from an increasingly conservative Supreme Court. Now with three Trump-appointed justices, the high court will hear a case in Februarybrought by Republican-led states and the coal industry challenging whether the EPA has authority to limit power plants' greenhouse gases under the Clean Air Act.

The case is unusual since the federal government does not have a policy limiting power plants' carbon dioxide emissions on the books.

"Normally the court would wait until they have a new rule to review," said Carrie Jenks, executive director of Harvard Law School's Environmental and Energy Law Program, adding that EPA officials "obviously have to see what the Supreme Court says. And the Supreme Court could say things that would change their timing."

But West Virginia Attorney General Patrick Morrisey, who leads the lawsuit against the EPA, said Congress has never given federal officials the authority to transform the way utilities produce power in the first place.

"This is a really important case for the future of our republic because it raises a number of important questions," he said in a recent interview. "Who do we want to make the nation's most important, life-changing decisions? Do we want elected representatives who are accountable to the people? Or do we want unelected bureaucrats?"

Beyond capping greenhouse gas emissions, the Biden administration is taking other steps that, when combined, will make it more costly to burn coal and could hasten the closure of polluting power plants.

"All these hidden environmental and public health costs need to be brought back into the equation, so coal and gas aren't getting a free ride," said Jeremy Symons, an environmental consultant who co-wrote a 300-page blueprint in 2020 laying out how the EPA can avoid some of the pitfalls that slowed down the Obama administration.

This fall, for instance, the EPA plans to propose a rule compelling many coal-fired plants to update filtration systems that treat wastewater laced with arsenic and other contaminants before reaching drinking water. The stricter requirements would undo one of the Trump administration'sregulatory rollbacks. At least 20 power

plants have told state regulators they may need to close or switch to natural gas if those wastewater requirements take effect, according to the Sierra Club.

The agency is also ramping up enforcement of another power plant rule: toxic coal ash disposal. About 500 unlined surface impoundments of waste from coal combustion threaten to leach contaminants such as mercury, cadmium and arsenic into nearby water. On Jan. 11, the EPA proposed denying requests from three power plants — in Indiana, Iowa and Ohio — to extend the use of their coal ash sites.

"We think it's just a matter of time" until there is a contamination problem, said Richard Hill, an activist who lives near the Clifty Creek Power Station on the Ohio River in Indiana. "Eventually, there will be issues."

EPA spokeswoman Lindsay Hamilton said the Biden administration is working to "identify the full range of our regulatory tools and consider how best to apply them to address the multipollutant impacts of the power sector."

Over the past decade, the economics of running coal plants have become harder in the face of competition from cheaper gas-fired energy as well as wind turbines and solar farms.

Yet in pockets across the country, coal persists. One of the country's top mercury emitters is North Dakota's Coal Creek Station, according to an analysis by the Environmental Defense Fund. The plant was on the verge of shutting down when local officials rallied to save it by blocking competing wind and solar projects.

Overall, the pace of coal retirements slowed during Biden's first year in office, according to the U.S. Energy Information Administration, though that rate is expected to rise this year.

WSJ: EPA Moves to Restore Obama-Era Rules on Power Plants

https://www.wsj.com/articles/epa-moves-to-restore-obama-era-rules-on-power-plants-11643664569

By Katy Stech Ferek

The Environmental Protection Agency on Monday moved to restore a federal determination that allowed it to regulate mercury, lead and other toxic metals from coal-fired and oil-fired power plants.

Under the Obama administration, the EPA said it had the authority to regulate emissions of mercury and other toxic metals from power plant emissions under the Clean Air Act as long as EPA officials determined it was "appropriate and necessary."

In 2020, the Trump administration withdrew that determination, saying that regulators made errors when calculating the costs and benefits of the rules. That revocation led a coal producer to ask the U.S. Court of Appeals for District of Columbia Circuit to eliminate the regulations that Obama-era officials had relied on to regulate air pollutants.

In reinstating the policy, the EPA said that controlling toxic emissions reduces cancer risks and neurodevelopmental delays in children.

Scoops, analysis and insights driving Washington from the WSJ's D.C. bureau.

"Sound science makes it clear that we need to limit mercury and toxins in the air to protect children and vulnerable communities from dangerous pollution," said EPA Administrator Michael Regan.

The Wall Street Journal reported last week that the EPA was moving to toughen rules on power plants as part of President Biden's efforts to curb greenhouse-gas emissions blamed for climate change.

Monday's proposal, if enacted, would mark a setback for coal miner Westmoreland Mining Holdings LLC, which had asked the court to get rid of regulations that require operators of the country's coal- and oil-burning power plants to cut emissions, including by installing filtration equipment that strained the pollutants from the air. A judge has yet to rule on that request.

Public-health and environmental groups said the existing regulations, which set an April 2015 compliance deadline for operators, have been effective at cutting air pollutants emissions. Mercury emissions from power plants dropped by 86% in 2017 compared with 2010 levels, according to an EPA estimate.

Before the regulations, power plants ranked as the largest domestic source of mercury, the agency said.

Mercury, arsenic and other toxic metals are released into the air from power plant smokestacks and make their way into U.S. waterways and to the food chain, leading to fish consumption advisories. They are linked to brain developmental problems in infants and cancer.

Federal law requires regulators who make rules under the Clean Air Act to first determine that the protections are appropriate and necessary. They first made that determination related to coal-fired and oil-fired power plants in 2000, then reaffirmed it as the 2012 regulations were released.

A year ago, Mr. Biden ordered EPA officials to review the Trump administration's revocation related to the mercury emissions rules, known as the Mercury and Air Toxics Standards. EPA officials will take comments for 60 days on Monday's proposal.

Message

From: Goffman, Joseph [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=23474D598E8D4EDFA9214A5991F2935B-GOFFMAN, JO]
Sent: 2/1/2022 11:00:02 PM
To: Grundler, Christopher [grundler.christopher@epa.gov]; Sasser, Erika [Sasser.Erika@epa.gov]; Profeta, Timothy [Profeta.Timothy@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Tsirigotis, Peter [Tsirigotis.Peter@epa.gov]; Culligan, Kevin [Culligan.Kevin@epa.gov]
Subject: RE: Proposed language for SOTU

This is great, Erika, especially the Estimated Burdens document. At this point we may not know any sooner than Thursday or Friday where the Administrator and/or the SOTU team want to go with this, so stay tuned. Great progress so far, though. Thanks to everyone who worked on this.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Grundler, Christopher <grundler.christopher@epa.gov>
Sent: Tuesday, February 1, 2022 5:55 PM
To: Sasser, Erika <Sasser.Erika@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Thanks for the quick work on this Erika

Christopher Grundler, Director
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202.343.9140 (o)
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From: Sasser, Erika <Sasser.Erika@epa.gov>
Sent: Tuesday, February 1, 2022 5:23 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Hope this is useful. Please let us know if more is needed.

thanks

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Monday, January 31, 2022 7:54 PM
To: Sasser, Erika <Sasser.Erika@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Sasser, Erika <Sasser.Erika@epa.gov>
Sent: Monday, January 31, 2022 5:06 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Ex. 5 Deliberative Process (DP)

thanks

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Sunday, January 30, 2022 2:35 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Goffman, Joseph
Sent: Sunday, January 30, 2022 11:51 AM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

OK. I'm about to disappear into a couple of hours of stakeholder calls on the MATS proposal, but I will turn to playing around with this language after that. Next stop will be Dan. Thanks, Tim, Tomas, and everyone for getting us to this point.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Sunday, January 30, 2022 11:41 AM
To: Grundler, Christopher <grundler.christopher@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Hello all –

Ex. 5 Deliberative Process (DP)

Tim

**

Ex. 5 Deliberative Process (DP)

From: Grundler, Christopher <grundler.christopher@epa.gov>
Sent: Sunday, January 30, 2022 10:56 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Ex. 5 Deliberative Process (DP)

Christopher Grundler, Director
Office of Atmospheric Programs
U.S. Environmental Protection Agency
202.343.9140 (o)
734.645.5221 (m)

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Sunday, January 30, 2022 10:46 AM
To: Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Grundler, Christopher <grundler.christopher@epa.gov>
Sent: Sunday, January 30, 2022 10:30 AM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

I like this revision

Christopher Grundler, Director
Office of Atmospheric Programs
U.S. Environmental Protection Agency
202.343.9140 (o)
734.645.5221 (m)

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Saturday, January 29, 2022 5:22 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Thanks Tim, I thought both the memo and the pithier version below looked great. A couple of comments here, attempting to capture some of the ideas Joe and I discussed.

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Best,

Tomás

Ex. 5 Deliberative Process (DP)

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Saturday, January 29, 2022 4:05 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Ex. 5 Deliberative Process (DP)

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Saturday, January 29, 2022 2:54 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Happy to chat if anyone is around this weekend. I will ask Thierry to find a time on Monday if you think that would be useful.

Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Friday, January 28, 2022 5:19 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: Proposed language for SOTU

Greetings Joe and Tomas –

Ex. 5 Deliberative Process (DP)

Have a great weekend!

Tim

Tim Profeta
Special Counsel for the Power Sector
Office of Air Quailty, Planning and Standards
U.S. Environmental Protection Agency
Profeta.Timothy@epa.gov

Office: 919/541-5667
Mobile: 919/309-5395

Message

From: DeLuca, Isabel [DeLuca.Isabel@epa.gov]
Sent: 10/25/2021 9:27:27 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
CC: Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Millett, John [Millett.John@epa.gov]
Subject: Propublica inquiry on air toxics
Attachments: 10.14.21 Incoming Questions Propublica.docx; 10.21.21 Statement response to Propublica 10.14 questions.docx

Hi all,
We wanted to flag for you a series of articles that Propublica is working on about estimated cancer risk from toxic industrial air pollution, and hopefully discuss next steps briefly in RT tomorrow.

Propublica has been engaging EPA on this series since May (and other, similar stories since summer of 2020). They have requested interviews multiple times, but because the questions cover work from multiple program offices, we have preferred written responses.

On 10/14, Propublica's Lilla Younes sent a new round of questions (15 pages worth, see attached). Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

FYI, we also currently have another suite of open questions from a different Propublica reporter (Lisa Song) who is working on a follow-on story about toxic air emissions in Pascagoula, MS.

Propublica is pressing for an interview this week, and Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Thanks,
Isabel

From: Lisa Song <Lisa.Song@propublica.org>
Sent: Friday, October 22, 2021 12:57 PM
To: Beal, Madeline <Beal.Madeline@epa.gov>; Ava Kofman <Ava.Kofman@propublica.org>; Jones, Enesta <Jones.Enesta@epa.gov>
Cc: Lylla Younes <lylla.younes@propublica.org>; EPA Press Office <Press@epa.gov>
Subject: Re: [time-sensitive] ProPublica deadline tomorrow

Great, thank you!

After reading this, we'd still like to discuss a few things by phone. We're requesting a call with one or two EPA experts who can talk about how the agency assesses cumulative cancer risk from industrial sources, and how that overlaps with enforcement (for instance, what are the cases where elevated industrial cancer risk in a community would lead to enforcement, and how does that process work?).

This can be a single call or two, if needed. **Our deadline is EOD next Tuesday.** Ava, Lylla and/or I will be on these call(s). Two of us are on eastern time and Ava is on Pacific time, in case that helps.

Thanks!
Lisa

From: Ava Kofman <Ava.Kofman@propublica.org>
Sent: Wednesday, October 20, 2021 5:38 PM
To: Jones, Enesta <Jones.Enesta@epa.gov>; Beal, Madeline <Beal.Madeline@epa.gov>
Cc: Lylla Younes <lylla.younes@propublica.org>; Lisa Song <Lisa.Song@propublica.org>; EPA Press Office <Press@epa.gov>
Subject: [time-sensitive] ProPublica deadline tomorrow
Importance: High

Hi Madeline,

Hope this finds you well!

I'm following up to see if have any questions or comments or updates to share before **our deadline** tomorrow. We remain eager to schedule interviews with the appropriate subject matter experts to discuss our work in further detail, address our queries, and answer any questions you might have.

We have a few additional questions from our conversations, which I am including below.

1. We understand residents can petition the EPA to set stricter standards for facilities or file a petition with the state if the modeled elevated cancer risk is more than 1 in 10,000. Victor B. Flatt, an environmental law professor at the University of Houston, said this is a years-long process that has rarely led to significant changes for residents living near facilities. What are some of the changes that such petitions have led to? Is this accurate to characterize these petitions as "a years-long process that has rarely led to significant changes"?
2. Wayne Davis, a former EPA employee who oversaw the RSEI program under the Trump administration, said that some of his supervisors were hesitant about publishing materials that would directly implicate a facility. He told ProPublica: "They always told us, 'Don't make a big deal of it, don't market it, and hopefully you'll continue to get funding next year. They didn't want to make anything public that would raise questions about why the EPA hadn't done anything to regulate that facility." What is the agency's response to this assertion?
3. The EPA says it "strives to protect the greatest number of people possible" from a cancer risk level no higher than 1 in a million, meaning that if a million people in an area are exposed to toxic air pollutants over a presumed lifetime of 70 years, one of those people would be expected to develop cancer from the exposure. According to our analysis, 27 million people across the country are being exposed to levels of risk higher than this goal.
4. We understand that the EPA does not see its own threshold as a "bright line." The agency's policies tolerate a maximum cancer risk level of 1 in 10,000. It is rooted not in current science, but in a 1988 EPA report comparing the probability of dying from unusual causes like "ignition of clothing" and "venomous plants." The agency has said it chose that number because it fell roughly in the middle of the risk range of the scenarios.
5. A 1 in 10,000 estimated cancer risk from air toxics is a degree of exposure numerous experts told ProPublica is too high. For instance, Patricia Ross McCubbin, a professor of environmental law at Southern Illinois University who's researched the agency's risk program said that the EPA's decision to choose this risk level was "essentially arbitrary." Is that characterization a fair assertion? Why or why not?
6. Our understanding is that the EPA does not immediately crack down on polluters who may cross this 1 in 10,000 threshold, since it is not a bright line. Does the EPA see crossing this risk threshold as more of a warning sign than a cause for action? How often does it crack down on polluters that, alone or in combination, raise the cancer risk in an area above the acceptable level?

7. Advocates say lawsuits from citizens and groups have been necessary to ensure the agency abides by its mandates to enforce provisions of the CAA. Without lawsuits, Emma Cheuse of Earthjustice told us, "people would be just waiting indefinitely for protection that they have a legal right to." What is the agency's response to this assertion?

All my best,

Ava Kofman
Reporter, ProPublica
www.propublica.org
Cell and Signal: 347-410-0113

From: Lylla Younes <lylla.younes@propublica.org>
Sent: Thursday, October 14, 2021 6:23 PM
To: Jones, Enesta <Jones.Enesta@epa.gov>; EPA Press Office <Press@epa.gov>
Cc: Ava Kofman <Ava.Kofman@propublica.org>; Lisa Song <Lisa.Song@propublica.org>
Subject: ProPublica Substantive Interview Request

Hello, again, from ProPublica.

We have continued our research on a series of stories about estimated cancer risk from toxic industrial air pollution.

The stories are based on our independent analysis of data from the EPA's RSEI model. We analyzed and visualized the spread of cancer-causing chemicals from every major source of toxic air pollution in the country. The multi-year analysis accounts for how these estimated cancer risks add up in every square kilometer of the country. We will be publishing a searchable map displaying the data from our analysis.

We are eager to hear your feedback on the analysis and the methodology, which we detail in the attached letter.

Alongside this data analysis, we also expect to publish various stories. The first of these stories, which we are currently writing to discuss, broadly examines how the implementation of the Clean Air Act fails to adequately regulate air toxics. Building off of our analysis, the story asks how and why the EPA has allowed these pockets of cancer-causing air — what we call, "toxic hotspots" — to take root across the United States. It raises questions about how the federal rules designed to protect Americans from toxic air pollution have left some of the country's most vulnerable communities behind.

Below we have outlined in detail our questions and what we've learned from the reporting we've done for this specific story. (We have been in touch along the way about various questions and we know that some of our colleagues, such as Kiah Collier and Maya Miller, have asked you questions for other, separate stories).

We understand that there isn't a single person at the agency who will be able to speak to our questions, correct any misunderstandings we might have, and/or offer deeper context. Because of this, we are requesting interviews with relevant experts in the following programs and subject areas: air toxics regulated under the Clean Air Act Section 112 (Office of Air and Radiation (OAR)), enforcement (EPA's Office of Enforcement and Compliance Assurance), environmental justice (EPA's Office of Environmental Justice), RSEI & the TRI program (Office of Pollution Prevention and Toxics), and residual risk assessments (Office of Air and Radiation, Office of Air Quality Planning and Standards). We have attempted to steer our questions accordingly to the proper officials at the agency.

We are available any time before 6PM on the 21st to speak about what we've learned, and to learn from you. We would also like to know if there are any inaccuracies in what we've laid out below. We are happy to talk over video, in person, or by phone. Your responses are important to us. We take them seriously and we are eager to engage in these conversations.

Many thanks,

Lylla Younes (318-730-4959), Lisa Song (646-712-0120), and Ava Kofman (347-410-0113)

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 12/24/2021 10:24:23 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: Re: January Due Outs from Today's CPO Call

Will get on it next week

Ann (Campbell) Ferrio
Chief of Staff
Office of Air and Radiation
(202) 566-1370

> On Dec 23, 2021, at 4:39 PM, Goffman, Joseph <Goffman.Joseph@epa.gov> wrote:
>
> Information about MATS technology standards
> GHG BACT white paper
>
> Thanks
>
> Sent from my iPhone

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 12/23/2021 3:35:58 AM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]; Lubetsky, Jonathan [Lubetsky.Jonathan@epa.gov]; Millett, John [Millett.John@epa.gov]
Subject: RE: Status of Reg Actions: Dec 22 edition - Take 2

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Campbell, Ann
Sent: Wednesday, December 22, 2021 5:38 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>; Eun Kim (Kim.Eun@epa.gov) <Kim.Eun@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>; Lubetsky, Jonathan <Lubetsky.Jonathan@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: Status of Reg Actions: Dec 22 edition

All – below is the status of our reg actions. OP is advocating for the remainder of the packages signed all at once. I will largely be off tomorrow but will keep my phone with me. Happy Holidays everyone!

Ex. 5 Deliberative Process (DP)

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/3/2022 1:04:47 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: RE: January Due Outs from Today's CPO Call

Joe, just following up on this to see what exactly is needed. Will raise during RT if it's easier to discuss. Thanks.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

> On Dec 23, 2021, at 4:39 PM, Goffman, Joseph <Goffman.Joseph@epa.gov> wrote:
>
> Information about MATS technology standards GHG BACT white paper
>
> Thanks
>
> Sent from my iPhone

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 12/22/2021 6:10:43 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Shaw, Betsy [Shaw.Betsy@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]; Tsirigotis, Peter [Tsirigotis.Peter@epa.gov]; Koerber, Mike [Koerber.Mike@epa.gov]; Lubetsky, Jonathan [Lubetsky.Jonathan@epa.gov]; Shoaff, John [Shoaff.John@epa.gov]; Olson, Heather [Olson.Heather@epa.gov]; OAQPSREGPROCESSING [OAQPSREGPROCESSING@epa.gov]; Biton, Leiran [biton.leiran@epa.gov]; Culligan, Kevin [Culligan.Kevin@epa.gov]; Chang, Alice [Chang.Alice@epa.gov]; Millett, John [Millett.John@epa.gov]; DeLuca, Isabel [DeLuca.Isabel@epa.gov]
Subject: SIGNED: Primary Copper Smelting RTR (SAN 7522)
Attachments: FRN Primary Copper Smelting RTR Proposal 17Dec21_AdminMR.docx

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Wachter, Eric <Wachter.Eric@epa.gov>
Sent: Wednesday, December 22, 2021 12:54 PM
To: Pritchard, Eileen <Pritchard.Eileen@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>; Gaines, Cynthia <Gaines.Cynthia@epa.gov>; Grantham, Nancy <Grantham.Nancy@epa.gov>
Subject: Signed: Primary Copper Smelting RTR (SAN 7522)

Hi, Eileen,
Please see the attached signed by the Administrator.
Thank you.

Eric E. Wachter
Director
Office of the Executive Secretariat
(202) 564-1878 (o)
(202) 913-3252 (m)
he/him/his

6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 63

[EPA-HQ-OAR-2020-0430; FRL-7522-01-OAR]

RIN 2060-AU63

National Emission Standards for Hazardous Air Pollutants: Primary Copper Smelting Residual Risk and Technology Review and Primary Copper Smelting Area Source Technology Review

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: This proposal presents the results of the U.S. Environmental Protection Agency's (EPA's) residual risk and technology review (RTR) for the National Emission Standards for Hazardous Air Pollutants (NESHAP) for major source Primary Copper Smelters as required under the Clean Air Act (CAA). Pursuant to the CAA, this action also presents the results of the technology review for the Primary Copper Smelting area source NESHAP.

Based on the results of the risk review, the EPA is proposing that risks from emissions of air toxics from this major source category are unacceptable. The EPA also completed a demographic analysis which indicates that elevated cancer risks associated with emissions from the major source category disproportionately affect communities with environmental justice concerns, including low-income residents, Native Americans, and Hispanics living near these facilities. To address these risks, the EPA is proposing new emissions standards in the major source NESHAP, which will reduce risks to an acceptable level, and is also proposing work practice standards to provide an ample margin of safety to protect public health.

The EPA is also proposing new emissions standards for the major source NESHAP to address currently unregulated emissions of hazardous air pollutants (HAP), as follows: particulate matter (PM), as a surrogate for particulate HAP metals, for anode refining furnace point source emissions; and PM for roofline emissions from anode refining furnaces, smelting furnaces, and converters. EPA is also proposing new emission standards for mercury emissions from any combination of stacks from dryers, converters, anode refining furnaces, and smelting furnaces. The EPA is proposing test methods for roofline PM emissions and amending the test methods to incorporate by reference three voluntary consensus standards (VCS).

Under the technology review, the EPA identified no developments in practices, processes, or control technologies to achieve further emissions reductions beyond the controls and reductions proposed under the risk review for major sources. With regard to primary copper smelting area sources, the Agency did not identify any developments in practices, processes, or control technologies.

The EPA is also proposing to remove exemptions for periods of startup, shutdown, and malfunction (SSM) and specify that the emission standards apply at all times and require electronic reporting of performance test results and notification of compliance reports. Implementation of these proposed rules is expected to reduce HAP metal emissions from primary copper smelters, improve human health, and reduce environmental impacts associated with those emissions.

DATES: *Comments*. Comments must be received on or before **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Under the Paperwork Reduction Act (PRA), comments on the information collection provisions are best assured of consideration if the Office of Management and Budget (OMB) receives a copy of your

comments on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

Public hearing. If anyone contacts us requesting a public hearing on or before **[INSERT DATE 5 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the EPA will hold a virtual public hearing. See **SUPPLEMENTARY INFORMATION** for information on requesting and registering for a public hearing.

ADDRESSES: You may send comments, identified by Docket ID No. EPA-HQ-OAR-2020-0430, by any of the following methods:

- Federal eRulemaking Portal: *https://www.regulations.gov/* (our preferred method). Follow the online instructions for submitting comments.
- Email: *a-and-r-docket@epa.gov*. Include Docket ID No. EPA-HQ-OAR-2020-0430 in the subject line of the message.
- Fax: (202) 566-9744. Attention Docket ID No. EPA-HQ-OAR-2020-0430.
- Mail: U.S. Environmental Protection Agency, EPA Docket Center, Docket ID No. EPA-HQ-OAR-2020-0430, Mail Code 28221T, 1200 Pennsylvania Avenue, NW, Washington, DC 20460.
- Hand/Courier Delivery: EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004. The Docket Center's hours of operation are 8:30 a.m. – 4:30 p.m., Monday – Friday (except federal holidays).

Instructions: All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to *https://www.regulations.gov/*, including any personal information provided. For detailed instructions on sending comments and

additional information on the rulemaking process, see the **SUPPLEMENTARY INFORMATION** section of this document. Out of an abundance of caution for members of the public and our staff, the EPA Docket Center and Reading Room are closed to the public, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform. The EPA encourages the public to submit comments via *https://www.regulations.gov/* or email, as there may be a delay in processing mail and faxes. Hand deliveries and couriers may be received by scheduled appointment only. For further information on EPA Docket Center services and the current status, please visit us online at *https://www.epa.gov/dockets*.

FOR FURTHER INFORMATION CONTACT: For questions about this proposed action, contact Tonisha Dawson, Sector Policies and Programs Division (D243-02), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-1454; fax number: (919) 541-4991; and email address: *dawson.tonisha@epa.gov*. For specific information regarding the risk modeling methodology, contact James Hirtz, Health and Environmental Impacts Division (C539-02), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-0881; fax number: (919) 541-4991; and email address: *hirtz.james@epa.gov*.

SUPPLEMENTARY INFORMATION:

Participation in virtual public hearing. Please note that the EPA is deviating from its typical approach for public hearings because the President has declared a national emergency. Due to the current Centers for Disease Control and Prevention (CDC) recommendations, as well

as state and local orders for social distancing to limit the spread of COVID-19, the EPA cannot hold in-person public meetings at this time.

To request a virtual public hearing, contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov*. If requested, the virtual hearing will be held on **[INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The hearing will convene at 9:00 a.m. Eastern Time (ET) and will conclude at 3:00 p.m. ET. The EPA may close a session 15 minutes after the last pre-registered speaker has testified if there are no additional speakers. The EPA will announce further details at *https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air.*

The EPA will begin pre-registering speakers for the hearing upon publication of this document in the *Federal Register*. To register to speak at the virtual hearing, please use the online registration form available at *https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air* or contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov*. The last day to pre-register to speak at the hearing will be **[INSERT DATE 12 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Prior to the hearing, the EPA will post a general agenda that will list pre-registered speakers in approximate order at: *https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air.*

The EPA will make every effort to follow the schedule as closely as possible on the day of the hearing; however, please plan for the hearings to run either ahead of schedule or behind schedule.

Each commenter will have 5 minutes to provide oral testimony. The EPA encourages commenters to provide the EPA with a copy of their oral testimony electronically (via email) by emailing it to *dawson.tonisha@epa.gov*. The EPA also recommends submitting the text of your oral testimony as written comments to the rulemaking docket.

The EPA may ask clarifying questions during the oral presentations but will not respond to the presentations at that time. Written statements and supporting information submitted during the comment period will be considered with the same weight as oral testimony and supporting information presented at the public hearing.

Please note that any updates made to any aspect of the hearing will be posted online at *https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air.* While the EPA expects the hearing to go forward as set forth above, please monitor our website or contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov* to determine if there are any updates. The EPA does not intend to publish a document in the *Federal Register* announcing updates.

If you require the services of a translator or a special accommodation such as audio description, please pre-register for the hearing with the public hearing team and describe your needs by **[INSERT DATE 7 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The EPA may not be able to arrange accommodations without advanced notice.

Docket. The EPA has established a docket for this rulemaking under Docket ID No. EPA-HQ-OAR-2020-0430. All documents in the docket are listed in *https://www.regulations.gov/*. Although listed, some information is not publicly available, *e.g.*, Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available

only in hard copy. With the exception of such material, publicly available docket materials are available electronically in Regulations.gov.

Instructions. Direct your comments to Docket ID No. EPA-HQ-OAR-2020-0430. The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *https://www.regulations.gov/*, including any personal information provided, unless the comment includes information claimed to be CBI or other information whose disclosure is restricted by statute. Do not submit electronically any information that you consider to be CBI or other information whose disclosure is restricted by statute. This type of information should be submitted by mail as discussed below.

The EPA may publish any comment received to its public docket. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.*, on the Web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit *https://www.epa.gov/dockets/commenting-epa-dockets*.

The *https://www.regulations.gov/* website allows you to submit your comment anonymously, which means the EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to the EPA without going through *https://www.regulations.gov/*, your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, the EPA recommends that you

include your name and other contact information in the body of your comment and with any digital storage media you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, the EPA may not be able to consider your comment. Electronic files should not include special characters or any form of encryption and be free of any defects or viruses. For additional information about the EPA's public docket, visit the EPA Docket Center homepage at *https://www.epa.gov/dockets*.

The EPA is temporarily suspending its Docket Center and Reading Room for public visitors, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform. The EPA encourages the public to submit comments via *https://www.regulations.gov/* as there may be a delay in processing mail and faxes. Hand deliveries or couriers will be received by scheduled appointment only. For further information and updates on EPA Docket Center services, please visit us online at *https://www.epa.gov/dockets*.

The EPA continues to carefully and continuously monitor information from the CDC, local area health departments, and our Federal partners so that the Agency can respond rapidly as conditions change regarding COVID-19.

Submitting CBI. Do not submit information containing CBI to the EPA through *https://www.regulations.gov/* or email. Clearly mark all of the information that you claim to be CBI. For CBI information on any digital storage media that you mail to the EPA, mark the outside of the digital storage media as CBI and then identify electronically within the digital storage media the specific information that is claimed as CBI. In addition to one complete version of the comments that includes information claimed as CBI, you must submit a copy of the comments that does not contain the information claimed as CBI directly to the public docket

through the procedures outlined in *Instructions* above. If you submit any digital storage media that does not contain CBI, mark the outside of the digital storage media clearly that it does not contain CBI. Information not marked as CBI will be included in the public docket and the EPA's electronic public docket without prior notice. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 Code of Federal Regulations (CFR) part 2. Send or deliver information identified as CBI only to the following address: Office of Air Quality Planning and Standards Document Control Officer (C404-02), OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention Docket ID No. EPA-HQ-OAR-2020-0430. Note that written comments containing CBI and submitted by mail may be delayed and no hand deliveries will be accepted.

Preamble acronyms and abbreviations. The Agency uses multiple acronyms and terms in this preamble. While this list may not be exhaustive, to ease the reading of this preamble and for reference purposes, the EPA defines the following terms and acronyms here:

ACI	activated carbon injection
AEGL	acute exposure guideline level
AERMOD	air dispersion model used by the HEM-4 model
BTF	beyond-the-floor
CAA	Clean Air Act
CalEPA	California EPA
CBI	Confidential Business Information
CFR	Code of Federal Regulations
mg/dscm	milligrams per dry standard cubic meter
ECHO	Enforcement and Compliance History Online
EPA	Environmental Protection Agency
ERPG	emergency response planning guideline
ERT	Electronic Reporting Tool
GACT	generally available control technology
HAP	hazardous air pollutant(s)
HCl	hydrochloric acid

HEM-4	Human Exposure Model, Version 1.5.5
HF	hydrogen fluoride
HI	hazard index
HQ	hazard quotient
ICR	Information Collection Request
IRIS	Integrated Risk Information System
km	kilometer
MACT	maximum achievable control technology
mg/kg-day	milligrams per kilogram per day
mg/m^3	milligrams per cubic meter
MIR	maximum individual risk
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NEI	National Emissions Inventory
NESHAP	national emission standards for hazardous air pollutants
NTTAA	National Technology Transfer and Advancement Act
OAQPS	Office of Air Quality Planning and Standards
OMB	Office of Management and Budget
PB-HAP	hazardous air pollutants known to be persistent and bio-accumulative in the environment
PM	particulate matter
POM	polycyclic organic matter
ppm	parts per million
RBLC	Reasonably Available Control Technology, Best Available Control Technology, and Lowest Achievable Emission Rate Clearinghouse
RfC	reference concentration
RTR	residual risk and technology review
SAB	Science Advisory Board
SV	screening value
SSM	startup, shutdown, and malfunction
TOSHI	target organ-specific hazard index
tpy	tons per year
TRIM.FaTE	Total Risk Integrated Methodology.Fate, Transport, and Ecological Exposure model
UF	uncertainty factor
$\mu g/m^3$	microgram per cubic meter
URE	unit risk estimate
USGS	U.S. Geological Survey

VCS voluntary consensus standards

Organization of this document. The information in this preamble is organized as follows:

I. General Information
A. Does this action apply to me?
B. Where can I get a copy of this document and other related information?
II. Background
A. What is the statutory authority for this action?
B. What is this source category and how does the current NESHAP regulate its HAP emissions?
C. What data collection activities were conducted to support this action?
D. What other relevant background information and data are available?
III. Analytical Procedures and Decision-Making
A. How do we consider risk in our decision-making?
B. How do we perform the technology review?
C. How do we estimate post-MACT risk posed by the source category?
IV. Analytical Results and Proposed Decisions
A. What actions are we taking pursuant to CAA sections 112(d)(2) and 112(d)(3)?
B. What are the results of the risk assessment and analyses?
C. What are our proposed decisions regarding risk acceptability, ample margin of safety, and adverse environmental effect?
D. What are the results and proposed decisions based on our technology review?
E. What other actions are we proposing?
F. What compliance dates are we proposing?
V. Summary of Cost, Environmental, and Economic Impacts
A. What are the affected sources?
B. What are the air quality impacts?
C. What are the cost impacts?
D. What are the economic impacts?
E. What are the benefits?
VI. Request for Comments
VII. Submitting Data Corrections
VIII. Incorporation by Reference
IX. Statutory and Executive Order Reviews
A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review
B. Paperwork Reduction Act (PRA)
C. Regulatory Flexibility Act (RFA)
D. Unfunded Mandates Reform Act (UMRA)
E. Executive Order 13132: Federalism
F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments
G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks and 1 CFR Part 51
H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use
I. National Technology Transfer and Advancement Act (NTTAA)

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

I. General Information

A. Does this action apply to me?

The source categories that are the subject of this proposal are Primary Copper Smelting Major Sources regulated under 40 CFR part 63, subpart QQQ, and Primary Copper Smelting Area Sources, regulated under 40 CFR part 63, subpart EEEEEE. The North American Industry Classification System (NAICS) code for the primary copper smelting industry is 331410. This list of categories and NAICS codes is not intended to be exhaustive, but rather provides a guide for readers regarding the entities that this proposed action is likely to affect. The proposed standards, once promulgated, will be directly applicable to the affected sources. State, local, and tribal governments would not be directly affected by this proposed action. As defined in the *Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act Amendments of 1990* (see 57 FR 31576, July 16, 1992) and *Documentation for Developing the Initial Source Category List, Final Report* (*see* EPA-450/3-91-030, July 1992), the Primary Copper Smelting major source category was defined as any major source facility engaged in the pyrometallurgical process used for the extraction of copper from sulfur oxides, native ore concentrates, or other copper bearing minerals. As originally defined, the category includes, but is not limited to, the following smelting process units: roasters, smelting furnaces, and converters. Affected sources under the current major source NESHAP are concentrate dryers, smelting furnaces, slag cleaning vessels, converters, and fugitive emission sources. The area source category was added to the source category list in 2002 (67 FR 70427, 70428). Affected sources under the area source NESHAP are concentrate dryers, smelting vessels (*e.g.*, furnaces), converting vessels, matte drying and grinding plants, secondary gas systems, and anode refining operations.

B. Where can I get a copy of this document and other related information?

In addition to being available in the docket, an electronic copy of this action is available on the Internet. Following signature by the EPA Administrator, the EPA will post a copy of this proposed action at *https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air* and at *https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-area-sources-national-emissions-standards*. Following publication in the *Federal Register*, the EPA will post the *Federal Register* version of the proposal and key technical documents at these same websites. Information on the overall RTR program is available at *https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous*.

The proposed changes to the CFR that would be necessary to incorporate the changes proposed in this action are presented in attachments to the two memoranda titled: *Proposed Regulation Edits for 40 CFR Part 63, Subpart QQQ: Primary Copper Smelting NESHAP Risk and Technology Review Proposal;* and *Proposed Regulatory Edits for 40 CFR Part 63 Subpart EEEEEE: Primary Copper Smelting Area Sources NESHAP Technology Review Proposal,* both of which are available in the docket for this action (Docket ID No. EPA-HQ-OAR-2020-0430). These documents include redline versions of the two regulations. Following signature by the EPA Administrator, the EPA will also post a copy of these two memoranda and the attachments to *https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air* and to *https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-area-sources-national-emissions-standards*.

II. Background

A. What is the statutory authority for this action?

The statutory authority for this action is provided by sections 112 and 301 of the CAA, as amended (42 U.S.C. 7401 *et seq.*). Section 112 of the CAA establishes a two-stage regulatory process to develop standards for emissions of HAP from stationary sources. Generally, the first stage involves establishing technology-based standards and the second stage involves evaluating those standards that are based on maximum achievable control technology (MACT) to determine whether additional standards are needed to address any remaining risk associated with HAP emissions. This second stage is required under CAA section 112(f) and is commonly referred to as the "residual risk review." In addition to the residual risk review, section 112(d)(6) of the CAA requires the EPA to review standards set under CAA section 112 every 8 years and revise the standards as necessary taking into account any "developments in practices, processes, or control technologies." This review is commonly referred to as the "technology review." When the two reviews are combined into a single rulemaking, it is commonly referred to as the "risk and technology review." The discussion that follows identifies the most relevant statutory sections and briefly explains the contours of the methodology used to implement these statutory requirements. A more comprehensive discussion appears in the document titled *CAA Section 112 Risk and Technology Reviews: Statutory Authority and Methodology*, in the docket for this rulemaking.

In the first stage of the CAA section 112 standard setting process, the EPA promulgates technology-based standards under CAA section 112(d) for categories of sources identified as emitting one or more of the HAP listed in CAA section 112(b). Sources of HAP emissions are either major sources or area sources, and CAA section 112 establishes different requirements for major source standards and area source standards. "Major sources" are those that emit or have the potential to emit 10 tons per year (tpy) or more of a single HAP or 25 tpy or more of any

combination of HAP. All other sources are "area sources." For major sources, CAA section 112(d)(2) provides that the technology-based NESHAP must reflect the maximum degree of emission reductions of HAP achievable (after considering cost, energy requirements, and non-air quality health and environmental impacts). These standards are commonly referred to as MACT standards. CAA section 112(d)(3) also establishes a minimum control level for MACT standards, known as the MACT "floor." In certain instances, as provided in CAA section 112(h), the EPA may set work practice standards in lieu of numerical emission standards. The EPA must also consider control options that are more stringent than the floor. Standards more stringent than the floor are commonly referred to as beyond-the-floor (BTF) standards. For area sources, CAA section 112(d)(5) gives the EPA discretion to set standards based on generally available control technologies or management practices (GACT standards) in lieu of MACT standards.

The second stage in standard-setting focuses on identifying and addressing any remaining (*i.e.,* "residual") risk pursuant to CAA section 112(f). For source categories subject to MACT standards, section 112(f)(2) of the CAA requires the EPA to determine whether promulgation of additional standards is needed to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect. Section 112(d)(5) of the CAA provides that this residual risk review is not required for categories of area sources subject to GACT standards. Section 112(f)(2)(B) of the CAA further expressly preserves the EPA's use of the two-step approach for developing standards to address any residual risk and the Agency's interpretation of "ample margin of safety" developed in the National Emissions Standards for Hazardous Air Pollutants: Benzene Emissions from Maleic Anhydride Plants, Ethylbenzene/Styrene Plants, Benzene Storage Vessels, Benzene Equipment Leaks, and Coke By-Product Recovery Plants (Benzene NESHAP) (54 FR 38044, September 14, 1989). The EPA notified Congress in the

Residual Risk Report that the Agency intended to use the Benzene NESHAP approach in making CAA section 112(f) residual risk determinations (EPA–453/R–99–001, p. ES–11). The EPA subsequently adopted this approach in its residual risk determinations and the United States Court of Appeals for the District of Columbia Circuit upheld the EPA's interpretation that CAA section 112(f)(2) incorporates the approach established in the Benzene NESHAP. See *NRDC v. EPA*, 529 F.3d 1077, 1083 (D.C. Cir. 2008).

The approach incorporated into the CAA and used by the EPA to evaluate residual risk and to develop standards under CAA section 112(f)(2) is a two-step approach. In the first step, the EPA determines whether risks are acceptable. This determination "considers all health information, including risk estimation uncertainty, and includes a presumptive limit on maximum individual lifetime [cancer] risk (MIR)[1] of approximately 1 in 10 thousand." (54 FR at 38045). If risks are unacceptable, the EPA must determine the emissions standards necessary to reduce risk to an acceptable level without considering costs. In the second step of the approach, the EPA considers whether the emissions standards provide an ample margin of safety to protect public health "in consideration of all health information, including the number of persons at risk levels higher than approximately 1 in 1 million, as well as other relevant factors, including costs and economic impacts, technological feasibility, and other factors relevant to each particular decision." *Id.* The EPA must promulgate emission standards necessary to provide an ample margin of safety to protect public health or determine that the standards being reviewed provide an ample margin of safety without any revisions. After conducting the ample margin of safety analysis, the Agency considers whether a more stringent standard is necessary to prevent, taking

[1] Although defined as "maximum individual risk," MIR refers only to cancer risk. MIR, one metric for assessing cancer risk, is the estimated risk if an individual were exposed to the maximum level of a pollutant for a lifetime.

into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect.

CAA section 112(d)(6) separately requires the EPA to review standards promulgated under CAA section 112 and revise them "as necessary (taking into account developments in practices, processes, and control technologies)" no less often than every 8 years. While conducting the technology review, the EPA is not required to recalculate the MACT floor. *Natural Resources Defense Council (NRDC) v. EPA*, 529 F.3d 1077, 1084 (D.C. Cir. 2008). *Association of Battery Recyclers, Inc. v. EPA*, 716 F.3d 667 (D.C. Cir. 2013). The EPA may consider cost in deciding whether to revise the standards pursuant to CAA section 112(d)(6). The EPA is required to address regulatory gaps, such as missing standards for listed air toxics known to be emitted from the source category. *Louisiana Environmental Action Network (LEAN) v. EPA*, 955 F.3d 1088 (D.C. Cir. 2020).

B. What is this source category and how does the current NESHAP regulate its HAP emissions?

The primary copper smelting source category includes any facility that uses a pyrometallurgical process to produce anode copper from copper ore concentrates. Primary copper smelting begins with copper mines supplying the ore concentrate (typically 30 percent copper). In most cases, the moisture is reduced from the ore concentrate in dryers, and then fed through a smelting furnace where it is melted and reacts to produce copper matte. One existing smelter is able to feed its copper concentrate directly to the smelting furnace without prior drying. Copper matte is a molten solution of copper sulfide mixed with iron sulfide and is about 60 percent copper. The solution is further refined using converters to make blister copper, which is approximately 98 percent copper. Converters use oxidation to remove sulfide as sulfur dioxide (SO_2) gas and the iron as a ferrous oxide slag. The majority of the SO_2 gases are sent to a sulfuric

acid plant. The slag is removed, cooled, and often processed again to remove any residual copper. The blister copper is reduced in the anode furnace to remove impurities and oxygen, typically by injecting natural gas and steam, to produce a high purity copper. The molten copper from the anode refining furnace is poured into molds and cooled to produce solid copper ingots called anodes. This process is known as casting. The anodes are sent to a copper refinery, either on-site or at an off-site location, for further purification using an electrolytic process to obtain high purity copper that is sold as a product.

The processing units of interest at primary copper smelters, because of their potential to generate HAP emissions, are the following: dryers, smelting furnaces, copper converters, anode refining furnaces, and, if present, copper holding vessels, slag cleaning vessels, and matte drying and grinding plants. In addition, fugitive emissions are sources of HAP at primary copper smelters. The transfer of matte, converter slag, and blister copper is the primary source of fugitive emissions.

There are three primary copper smelting facilities in the U.S. that are subject to the NESHAPs in this review. Two of the facilities (Asarco and Freeport – both located in Arizona) are major sources of HAP emissions and are subject to subpart QQQ, the major source NESHAP; the third facility (Kennecott – located in Utah) is an area source and subject to subpart EEEEEE, the area source NESHAP.

Two of the facilities (Asarco and Kennecott) use flash smelting furnaces (the INCO smelting furnace and the Outotec®, respectively). Flash smelting furnaces consist of blowing fine, dried copper sulfide concentrate and silica flux with air, oxygen-enriched air or oxygen into a hot hearth-type furnace. The sulfide minerals in the concentrate react with oxygen resulting in oxidation of the iron and sulfur, which produces heat and therefore melting of the solids. The

molten matte and slag are removed separately from the furnace as they accumulate, and at the facility using the INCO furnace, the matte is transferred via ladles to the copper converters. The Freeport facility uses an ISA smelting furnace. The ISA smelt® process involves dropping wet feed through a feed port, such that dryers are not needed. A mixture of air, oxygen, and natural gas is blown through a vertical lance in the center of the furnace, generating heat and melting the feed. The molten metal is then tapped from the bottom and sent to an electric furnace to separate the matte from slag. The slag is removed from the electric furnace through tapholes and is transferred to slag pots via ladles. The matte is also removed from the electric furnace through tapholes and transferred to the converter via ladles.

At the area source primary copper smelter, molten copper matte tapped from the Outotec® smelting furnace is not transferred as molten material directly to the converting vessel as is performed at the two major source smelters. Instead, the matte is first quenched with water to form solid granules of copper matte. These matte granules are then ground to a finer texture and fed to the flash converting furnace for the continuous converting of copper. The continuous copper converter differs significantly in design and operation from the cylindrical batch converters operated at the other U.S. smelters. Because there are no transfers of molten material between the smelting furnace and the continuous copper converter, this technology has inherently lower potential HAP emissions than a smelter using batch copper converting technology.

Molten blister copper is transferred from the converting vessel to an anode furnace for refining to further remove residual impurities and oxygen. The blister copper is reduced in the anode refining furnace to remove oxygen, typically by injecting natural gas and steam to produce a high purity copper. The molten copper from the anode refining furnace is poured into molds to

produce solid copper ingots called anodes. The anode copper is sent to a copper refinery, either on-site or at another location, where it is further purified using an electrolytic process to obtain the high purity copper that is sold as a product. The copper refinery is not part of the primary copper smelting source category.

The current NESHAP for major sources (40 CFR part 63, subpart QQQ) was proposed on April 20, 1998 (63 FR 19582), with a supplement to the proposed rule published on June 26, 2000 (65 FR 39326). The final rule, promulgated on June 12, 2002 (67 FR 40478), established PM standards as a surrogate for HAP metals for copper concentrate dryers, smelting furnaces, slag cleaning vessels, and existing converters. The major source NESHAP applies to major sources that use batch copper converters. Regarding new sources, the NESHAP prohibits batch converters for new sources, which indirectly means that any new source would need to have continuous converters, similar to the area source (Kennecott), or another technology. The converter building is subject to an opacity limit that only applies during performance testing. A fugitive dust plan is required to minimize fugitive dust emissions. Subpart QQQ also establishes requirements to demonstrate initial and continuous compliance with all applicable emission limitations, work practice standards, and operation and maintenance requirements. Annual performance testing is required to demonstrate compliance.

The NESHAP for area sources (40 CFR part 63, subpart EEEEEE) establishes GACT standards for primary copper smelting area sources and was proposed on October 6, 2006 (71 FR 59302), and finalized on January 23, 2007 (72 FR 2930). Technical corrections were then published on July 3, 2007, via direct final rule (72 FR 36363). The affected sources (*i.e.*, copper concentrate dryers, smelting vessels, converting vessels, matte drying and grinding plants, secondary gas systems and anode refining departments) are subject to PM limits as a surrogate

for HAP metals. Compliance must be demonstrated by performance tests conducted every 2.5 years.

C. *What data collection activities were conducted to support this action?*

For the Primary Copper Smelting source category, the EPA used the best available data. Initially, emissions and supporting data from the 2017 National Emissions Inventory (NEI) were gathered to develop the initial draft model input file for the residual risk assessments for major source primary copper smelters. The NEI is a database that contains information about sources that emit criteria air pollutants, their precursors, and HAP. The database includes estimates of annual air pollutant emission from point, nonpoint, and mobile sources in the 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. The EPA collects this information and releases an updated version of the NEI database every 3 years. The NEI includes data necessary for conducting risk modeling, including annual HAP emissions estimates from individual emission sources at facilities and the related emissions release parameters.

The Arizona Department of Environmental Quality (ADEQ) provided 2018 emissions test data for both major source primary copper smelters located in that state, which allowed the EPA to use more current metal HAP emissions data than what was available in the 2017 NEI in some cases. The data from ADEQ and the NEI were used to develop an initial draft risk model input file. This initial draft model file was posted to the EPA's Primary Copper website on February 26, 2020, and stakeholders were provided an opportunity to voluntarily review and provide input regarding the sources of emissions and release parameters that were reported in the NEI. The Asarco and Freeport facilities provided input, and the modeling file was finalized. The data include multiple emissions test reports for PM and HAP metals for point source emissions from both facilities and seven test reports for emissions tests conducted in 2018, 2019 and 2020

for process fugitive emissions for anode refining, smelting furnaces and converters at Freeport. However, we have no test data for Asarco process fugitive emissions. The process fugitive emissions estimates for Asarco are based on emissions factors and process information. Therefore, we have higher confidence and less uncertainty with our emissions estimates for Freeport as compared to Asarco. We made an adjustment to the lead emissions estimates from the anode refining roofline at Freeport by applying a weighting factor to one of the 2018 test results. This factor is based on information in the document titled: *Technical Report on Test Method for Roofline Lead Emissions, Operational Influences During Testing, And Effect of Smelter Reconfiguration*, by Trinity Consultants, December 2018, which is available in the docket for this action. The data and data sources used to support this action and additional information on the development of the modeling file are described in Appendix 1 to the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule*, which is available in the docket for this proposed rule (Docket ID No. EPA-HQ-OAR-2020-0430). Additional information is provided in section II.D below.

D. What other relevant background information and data are available?

The EPA used multiple sources of information to support this proposed action. Before developing the final list of affected facilities described in section II.B of this preamble, the EPA's Enforcement and Compliance History Online (ECHO) database was used as a tool to identify potentially affected facilities with primary copper smelting operations that are subject to the NESHAPs. The ECHO database provides integrated compliance and enforcement information for approximately 800,000 regulated facilities nationwide. The EPA also reviewed

the compliance history on the ADEQ website, active consent decrees, and consent orders to verify that the facilities were accurately classified as major sources.

During the technology review, the EPA examined information in the Reasonably Available Control Technology (RACT)/Best Available Control Technology (BACT)/Lowest Achievable Emission Rate (LAER) Clearinghouse (RBLC) to identify technologies in use and determine whether there have been relevant developments in practices, processes, or control technologies. The RBLC is a database that contains case specific information on air pollution technologies that have been required to reduce the emissions of air pollutants from stationary sources. Under the EPA's New Source Review (NSR) program, if a facility is planning new construction or a modification that will significantly increase air emissions, an NSR permit must be obtained. This central database promotes the sharing of information among permitting agencies and aids in case-by-case determinations for NSR permits. The EPA also reviewed subsequent air toxics regulatory actions for other source categories and information from a virtual site visit at the Freeport plant to determine whether there have been developments in practices, processes, or control technologies in the Primary Copper Smelting source category. The docket for this rulemaking contains the following document which provides more information on the technology review: *Final Technology Review for the Primary Copper Smelting Source Category*.

III. Analytical Procedures and Decision-Making

In this section, the Agency describes the analyses performed to support the proposed decisions for the RTR and other issues addressed in this proposal. In this proposed action, pursuant to CAA section 112(f), the EPA conducted a risk review for the major sources in the primary copper smelting source category. Consistent with CAA section 112(f)(5), the risk review

did not cover the area source category. Therefore, the discussions of risk assessment procedures described in the following paragraphs apply only to the major source category. However, pursuant to CAA section 112(d)(6), the EPA conducted a technology review for the NESHAPs covering both the major source category and the area source category (40 CFR part 63, subpart EEEEEE). Therefore, the following discussions of the technology reviews apply to both major sources and area sources.

A. How do we consider risk in our decision-making?

As discussed in section II.A of this preamble and in the Benzene NESHAP, in evaluating and developing standards under CAA section 112(f)(2), the Agency applies a two-step approach to determine whether or not risks are acceptable and to determine if the standards provide an ample margin of safety to protect public health. As explained in the Benzene NESHAP, "the first step judgment on acceptability cannot be reduced to any single factor" and, thus, "[t]he Administrator believes that the acceptability of risk under section 112 is best judged on the basis of a broad set of health risk measures and information." (54 FR at 38046). Similarly, with regard to the ample margin of safety determination, "the Agency again considers all of the health risk and other health information considered in the first step. Beyond that information, additional factors relating to the appropriate level of control will also be considered, including cost and economic impacts of controls, technological feasibility, uncertainties, and any other relevant factors." *Id.*

The Benzene NESHAP approach provides flexibility regarding factors the EPA may consider in making determinations and how the EPA may weigh those factors for each source category. The EPA conducts a risk assessment that provides estimates of the MIR posed by emissions of HAP that are carcinogens from each source in the source category, the hazard index

(HI) for chronic exposures to HAP with the potential to cause noncancer health effects, and the hazard quotient (HQ) for acute exposures to HAP with the potential to cause noncancer health effects.[2] The assessment also provides estimates of the distribution of cancer risk within the exposed populations, cancer incidence, and an evaluation of the potential for an adverse environmental effect. The scope of the EPA's risk analysis is consistent with the explanation in EPA's response to comments on our policy under the Benzene NESHAP:

> The policy chosen by the Administrator permits consideration of multiple measures of health risk. Not only can the MIR figure be considered, but also incidence, the presence of noncancer health effects, and the uncertainties of the risk estimates. In this way, the effect on the most exposed individuals can be reviewed as well as the impact on the general public. These factors can then be weighed in each individual case. This approach complies with the *Vinyl Chloride* mandate that the Administrator ascertain an acceptable level of risk to the public by employing his expertise to assess available data. It also complies with the Congressional intent behind the CAA, which did not exclude the use of any particular measure of public health risk from the EPA's consideration with respect to CAA section 112 regulations, and thereby implicitly permits consideration of any and all measures of health risk which the Administrator, in his judgment, believes are appropriate to determining what will "protect the public health".

(54 FR at 38057). Thus, the level of the MIR is only one factor to be weighed in determining acceptability of risk. The Benzene NESHAP explained that "an MIR of approximately one in 10 thousand should ordinarily be the upper end of the range of acceptability. As risks increase above this benchmark, they become presumptively less acceptable under CAA section 112, and would be weighed with the other health risk measures and information in making an overall judgment on acceptability. Or, the Agency may find, in a particular case, that a risk that includes an MIR less than the presumptively acceptable level is unacceptable in the light of other health risk

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[2] The MIR is defined as the cancer risk associated with a lifetime of exposure at the highest concentration of HAP where people are likely to live. The HQ is the ratio of the potential HAP exposure concentration to the noncancer dose-response value; the HI is the sum of HQs for HAP that affect the same target organ or organ system.

factors." *Id.* at 38045. In other words, risks that include an MIR above 100-in-1 million may be determined to be acceptable, and risks with an MIR below that level may be determined to be unacceptable, depending on all of the available health information. Similarly, with regard to the ample margin of safety analysis, the EPA stated in the Benzene NESHAP that: "EPA believes the relative weight of the many factors that can be considered in selecting an ample margin of safety can only be determined for each specific source category. This occurs mainly because technological and economic factors (along with the health-related factors) vary from source category to source category." *Id.* at 38061. The Agency also considers the uncertainties associated with the various risk analyses, as discussed earlier in this preamble, in our determinations of acceptability and ample margin of safety.

The EPA notes that it has not considered certain health information to date in making residual risk determinations. At this time, the Agency does not attempt to quantify the HAP risk that may be associated with emissions from other facilities that do not include the source category under review, mobile source emissions, natural source emissions, persistent environmental pollution, or atmospheric transformation in the vicinity of the sources in the category.

The EPA understands the potential importance of considering an individual's total exposure to HAP in addition to considering exposure to HAP emissions from the source category and facility. The Agency recognizes that such consideration may be particularly important when assessing noncancer risk, where pollutant-specific exposure health reference levels (*e.g.*, reference concentrations (RfCs)) are based on the assumption that thresholds exist for adverse health effects. For example, the EPA recognizes that, although exposures attributable to emissions from a source category or facility alone may not indicate the potential for increased

risk of adverse noncancer health effects in a population, the exposures resulting from emissions from the facility in combination with emissions from all of the other sources (*e.g.*, other facilities) to which an individual is exposed may be sufficient to result in an increased risk of adverse noncancer health effects. In May 2010, the Science Advisory Board (SAB) advised the EPA "that RTR assessments will be most useful to decision makers and communities if results are presented in the broader context of aggregate and cumulative risks, including background concentrations and contributions from other sources in the area."[3]

In response to the SAB recommendations, the EPA incorporates cumulative risk analyses into its RTR risk assessments. The Agency (1) conducts facility-wide assessments, which include source category emission points, as well as other emission points within the facilities; (2) combines exposures from multiple sources in the same category that could affect the same individuals; and (3) for some persistent and bioaccumulative pollutants, analyzes the ingestion route of exposure. In addition, the RTR risk assessments consider aggregate cancer risk from all carcinogens and aggregated noncancer HQs for all noncarcinogens affecting the same target organ or target organ system.

Although the EPA is interested in placing source category and facility-wide HAP risk in the context of total HAP risk from all sources combined in the vicinity of each source, the EPA is also concerned about the uncertainties of doing so. Estimates of total HAP risk from emission sources other than those that the Agency has studied in depth during this RTR review would have significantly greater associated uncertainties than the source category or facility-wide

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[3] Recommendations of the SAB Risk and Technology Review Methods Panel are provided in their report, which is available at: *https://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EPA-SAB-10-007-unsigned.pdf.*

estimates. Such aggregate or cumulative assessments would compound those uncertainties, making the assessments too unreliable.

B. How do we perform the technology review?

Our technology review primarily focuses on the identification and evaluation of developments in practices, processes, and control technologies that have occurred since the MACT standards were promulgated. Where we identify such developments, we analyze their technical feasibility, estimated costs, energy implications, and non-air environmental impacts. The EPA also considers the emission reductions associated with applying each development. This analysis informs our decision of whether it is "necessary" to revise the emissions standards. In addition, the Agency considers the appropriateness of applying controls to new sources versus retrofitting existing sources. For this exercise, the EPA considers any of the following to be a "development":

- Any add-on control technology or other equipment that was not identified and considered during development of the original MACT standards;
- Any improvements in add-on control technology or other equipment (that were identified and considered during development of the original MACT standards) that could result in additional emissions reduction;
- Any work practice or operational procedure that was not identified or considered during development of the original MACT standards;
- Any process change or pollution prevention alternative that could be broadly applied to the industry and that was not identified or considered during development of the original MACT standards; and

- Any significant changes in the cost (including cost effectiveness) of applying controls (including controls the EPA considered during the development of the original MACT standards).

In addition to reviewing the practices, processes, and control technologies that were considered at the time the EPA originally developed the NESHAP, we review a variety of data sources in our investigation of potential practices, processes, or controls to consider. The EPA also reviews the NESHAP and the available data to determine if there are any unregulated emissions of HAP within the source category, and evaluate the data for use in developing new emission standards. See sections II.C and II.D of this preamble for information on the specific data sources that were reviewed as part of the technology review.

C. How do we estimate post-MACT risk posed by the source category?

In this section, the EPA provides a complete description of the types of analyses that we generally perform during the risk assessment process. In some cases, the Agency does not perform a specific analysis because it is not relevant. For example, in the absence of emissions of hazardous air pollutants known to be persistent and bioaccumulative in the environment (PB-HAP), the Agency would not perform a multipathway exposure assessment. If an analysis is not performed, the Agency will provide the reason. While we present all of our risk assessment methods, the Agency only presents risk assessment results for the analyses actually conducted (see section IV.B of this preamble).

The EPA conducts a risk assessment that provides estimates of the MIR for cancer posed by the HAP emissions from each source in the source category, the HI for chronic exposures to HAP with the potential to cause noncancer health effects, and the HQ for acute exposures to HAP with the potential to cause noncancer health effects. The assessment also provides estimates

of the distribution of cancer risk within the exposed populations, cancer incidence, and an evaluation of the potential for an adverse environmental effect. The eight sections that follow this paragraph describe how the Agency estimated emissions and conducted the risk assessment. The docket for this rulemaking contains the following document which provides more information on the risk assessment inputs and models: *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule*. The methods used to assess risk (as described in the eight primary steps below) are consistent with those described by the EPA in the document reviewed by a panel of the EPA's SAB in 2009[4] and described in the SAB review report issued in 2010. They are also consistent with the key recommendations contained in that report.

1. How did we estimate actual emissions and identify the emissions release characteristics?

To create the initial modeling input file, the Agency gathered actual HAP emissions data from the 2017 NEI and 2018 emissions estimates provided by ADEQ. The 2019 emissions data for Asarco and Freeport were not available when the initial modeling input file was developed. The Asarco plant's smelting operation was shut down for a significant portion of 2018 due to equipment upgrades. Since the 2019 emissions data for Asarco were not available, the 2017 NEI data were used for the initial modeling input file. The Freeport plant made significant upgrades in 2017, so the 2018 emissions data were used for the initial modeling input file as the best representation of the current plant configuration. The modeling input file was posted on the EPA

[4] U.S. EPA. *Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by the EPA's Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing*, June 2009. EPA-452/R-09-006. *https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous*.

website on February 26, 2020, for public review. Asarco and Freeport provided comments, revisions to the initial modeling file, and supporting documents, which consisted of 2019 emissions data and various performance test reports. The data provided by both facilities were used to develop the final modeling input file.

For each NEI record, the EPA reviewed the standard classification code (SCC) and emission unit and process descriptions, and assigned the record to one of the emission process groups (*i.e.*, Anode Furnaces; Anode Refining Roofline; Combustion; Converters; Anode Furnaces and Converters; Converters Roofline; Dryers, Furnaces, Converters and Acid Plant; Non-process Fugitives; Rod Plant; Smelting Furnace Roofline; Smelting Furnace Secondary; Smelting Furnaces and Converters).

If the SCC and emission unit and process descriptions were ambiguous for a specific NEI record, the Agency used the facility air permits and flow diagrams to help us assign the appropriate emission process group. Both facilities have many combined gas streams that vent to a common control system and/or stack. In those cases, there may be multiple emissions sources included in the Emission Process Group Description. For example, at Asarco, the exhaust gases from the two dryers and flash furnace are vented to the same baghouse. The facility has a sampling port at the exhaust of the baghouse to measure emissions during performance testing. The emission sources associated with this example are represented by "Dryers and Flash Furnace" under the Emission Process Group Description.

The EPA did not conduct a risk review pursuant to section 112(f) of the CAA for Kennecott since it is an area source subject to GACT standards (not MACT standards). However, we did obtain emissions estimates and evaluated some information on ambient monitoring data near the facility.

Based on reported 2017 estimates to the NEI, Kennecott emits an estimated 5.6 tpy of lead and 1.6 tpy of arsenic. However, we do not have any HAP metals emissions test data for Kennecott. Therefore, we consider these estimates uncertain and we are soliciting comments, data and additional information regarding these emissions estimates.

With regard to ambient monitoring data, Utah Division of Air Quality (DAQ) conducted lead monitoring at the Magna station near the Kennecott copper smelter from January 2010 through June 2017 (see Figure 18 of the memorandum titled *Emissions Data Used for Primary Copper Smelting Risk and Technology Review (RTR) Modeling Files*). At that time Utah DAQ was able to demonstrate that the likelihood of violating the National Ambient Air Quality Standard (NAAQS) for lead was so low, it would no longer be necessary to run the monitor. With EPA's concurrence, the Magna lead monitor was shut down in June 2017. Utah DAQ and the EPA continue to evaluate the development of requirements, such as source emission thresholds, population, and NAAQS revisions, that may trigger the necessity to resume monitoring lead in Utah.[5] Nevertheless, the Agency solicits comments, data and additional information regarding these ambient monitoring data and how they should be considered in the context of the EPA's technology review of the Primary Copper Smelting area source NESHAP.

2. How did we estimate MACT-allowable emissions?

The available emissions data in the RTR emissions dataset include estimates of the mass of HAP emitted during a specified annual time period. These "actual" emission levels are often lower than the emission levels allowed under the requirements of the current MACT standards. The emissions allowed under the MACT standards are referred to as the "MACT-allowable"

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[5] *Utah Division of Air Quality 2019 Annual Report.* 2019. Utah Department of Environmental Quality – Air Quality. Available at: *https://deq.utah.gov/air-quality/annual-reports-division-of-air-quality*.

emissions. The Agency discussed the consideration of both MACT-allowable and actual emissions in the final Coke Oven Batteries RTR (70 FR 19992, 19998–19999, April 15, 2005) and in the proposed and final Hazardous Organic NESHAP RTR (71 FR 34421, 34428, June 14, 2006, and 71 FR 76603, 76609, December 21, 2006, respectively). In those actions, the Agency noted that assessing the risk at the MACT-allowable level is inherently reasonable since that risk reflects the maximum level facilities could emit and still comply with national emission standards. The EPA also explained that it is reasonable to consider actual emissions, where such data are available, in both steps of the risk analysis, in accordance with the Benzene NESHAP approach. (54 FR 38044.)

The current Primary Copper Smelting NESHAP specifies numerical emission standards for each copper concentrate dryer, smelting vessel, and slag cleaning vessel. Consequently, the MACT-allowable emissions for each of these emission sources are assumed to be equal to the numerical emission standard. The NESHAP specifies work practice standards for fugitive dust sources. Therefore, the Agency believes that the actual fugitive dust sources emission levels are a reasonable estimation of the MACT-allowable emissions levels. The current NESHAP does not include standards for anode refining departments, anode refining rooflines, converter rooflines and smelting furnace rooflines. However, the EPA has determined that these sources are part of the source category and plans to propose MACT standards with this RTR. The MACT-allowable emissions for our baseline risk assessment for the anode refining departments, anode refining rooflines, converter rooflines and smelting furnace rooflines are assumed to be equal to the actual emissions, which are the estimated emissions prior to implementation of the proposed MACT standards.

For further details on the assumptions and methodologies used to estimate MACT-allowable emissions, see Appendix X of the document titled *Emissions Data Used for Primary Copper Smelting Risk and Technology Review (RTR) Modeling Files*, which is available in the docket for this rulemaking.

3. How do we conduct dispersion modeling, determine inhalation exposures, and estimate individual and population inhalation risk?

Both long-term and short-term inhalation exposure concentrations and health risk from the source category addressed in this proposal were estimated using the Human Exposure Model, Version 1.5.5(HEM-4).[6] The HEM-4 performs three primary risk assessment activities: (1) conducting dispersion modeling to estimate the concentrations of HAP in ambient air, (2) estimating long-term and short-term inhalation exposures to individuals residing within 50 kilometers (km) of the modeled sources, and (3) estimating individual and population-level inhalation risk using the exposure estimates and quantitative dose-response information.

a. Dispersion Modeling

The air dispersion model AERMOD, used by the HEM-4 model, is one of the EPA's preferred models for assessing air pollutant concentrations from industrial facilities.[7] To perform the dispersion modeling and to develop the preliminary risk estimates, HEM-4 draws on three data libraries. The first is a library of meteorological data, which is used for dispersion calculations. This library includes 1 year (2016) of hourly surface and upper air observations from 840 meteorological stations. These stations may include multiple years other than

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[6] For more information about HEM-4, go to *https://www.epa.gov/fera/risk-assessment-and-modeling-human-exposure-model-hem.*

[7] U.S. EPA. Revision to the *Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions* (70 FR 68218, November 9, 2005).

meteorological data from 2016. These meteorological stations provide coverage of the United States and Puerto Rico. However, for this source category, the EPA utilized on-site meteorological data (2012-2013) from non-attainment modeling conducted by ADEQ. A second library of United States Census Bureau census block[8] internal point locations and populations provides the basis of human exposure calculations (U.S. Census, 2010). In addition, for each census block, the census library includes the elevation and controlling hill height, which are also used in dispersion calculations. A third library of pollutant-specific dose-response values is used to estimate health risk. These are discussed below.

b. Risk from Chronic Exposure to HAP

In developing the risk assessment for chronic exposures, the EPA uses the estimated annual average ambient air concentrations of each HAP emitted by each source in the source category. The HAP air concentrations at each nearby census block centroid located within 50 km of the facility are a surrogate for the chronic inhalation exposure concentration for all the people who reside in that census block. A distance of 50 km is consistent with both the analysis supporting the 1989 Benzene NESHAP (54 FR 38044) and the limitations of Gaussian dispersion models, including AERMOD.

For each facility, the Agency calculates the MIR as the cancer risk associated with a continuous lifetime (24 hours per day, 7 days per week, 52 weeks per year, 70 years) exposure to the maximum concentration at the centroid of each inhabited census block. The EPA calculates individual cancer risk by multiplying the estimated lifetime exposure to the ambient concentration of each HAP (in micrograms per cubic meter ($\mu g/m^3$)) by its unit risk estimate (URE). The URE is an upper-bound estimate of an individual's incremental risk of contracting

[8] A census block is the smallest geographic area for which census statistics are tabulated.

cancer over a lifetime of exposure to a concentration of 1 microgram of the pollutant per cubic meter of air. For residual risk assessments, the EPA generally uses UREs from the EPA's Integrated Risk Information System (IRIS). For carcinogenic pollutants without IRIS values, the EPA looks to other reputable sources of cancer dose-response values, often using California EPA (CalEPA) UREs, where available. In cases where new, scientifically credible dose-response values have been developed in a manner consistent with the EPA's guidelines and have undergone a similar peer review process, the Agency may use such dose-response values in place of, or in addition to, other values, if appropriate. The pollutant-specific dose-response values used to estimate health risk are available at *https://www.epa.gov/fera/dose-response-assessment-assessing-health-risks-associated-exposure-hazardous-air-pollutants*.

Arsenic emissions from this source category are driving cancer risks. Inhalation cancer risks are based on an association between cumulative arsenic exposure and an increase in lung cancer mortality in two distinct smelter worker populations.[9]

Arsenic is also evaluated for multipathway risks as a PB-HAP based upon conservative food ingestions rates (*i.e.*, ingestion of fish and produce) and ingestion of contaminated soil.

To estimate individual lifetime cancer risks associated with exposure to HAP emissions from each facility in the source category, the Agency sums the risks for each of the carcinogenic HAP[10] emitted by the modeled facility. We estimate cancer risk at every census block within 50

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[9] US EPA IRIS; *Chemical Assessment Summary for Arsenic (inorganic) https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0278_summary.pdf#nameddest=cancerinhal.*

[10] The EPA's 2005 *Guidelines for Carcinogen Risk Assessment* classifies carcinogens as: "carcinogenic to humans," "likely to be carcinogenic to humans," and "suggestive evidence of carcinogenic potential." These classifications also coincide with the terms "known carcinogen, probable carcinogen, and possible carcinogen," respectively, which are the terms advocated in the EPA's *Guidelines for Carcinogen Risk Assessment*, published in 1986 (51 FR 33992,

km of every facility in the source category. The MIR is the highest individual lifetime cancer risk estimated for any of those census blocks. In addition to calculating the MIR, we estimate the distribution of individual cancer risks for the source category by summing the number of individuals within 50 km of the sources whose estimated risk falls within a specified risk range. We also estimate annual cancer incidence by multiplying the estimated lifetime cancer risk at each census block by the number of people residing in that block, summing results for all of the census blocks, and then dividing this result by a 70-year lifetime.

To assess the risk of noncancer health effects from chronic exposure to HAP, we calculate either an HQ or a target organ-specific hazard index (TOSHI). We calculate an HQ when a single noncancer HAP is emitted. Where more than one noncancer HAP is emitted, we sum the HQ for each of the HAP that affects a common target organ or target organ system to obtain a TOSHI. The HQ is the estimated exposure divided by the chronic noncancer dose-response value, which is a value selected from one of several sources. The preferred chronic noncancer dose-response value is the EPA RfC, defined as "an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime"

September 24, 1986). In August 2000, the document, *Supplemental Guidance for Conducting Health Risk Assessment of Chemical Mixtures* (EPA/630/R-00/002), was published as a supplement to the 1986 document. Copies of both documents can be obtained from *https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=20533&CFID=70315376&CFTOKEN=71597944*. Summing the risk of these individual compounds to obtain the cumulative cancer risk is an approach that was recommended by the EPA's SAB in their 2002 peer review of the EPA's National Air Toxics Assessment (NATA) titled *NATA - Evaluating the National-scale Air Toxics Assessment 1996 Data -- an SAB Advisory*, available at *https://yosemite.epa.gov/sab/sabproduct.nsf/214C6E915BB04E14852570CA007A682C/$File/ecadv02001.pdf*.

(*https://iaspub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&vocabName=IRIS%20Glossary*). In cases where an RfC from the EPA's IRIS is not available or where the EPA determines that using a value other than the RfC is appropriate, sometimes the EPA uses such an alternative value to assess risks. An example of such an alternative value is the use of the primary NAAQS for lead. The lead NAAQS is based upon a maximum 3-month average ambient concentration of 0.15 ug/m3. Additional chronic noncancer dose-response values can be a value from the following prioritized sources, which define their dose-response values similarly to the EPA: (1) the Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Level (*https://www.atsdr.cdc.gov/mrls/index.asp*); (2) the CalEPA Chronic Reference Exposure Level (*https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0*); or (3) as noted above, a scientifically credible dose-response value that has been developed in a manner consistent with the EPA guidelines and has undergone a peer review process similar to that used by the EPA. The pollutant-specific dose-response values used to estimate health risks are available at *https://www.epa.gov/fera/dose-response-assessment-assessing-health-risks-associated-exposure-hazardous-air-pollutants*.

This assessment identified emissions of arsenic and lead as a chronic noncancer hazard concern for children. Both pollutants impact brain development. The chronic, noncancer health effect benchmark for arsenic exposure is based on a decrease in intellectual function and adverse effects on neurobehavioral development in 10-yr-old children exposed through drinking water from birth.[11]

[11] Wasserman et al. (2004) and Tsai et al. (2003).

For lead, the NAAQS of 0.15 μg/m^3 specifies a level of air quality that protects the most sensitive subpopulation, children, from adverse effects, such as IQ loss, with an adequate margin of safety following exposure through inhalation or ingestion of lead previously emitted into the air.[12] Several studies were used as the basis for the standard, including an international pooled analysis of seven prospective cohort studies (n = 1,333).[13]

A review of the health effect benchmarks for arsenic and lead determined that, although the target organ is the same for these two pollutants, a TOSHI should not be calculated based upon the difference in exposure duration for the two benchmarks. The chronic REL for arsenic is an airborne concentration of inorganic arsenic at or below which no adverse noncancer health effects are anticipated in individuals indefinitely exposed to that concentration, while the lead standard is applied to a maximum 3-month rolling average of monitored lead concentrations.

c. Risk from Acute Exposure to HAP that May Cause Health Effects Other Than Cancer

For each HAP for which appropriate acute inhalation dose-response values are available, the EPA also assesses the potential health risks due to acute exposure. For these assessments, the EPA makes conservative assumptions about emission rates, meteorology, and exposure location. As part of our efforts to continually improve our methodologies to evaluate the risks that HAP emitted from categories of industrial sources pose to human health and the environment,[14] the EPA revised our treatment of meteorological data to use reasonable worst-case air dispersion conditions in our acute risk screening assessments instead of worst-case air dispersion

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[12] *EPA Final Rule (National Ambient Air Quality Standards for Lead*; November 12, 2008); *https://www.govinfo.gov/content/pkg/FR-2008-11-12/pdf/E8-25654.pdf.*

[13] Lanphear et al. (2005).

[14] See, *e.g.*, U.S. EPA. *Screening Methodologies to Support Risk and Technology Reviews (RTR): A Case Study Analysis* (Draft Report, May 2017. *https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous*).

conditions. This revised treatment of meteorological data and the supporting rationale are described in more detail in *Residual Risk Assessment for Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule* and in Appendix 5 of the report: *Technical Support Document for Acute Risk Screening Assessment.* This revised approach has been used in this proposed rule and in all other RTR rulemakings proposed on or after June 3, 2019.

To assess the potential acute risk to the maximally exposed individual, we use the peak hourly emission rate for each emission point,[15] reasonable worst-case air dispersion conditions (*i.e.*, 99th percentile), and the point of highest off-site exposure. Specifically, we assume that peak emissions from the source category and reasonable worst-case air dispersion conditions co-occur and that a person is present at the point of maximum exposure.

To characterize the potential health risks associated with estimated acute inhalation exposures to a HAP, we generally use multiple acute dose-response values, including acute RELs, acute exposure guideline levels (AEGLs), and emergency response planning guidelines (ERPG) for 1-hour exposure durations, if available, to calculate acute HQs. The acute HQ is calculated by dividing the estimated acute exposure concentration by the acute dose-response value. For each HAP for which acute dose-response values are available, the EPA calculates acute HQs. For this source category, acute risks from arsenic were a concern based upon the 1-

[15] In the absence of hourly emission data, the EPA develops estimates of maximum hourly emission rates by multiplying the average actual annual emissions rates by a factor (either a category-specific factor or a default factor of 10) to account for variability. This is documented in *Residual Risk Assessment for Primary Copper Smelting Major Source Category in Support of the 2020 Risk and Technology Review Proposed Rule* and in Appendix 5 of the report: *Technical Support Document for Acute Risk Screening Assessment*. Both are available in the docket for this rulemaking.

hour REL of 0.2 μg/m^3. The acute REL is based on developmental effects in mice (decreased fetal weight, growth retardation, skeletal defects)[16].

An acute REL is defined as "the concentration level at or below which no adverse health effects are anticipated for a specified exposure duration."[17] Acute RELs are based on the most sensitive, relevant, adverse health effect reported in the peer-reviewed medical and toxicological literature. They are designed to protect the most sensitive individuals in the population through the inclusion of margins of safety. Because margins of safety are incorporated to address data gaps and uncertainties, exceeding the REL does not automatically indicate an adverse health impact. AEGLs represent threshold exposure limits for the general public and are applicable to emergency exposures ranging from 10 minutes to 8 hours.[18] They are guideline levels for "once-in-a-lifetime, short-term exposures to airborne concentrations of acutely toxic, high-priority chemicals." *Id.* at 21. The AEGL–1 is specifically defined as "the airborne concentration (expressed as ppm (parts per million) or mg/m^3 (milligrams per cubic meter)) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure." *Id.* at 3.

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[16] Nagymajtenyi et al. 1985.

[17] CalEPA issues acute RELs as part of its Air Toxics Hot Spots Program, and the 1-hour and 8-hour values are documented in *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I, The Determination of Acute Reference Exposure Levels for Airborne Toxicants*, which is available at *https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary*.

[18] National Academy of Sciences, 2001. *Standing Operating Procedures for Developing Acute Exposure Levels for Hazardous Chemicals*, page 2. Available at *https://www.epa.gov/sites/production/files/2015-09/documents/sop_final_standing_operating_procedures_2001.pdf*. Note that the National Advisory Committee for Acute Exposure Guideline Levels for Hazardous Substances ended in October 2011, but the AEGL program continues to operate at the EPA and works with the National Academies to publish final AEGLs (*https://www.epa.gov/aegl*).

The document also notes that "Airborne concentrations below AEGL–1 represent exposure levels that can produce mild and progressively increasing but transient and nondisabling odor, taste, and sensory irritation or certain asymptomatic, nonsensory effects." *Id.* AEGL–2 are defined as "the airborne concentration (expressed as parts per million or milligrams per cubic meter) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape." *Id.*

ERPGs are "developed for emergency planning and are intended as health-based guideline concentrations for single exposures to chemicals."[19] *Id.* at 1. The ERPG–1 is defined as "the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or without perceiving a clearly defined, objectionable odor." *Id.* at 2. Similarly, the ERPG–2 is defined as "the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action." *Id.* at 1.

An acute REL for 1-hour exposure durations is typically lower than its corresponding AEGL–1 and ERPG–1. Even though their definitions are slightly different, AEGL–1s are often the same as the corresponding ERPG–1s, and AEGL–2s are often equal to ERPG–2s. The maximum HQs from our acute inhalation screening risk assessment typically result when we use

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[19] *ERPGS Procedures and Responsibilities*. March 2014. American Industrial Hygiene Association. Available at: *https://www.aiha.org/get-involved/AIHAGuidelineFoundation/EmergencyResponsePlanningGuidelines/Documents/ERPG%20Committee%20Standard%20Operating%20Procedures%20%20-%20March%202014%20Revision%20%28Updated%2010-2-2014%29.pdf.*

the acute REL for a HAP. In cases where the maximum acute HQ exceeds 1, we also report the HQ based on the next highest acute dose-response value (usually the AEGL–1 and/or the ERPG–1).

For this source category, we developed source category-specific acute factors ranging from 3 to 10 to estimate peak hourly emissions from annual emissions estimates for the input to the acute risk assessment modeling analysis. In general, hourly emissions estimates were based on batch cycle times for smelting and anode furnaces with an emission hourly multiplier of 3 applied while road fugitive emissions were modeled with a default hourly multiplier of 10 times the annual average. A further discussion of these factors and why they were chosen can be found in the memorandum, *Emissions Data Used for Primary Copper Smelting Risk and Technology Review (RTR) Modeling Files*, available in the docket for this rulemaking.

In our acute inhalation screening risk assessment, acute impacts are deemed negligible for HAP for which acute HQs are less than or equal to 1, and no further analysis is performed for these HAP. In cases where an acute HQ from the screening step is greater than 1, we assess the site-specific data to ensure that the acute HQ is at an off-site location. For this source category, the data refinements employed consisted of overlaying satellite imagery with off-site polar receptors to estimate off-site acute impacts. These refinements are discussed more fully in the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule*, which is available in the docket for this source category.

4. How do we conduct the multipathway exposure and risk screening assessment?

The EPA conducts a tiered screening assessment examining the potential for significant human health risks due to exposures via routes other than inhalation (*i.e.*, ingestion). We first

determine whether any sources in the source category emit any HAP known to be persistent and bioaccumulative in the environment, as identified in the EPA's Air Toxics Risk Assessment Library (see Volume 1, Appendix D, at *https://www.epa.gov/fera/risk-assessment-and-modeling-air-toxics-risk-assessment-reference-library).*

For the Primary Copper Smelting source category, we identified PB-HAP emissions of lead, arsenic, mercury and cadmium, so we proceeded to the next step of the evaluation. Except for lead, the human health risk screening assessment for PB-HAP consists of three progressive tiers. In a Tier 1 screening assessment, we determine whether the magnitude of the facility-specific emissions of PB-HAP warrants further evaluation to characterize human health risk through upper-end ingestion rates of (meat, produce, fruits, fish, etc.) based upon a combined farmer and fisher scenario. To facilitate this step, we evaluate emissions against previously developed screening threshold emission rates for several PB-HAP that are based on a hypothetical upper-end screening exposure scenario developed for use in conjunction with the EPA's Total Risk Integrated Methodology.Fate, Transport, and Ecological Exposure (TRIM.FaTE) model. The PB-HAP with screening threshold emission rates are arsenic compounds, cadmium compounds, chlorinated dibenzodioxins and furans, mercury compounds, and polycyclic organic matter (POM). Based on the EPA estimates of toxicity and bioaccumulation potential, these pollutants represent a conservative list for inclusion in multipathway risk assessments for RTR rules. (For more details see the risk assessment report cited above and Volume 1, Appendix D at *https://www.epa.gov/sites/production/files/2013-08/documents/volume_1_reflibrary.pdf.*). In this assessment, we compare the facility-specific emission rates of these PB-HAP to the screening threshold emission rates for each PB-HAP to assess the potential for significant human health risks via the ingestion pathway. We call this

application of the TRIM.FaTE model the Tier 1 screening assessment. The ratio of a facility's actual emission rate to the Tier 1 screening threshold emission rate is a screening value (SV).

We derive the Tier 1 screening threshold emission rates for these PB-HAP (other than lead compounds) to correspond to a maximum excess lifetime cancer risk of 1-in-1 million (*i.e.*, for arsenic compounds, polychlorinated dibenzodioxins and furans, and POM) or, for HAP that cause noncancer health effects (*i.e.*, cadmium compounds and mercury compounds), a maximum HQ of 1. If the emission rate of any one PB-HAP or combination of carcinogenic PB-HAP in the Tier 1 screening assessment exceeds the Tier 1 screening threshold emission rate for any facility (*i.e.*, the SV is greater than 1), we conduct a second screening assessment, which we call the Tier 2 screening assessment. The Tier 2 screening assessment separates the Tier 1 combined fisher and farmer exposure scenario into fisher, farmer, and gardener scenarios that retain upper-bound ingestion rates.

In the Tier 2 screening assessment, the location of each facility that exceeds a Tier 1 screening threshold emission rate is used to refine the assumptions associated with the Tier 1 fisher and farmer exposure scenarios at that facility. A key assumption in the Tier 1 screening assessment is that a lake and/or farm is located near the facility. As part of the Tier 2 screening assessment, we use a U.S. Geological Survey (USGS) database to identify actual waterbodies within 50 km of each facility and assume the fisher only consumes fish from lakes within that 50 km zone. We also examine the differences between local meteorology near the facility and the meteorology used in the Tier 1 screening assessment. We then adjust the previously developed Tier 1 screening threshold emission rates for each PB-HAP for each facility based on an understanding of how exposure concentrations estimated for the screening scenario change with the use of local meteorology and the USGS lakes database.

In the Tier 2 farmer scenario, we maintain an assumption that the farm is located within 0.5 km of the facility and that the farmer consumes meat, eggs, dairy, vegetables, and fruit produced near the facility. We may further refine the Tier 2 screening analysis by assessing a gardener scenario to characterize a range of exposures, with the gardener scenario being more plausible in RTR evaluations. Under the gardener scenario, we assume the gardener consumes home-produced eggs, vegetables, and fruit products at the same ingestion rate as the farmer. The Tier 2 screen continues to rely on the high-end food intake assumptions that were applied in Tier 1 for local fish (adult female angler at 99th percentile fish consumption[20]) and locally grown or raised foods (90th percentile consumption of locally grown or raised foods for the farmer and gardener scenarios[21]). If PB-HAP emission rates do not result in a Tier 2 SV greater than 1, we consider those PB-HAP emissions to pose risks below a level of concern. If the PB-HAP emission rates for a facility exceed the Tier 2 screening threshold emission rates, we may conduct a Tier 3 screening assessment.

There are several analyses that can be included in a Tier 3 screening assessment, depending upon the extent of refinement warranted, including validating that the lakes are fishable, locating residential/garden locations for urban and/or rural settings, considering plume-rise to estimate emissions lost above the mixing layer, and considering hourly effects of meteorology and plume-rise on chemical fate and transport (a time-series analysis). If necessary, the EPA may further refine the screening assessment through a site-specific assessment.

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[20] Burger, J. 2002. *Daily consumption of wild fish and game: Exposures of high end recreationists. International Journal of Environmental Health Research,* 12:343–354.
[21] U.S. EPA. *Exposure Factors Handbook 2011 Edition (Final)*. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R–09/052F, 2011.

In evaluating the potential multipathway risk from emissions of lead compounds, rather than developing a screening threshold emission rate, the Agency compares maximum estimated chronic inhalation exposure concentrations to the level of the current NAAQS for lead.[22] Values below the level of the primary (health-based) lead NAAQS are considered to have a low potential for multipathway risk. For this source category based upon high modeled annual concentrations of lead from HEM-4, a refined assessment was conducted to estimate the maximum 3-month average concentration for lead over multiple years. These refinements included the use of a post-processer (Lead-POST) in AERMOD to calculate the maximum 3-month lead concentration for each off-site receptor to directly compare to the current lead NAAQS standard.[23]

For further information on the multipathway assessment approach, see the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*, which is available in the docket for this action.

5. How do we assess risks considering emissions control options?

In addition to assessing baseline inhalation risks and screening for potential multipathway risks, the EPA also estimates risks considering the potential emission reductions that would be

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[22] In doing so, the EPA notes that the legal standard for a primary NAAQS – that a standard is requisite to protect public health and provide an adequate margin of safety (CAA section 109(b)) – differs from the CAA section 112(f) standard (requiring, among other things, that the standard provide an "ample margin of safety to protect public health"). However, the primary lead NAAQS is a reasonable measure of determining risk acceptability (*i.e.*, the first step of the Benzene NESHAP analysis) since it is designed to protect the most susceptible group in the human population – children, including children living near major lead emitting sources. 73 FR 67002/3; 73 FR 67000/3; 73 FR 67005/1. In addition, applying the level of the primary lead NAAQS at the risk acceptability step is conservative since that primary lead NAAQS reflects an adequate margin of safety.

[23] EPA Support Center for Regulatory Atmospheric Modeling site to access LEADPOST utilized in the Pb NAAQS program: *https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models.*

achieved by the control options under consideration. In these cases, the expected emission reductions are applied to the specific HAP and emission points in the RTR emissions dataset to develop corresponding estimates of risk and incremental risk reductions.

6. How do we conduct the environmental risk screening assessment?

a. Adverse Environmental Effect, Environmental HAP, and Ecological Benchmarks

The EPA conducts a screening assessment to examine the potential for an adverse environmental effect as required under section 112(f)(2)(A) of the CAA. Section 112(a)(7) of the CAA defines "adverse environmental effect" as "any significant and widespread adverse effect, which may reasonably be anticipated, to wildlife, aquatic life, or other natural resources, including adverse impacts on populations of endangered or threatened species or significant degradation of environmental quality over broad areas."

The EPA focuses on eight HAP, which are referred to as "environmental HAP," in its screening assessment: six PB-HAP and two acid gases. The PB-HAP included in the screening assessment are arsenic compounds, cadmium compounds, dioxins/furans, POM, mercury (both inorganic mercury and methyl mercury), and lead compounds. The acid gases included in the screening assessment are hydrochloric acid (HCl) and hydrogen fluoride (HF).

HAP that persist and bioaccumulate are of particular environmental concern because they accumulate in the soil, sediment, and water. The acid gases, HCl and HF, are included due to their well-documented potential to cause direct damage to terrestrial plants. In the environmental risk screening assessment, the EPA evaluates the following four exposure media: terrestrial soils, surface water bodies (includes water-column and benthic sediments), fish consumed by wildlife, and air. Within these four exposure media, the Agency evaluates nine ecological assessment endpoints, which are defined by the ecological entity and its attributes. For PB-HAP (other than

lead), both community-level and population-level endpoints are included. For acid gases, the ecological assessment endpoint evaluated is terrestrial plant communities.

An ecological benchmark represents a concentration of HAP that has been linked to a particular environmental effect level. For each environmental HAP, the Agency identified the available ecological benchmarks for each assessment endpoint and where possible, the ecological benchmarks at the following effect levels: probable effect levels, lowest-observed-adverse-effect level, and no-observed-adverse-effect level. In cases where multiple effect levels were available for a particular PB-HAP and assessment endpoint, the EPA uses all of the available effect levels to help us to determine whether ecological risks exist and, if so, whether the risks could be considered significant and widespread.

For further information on how the environmental risk screening assessment was conducted, including a discussion of the risk metrics used, how the environmental HAP were identified, and how the ecological benchmarks were selected, see Appendix 9 of the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*, which is available in the docket for this action.

b. Environmental Risk Screening Methodology

For the environmental risk screening assessment, the EPA first determined whether any facilities in the Primary Copper Smelting source category emitted any of the environmental HAP. For the Primary Copper Smelting source category, the Agency identified emissions of arsenic, mercury, cadmium and lead. Because one or more of the environmental HAP evaluated are emitted by at least one facility in the source category, the Agency proceeded to the second step of the evaluation.

c. PB-HAP Methodology for Environmental Risk Screening

The environmental risk screening assessment includes six PB-HAP: arsenic compounds, cadmium compounds, dioxins/furans, POM, mercury (both inorganic mercury and methyl mercury), and lead compounds. With the exception of lead, the environmental risk screening assessment for PB-HAP consists of three tiers. The first tier of the environmental risk screening assessment uses the same health-protective conceptual model that is used for the Tier 1 human health screening assessment. TRIM.FaTE model simulations were used to back-calculate Tier 1 screening threshold emission rates. The screening threshold emission rates represent the emission rate in tons of pollutant per year that results in media concentrations at the facility that equal the relevant ecological benchmark. To assess emissions from each facility in the category, the reported emission rate for each PB-HAP was compared to the Tier 1 screening threshold emission rate for that PB-HAP for each assessment endpoint and effect level. If emissions from a facility do not exceed the Tier 1 screening threshold emission rate, the facility "passes" the screening assessment, and, therefore, is not evaluated further under the screening approach. If emissions from a facility exceed the Tier 1 screening threshold emission rate, the EPA evaluates the facility further in Tier 2.

In Tier 2 of the environmental risk screening assessment, the screening threshold emission rates are adjusted to account for local meteorology and the actual location of lakes in the vicinity of facilities that did not pass the Tier 1 screening assessment. For soils, the EPA evaluates the average soil concentration for all soil parcels within a 7.5-km radius for each facility and PB-HAP. For the water, sediment, and fish tissue concentrations, the highest value for each facility for each pollutant is used. If emission concentrations from a facility do not exceed the Tier 2 screening threshold emission rate, the facility "passes" the screening

assessment and typically is not evaluated further. If emissions from a facility exceed the Tier 2 screening threshold emission rate, the EPA evaluates the facility further in Tier 3.

As in the multipathway human health risk assessment, in Tier 3 of the environmental risk screening assessment, the Agency examines the suitability of the lakes around the facilities to support life and remove those that are not suitable (*e.g.*, lakes that have been filled in or are industrial ponds), adjust emissions for plume-rise, and conduct hour-by-hour time-series assessments. If these Tier 3 adjustments to the screening threshold emission rates still indicate the potential for an adverse environmental effect (*i.e.*, facility emission rate exceeds the screening threshold emission rate), the Agency may elect to conduct a more refined assessment using more site-specific information. If, after additional refinement, the facility emission rate still exceeds the screening threshold emission rate, the facility may have the potential to cause an adverse environmental effect.

To evaluate the potential for an adverse environmental effect from lead, we compared the average modeled air concentrations (from HEM-4) of lead around each facility in the source category to the level of the secondary NAAQS for lead. The secondary lead NAAQS is a reasonable means of evaluating environmental risk because it is set to provide substantial protection against adverse welfare effects which can include "effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being."

d. Acid Gas Environmental Risk Methodology

The environmental risk screening assessment for acid gases evaluates the potential phytotoxicity and reduced productivity of plants due to chronic exposure to HF and HCl. The

environmental risk screening methodology for acid gases is a single-tier screening assessment that compares modeled ambient air concentrations (from AERMOD) to the ecological benchmarks for each acid gas. To identify a potential adverse environmental effect (as defined in section 112(a)(7) of the CAA) from emissions of HF and HCl, the Agency evaluates the following metrics: the size of the modeled area around each facility that exceeds the ecological benchmark for each acid gas, in acres and square kilometers; the percentage of the modeled area around each facility that exceeds the ecological benchmark for each acid gas; and the area-weighted average SV around each facility (calculated by dividing the area-weighted average concentration over the 50-km modeling domain by the ecological benchmark for each acid gas). For further information on the environmental screening assessment approach, see Appendix 9 of the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 20201 Proposed Rule*, which is available in the docket for this action.

7. How do we conduct facility-wide assessments?

To put the source category risks in context, the EPA typically examines the risks from the entire "facility," where the facility includes all HAP-emitting operations within a contiguous area and under common control. In other words, the Agency examines the HAP emissions not only from the source category emission points of interest, but also emissions of HAP from all other emission sources at the facility for which we have data. For this source category, we conducted the facility-wide assessment using a dataset compiled from the 2017 NEI and 2018 actual emissions provided by ADEQ. The source category records of that 2017 and 2018 actual emissions dataset were removed, evaluated, and updated as described in section II.C of this preamble: What data collection activities were conducted to support this action? Once a quality

assured source category dataset was available, it was placed back with the remaining records from the NEI for that facility. The facility-wide file was then used to analyze risks due to the inhalation of HAP that are emitted "facility-wide" for the populations residing within 50 km of each facility, consistent with the methods used for the source category analysis described above. For these facility-wide risk analyses, the modeled source category risks were compared to the facility-wide risks to determine the portion of the facility-wide risks that could be attributed to the source category addressed in this proposal. The EPA also specifically examined the facility that was associated with the highest estimate of risk and determined the percentage of that risk attributable to the source category of interest. The *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 20201 Proposed Rule*, available through the docket for this action, provides the methodology and results of the facility-wide analyses, including all facility-wide risks and the percentage of source category contribution to facility-wide risks.

8. How do we consider uncertainties in risk assessment?

Uncertainty and the potential for bias are inherent in all risk assessments, including those performed for this proposal. Although uncertainty exists, we believe that our approach, which used conservative tools and assumptions, ensures that our decisions are health and environmentally protective. A brief discussion of the uncertainties in the RTR emissions dataset, dispersion modeling, inhalation exposure estimates, and dose-response relationships follows below. Also included are those uncertainties specific to our acute screening assessments, multipathway screening assessments, and our environmental risk screening assessments. A more thorough discussion of these uncertainties is included in the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review*

2021 Proposed Rule, which is available in the docket for this action. If a multipathway site-specific assessment was performed for this source category, a full discussion of the uncertainties associated with that assessment can be found in Appendix 11 of that document, *Site-Specific Human Health Multipathway Residual Risk Assessment Report*.

a. Uncertainties in the RTR Emissions Dataset

Although the development of the RTR emissions dataset involved quality assurance/quality control processes, the accuracy of emissions values will vary depending on the source of the data, the degree to which data are incomplete or missing, the degree to which assumptions made to complete the datasets are accurate, errors in emission estimates, and other factors. The emission estimates considered in this analysis generally are annual totals for certain years, and they generally do not reflect short-term fluctuations during the course of a year or variations from year to year except in potentially a few cases, such as the May/June 2018 lead test data for anode refining roof vent fugitive emissions from the Freeport facility. Nevertheless, the estimates of peak hourly emission rates for the acute effects screening assessment were based on emission adjustment factors applied to the average annual hourly emission rates, which are intended to account for emission fluctuations due to normal facility operations.

b. Uncertainties in Dispersion Modeling

The EPA recognizes there is uncertainty in ambient concentration estimates associated with any model, including the EPA's recommended regulatory dispersion model, AERMOD. In using a model to estimate ambient pollutant concentrations, the user chooses certain options to apply. For RTR assessments, we select some model options that have the potential to overestimate ambient air concentrations (*e.g.*, not including plume depletion or pollutant transformation). We select other model options that have the potential to underestimate ambient

impacts (*e.g.*, not including building downwash). Other options that we select have the potential to either under- or overestimate ambient levels (*e.g.*, location and year of meteorology data and receptor locations). On balance, considering the directional nature of the uncertainties commonly present in ambient concentrations estimated by dispersion models, the approach we apply in the RTR assessments should yield unbiased estimates of ambient HAP concentrations. The uncertainties attributed to dispersion modeling in RTR assessments were assessed by EPA's Science Advisory Board (SAB) and deemed suitable and appropriate.[24] We also note that the selection of meteorology dataset location could have an impact on the risk estimates. For this source category, the two facilities being modeled have ambient air toxics monitors and on-site meteorological stations in place that can be used to help characterize the uncertainty of the emissions modeling. For the Freeport facility, we were unable to collect on-site meteorological data for the 2019 monitor to model comparison; therefore, the model to monitor evaluation was based upon on-site 2011-2012 meteorological data with the 2019 monitoring data. This was not an uncertainty for the Asarco facility, since both model and monitoring comparisons were for 2019. A review of the model to monitor comparisons between the two site(s) can be found in Appendix 1 of the *Residual Risk Assessment for the Primary Copper Smelting Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*, report which is available in the docket for this action and Section IV; B-6 of this proposal. As we continue to update and

[24] USEPA, 2009a. *Risk and Technology Review (RTR) Risk Assessment Methodologies: For Review by the EPA's Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing*. EPA-452/R-09-006. https://yosemite.epa.gov/sab/sabproduct.nsf/4AB3966E263D943A8525771F00668381/$File/EPA-SAB-10-007-unsigned.pdf

expand our library of meteorological station data used in our risk assessments, we expect to reduce this variability.

c. Uncertainties in Inhalation Exposure Assessment

Although every effort is made to identify all of the relevant facilities and emission points, as well as to develop accurate estimates of the annual emission rates for all relevant HAP, the uncertainties in our emission inventory likely dominate the uncertainties in the exposure assessment. Some uncertainties in our exposure assessment include human mobility, using the centroid of each census block, assuming lifetime exposure, and assuming only outdoor exposures. For most of these factors, there is neither an under nor overestimate when looking at the maximum individual risk or the incidence, but the shape of the distribution of risks may be affected. With respect to outdoor exposures, actual exposures may not be as high if people spend time indoors, especially for very reactive pollutants or larger particles. For all factors, we reduce uncertainty when possible. For example, with respect to census-block centroids, we analyze large blocks using aerial imagery and adjust locations of the block centroids to better represent the population in the blocks. We also add additional receptor locations where the population of a block is not well represented by a single location.

d. Uncertainties in Dose-Response Relationships

There are uncertainties inherent in the development of the dose-response values used in our risk assessments for cancer effects from chronic exposures and noncancer effects from both chronic and acute exposures. Some uncertainties are generally expressed quantitatively, and others are generally expressed in qualitative terms. We note, as a preface to this discussion, a point on dose-response uncertainty that is stated in the EPA's *2005 Guidelines for Carcinogen Risk Assessment*; namely, that "the primary goal of EPA actions is protection of human health;

accordingly, as an Agency policy, risk assessment procedures, including default options that are used in the absence of scientific data to the contrary, should be health protective" (the EPA's *2005 Guidelines for Carcinogen Risk Assessment*, page 1-7). This is the approach followed here as summarized in the next paragraphs.

Cancer UREs used in our risk assessments are those that have been developed to generally provide an upper bound estimate of risk.[25] That is, they represent a "plausible upper limit to the true value of a quantity" (although this is usually not a true statistical confidence limit). In some circumstances, the true risk could be as low as zero; however, in other circumstances the risk could be greater.[26] Chronic noncancer RfC and reference dose values represent chronic exposure levels that are intended to be health-protective levels. To derive dose-response values that are intended to be "without appreciable risk," the methodology relies upon an uncertainty factor (UF) approach,[27] which considers uncertainty, variability, and gaps in the available data. The UFs are applied to derive dose-response values that are intended to protect against appreciable risk of deleterious effects.

Many of the UFs used to account for variability and uncertainty in the development of acute dose-response values are quite similar to those developed for chronic durations. Additional adjustments are often applied to account for uncertainty in extrapolation from observations at one exposure duration (*e.g.*, 4 hours) to derive an acute dose-response value at another exposure

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[25] IRIS glossary (*https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&glossaryName=IRIS%20Glossary*).

[26] An exception to this is the URE for benzene, which is considered to cover a range of values, each end of which is considered to be equally plausible, and which is based on maximum likelihood estimates.

[27] See *A Review of the Reference Dose and Reference Concentration Processes*, U.S. EPA, December 2002, and *Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry*, U.S. EPA, 1994.

duration (*e.g.*, 1 hour). Not all acute dose-response values are developed for the same purpose, and care must be taken when interpreting the results of an acute assessment of human health effects relative to the dose-response value or values being exceeded. Where relevant to the estimated exposures, the lack of acute dose-response values at different levels of severity should be factored into the risk characterization as potential uncertainties.

Uncertainty also exists in the selection of ecological benchmarks for the environmental risk screening assessment. The EPA established a hierarchy of preferred benchmark sources to allow selection of benchmarks for each environmental HAP at each ecological assessment endpoint. We searched for benchmarks for three effect levels (*i.e.*, no-effects level, threshold-effect level, and probable effect level), but not all combinations of ecological assessment/environmental HAP had benchmarks for all three effect levels. Where multiple effect levels were available for a particular HAP and assessment endpoint, we used all of the available effect levels to help us determine whether risk exists and whether the risk could be considered significant and widespread.

For a group of compounds that are unspeciated (*e.g.*, glycol ethers), we conservatively use the most protective dose-response value of an individual compound in that group to estimate risk. Similarly, for an individual compound in a group (*e.g.*, ethylene glycol diethyl ether) that does not have a specified dose-response value, we also apply the most protective dose-response value from the other compounds in the group to estimate risk.

e. Uncertainties in Acute Inhalation Screening Assessments

In addition to the uncertainties highlighted above, there are several factors specific to the acute exposure assessment that the EPA conducts as part of the risk review under section 112 of the CAA. The accuracy of an acute inhalation exposure assessment depends on the simultaneous

occurrence of independent factors that may vary greatly, such as hourly emissions rates, meteorology, and the presence of a person. In the acute screening assessment that we conduct under the RTR program, we assume that peak emissions from the source category and reasonable worst-case air dispersion conditions (*i.e.*, 99th percentile) co-occur. We then include the additional assumption that a person is located at this point at the same time. Together, these assumptions represent a reasonable worst-case actual exposure scenario. In most cases, it is unlikely that a person would be located at the point of maximum exposure during the time when peak emissions and reasonable worst-case air dispersion conditions occur simultaneously.

f. Uncertainties in the Multipathway and Environmental Risk Screening Assessments

For each source category, the Agency generally relies on site-specific levels of PB-HAP or environmental HAP emissions to determine whether a refined assessment of the impacts from multipathway exposures is necessary or whether it is necessary to perform an environmental screening assessment. This determination is based on the results of a three-tiered screening assessment that relies on the outputs from models – TRIM.FaTE and AERMOD – that estimate environmental pollutant concentrations and human exposures for five PB-HAP (dioxins, POM, mercury, cadmium, and arsenic) and two acid gases (HF and HCl). For lead, the Agency uses AERMOD to determine ambient air concentrations, which are then compared to the secondary NAAQS standard for lead. Two important types of uncertainty associated with the use of these models in RTR risk assessments and inherent to any assessment that relies on environmental modeling are model uncertainty and input uncertainty.[28]

[28] In the context of this discussion, the term "uncertainty" as it pertains to exposure and risk encompasses both ***variability*** in the range of expected inputs and screening results due to existing spatial, temporal, and other factors, as well as ***uncertainty*** in being able to accurately estimate the true result.

Model uncertainty concerns whether the model adequately represents the actual processes (*e.g.*, movement and accumulation) that might occur in the environment. For example, does the model adequately describe the movement of a pollutant through the soil? This type of uncertainty is difficult to quantify. However, based on feedback received from previous EPA SAB reviews and other reviews, we are confident that the models used in the screening assessments are appropriate and state-of-the-art for the multipathway and environmental screening risk assessments conducted in support of RTRs. For example, the SAB found that the general methodology of the tiered screening approach and the use of TRIM.FaTE and AERMOD are appropriate for both multipathway and ecological screening tools. The SAB noted the simplicity of the air dispersion treatment in TRIM.FaTE and encouraged the advancement of incorporating AERMOD analysis within the TRIM.FaTE framework.[29]

Input uncertainty is concerned with how accurately the models have been configured and parameterized for the assessment at hand. For Tier 1 of the multipathway and environmental screening assessments, the EPA configured the models to avoid underestimating exposure and risk. This was accomplished by selecting upper-end values from nationally representative datasets for the more influential parameters in the environmental model, including selection and spatial configuration of the area of interest, lake location and size, meteorology, surface water, soil characteristics, and structure of the aquatic food web. The EPA also assumes an ingestion exposure scenario and values for human exposure factors that represent reasonable maximum exposures.

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[29] USEPA, 2018. Review of EPA's draft technical report entitle Screening Methodologies to Support Risk and Technology Review (RTR): A Case Study Analysis; EPA-SAB-18-004. https://yosemite.epa.gov/sab/sabproduct.nsf/LookupWebReportsLastMonthBOARD/7A84AADF3F2FE04A85258307005F7D70/$File/EPA-SAB-18-004+.pdf

In Tier 2 of the multipathway and environmental screening assessments, we refine the model inputs to account for meteorological patterns in the vicinity of the facility versus using upper-end national values, and we identify the actual location of lakes near the facility rather than the default lake location that we apply in Tier 1. By refining the screening approach in Tier 2 to account for local geographical and meteorological data, we decrease the likelihood that concentrations in environmental media are overestimated, thereby increasing the usefulness of the screening assessment. In Tier 3 of the screening assessments, we refine the model inputs again to account for hour-by-hour plume-rise and the height of the mixing layer. The EPA can also use those hour-by-hour meteorological data in a TRIM.FaTE run using the screening configuration corresponding to the lake location. These refinements produce a more accurate estimate of chemical concentrations in the media of interest, thereby reducing the uncertainty with those estimates. The assumptions and the associated uncertainties regarding the selected ingestion exposure scenario are the same for all three tiers.

For the environmental screening assessment for acid gases, we employ a single-tiered approach. We use the modeled air concentrations and compare those with ecological benchmarks.

For all tiers of the multipathway and environmental screening assessments, our approach to addressing model input uncertainty is generally cautious. We choose model inputs from the upper end of the range of possible values for the influential parameters used in the models, and we assume that the exposed individual exhibits ingestion behavior that would lead to a high total exposure. This approach reduces the likelihood of not identifying high risks for adverse impacts.

Despite the uncertainties, when individual pollutants or facilities do not exceed screening threshold emission rates (*i.e.*, screen out), we are confident that the potential for adverse

multipathway impacts on human health is very low. On the other hand, when individual pollutants or facilities do exceed screening threshold emission rates, it does not mean that impacts are significant, only that the Agency cannot rule out that possibility and that a refined assessment for the site might be necessary to obtain a more accurate risk characterization for the source category.

The EPA evaluates the following HAP in the multipathway and/or environmental risk screening assessments, where applicable: arsenic, cadmium, dioxins/furans, lead, mercury (both inorganic and methyl mercury), POM, HCl, and HF. These HAP represent pollutants that can cause adverse impacts either through direct exposure to HAP in the air or through exposure to HAP that are deposited from the air onto soils and surface waters and then through the environment into the food web. These HAP represent those HAP for which the Agency can conduct a meaningful multipathway or environmental screening risk assessment. For other HAP not included in our screening assessments, the model has not been parameterized such that it can be used for that purpose. In some cases, depending on the HAP, the Agency may not have appropriate multipathway models that allow us to predict the concentration of that pollutant. The EPA acknowledges that other HAP beyond these that we are evaluating may have the potential to cause adverse effects and, therefore, the EPA may evaluate other relevant HAP in the future, as modeling science and resources allow.

IV. Analytical Results and Proposed Decisions

A. What actions are we taking pursuant to CAA sections 112(d)(2) and 112(d)(3)?

In this proposal, the EPA is proposing the following standards pursuant to CAA section 112(d)(2) and (3) for the major source NESHAP (40 CFR part 63, subpart QQQ):

- PM limits for anode refining point sources at existing and new sources.

- PM limits for process fugitive emissions from rooflines of smelting furnaces at existing and new sources.
- PM limits for process fugitive emissions from converters at existing and new sources.
- PM limits for process fugitive emissions from roof vents at anode refining operations at existing and new sources.
- Mercury limits for any existing and new combination of stacks or other vents from the copper concentrate dryers, converting department, the anode refining department, and the smelting vessels affected sources.
- PM limits for new converters.

The results and proposed decisions based on the analyses performed pursuant to CAA section 112(d)(2) and (3) are presented below. When addressing previously unregulated HAP emission sources or unregulated HAP from previously regulated sources in the proposed rule, we apply the MACT methodology, as described in section II.A above.

1. Anode Refining Point Source Emissions

The 1998 proposal for primary copper smelting identified anode refining in the definition of primary copper smelters. However, at that time, the EPA said there were insufficient data to set an emission limit for anode refining. Therefore, the Agency did not propose specific emission standards for anode copper refining operations in the major source NESHAP at that time. In contrast, the 2007 area source NESHAP for primary copper smelting (subpart EEEEEE) does include emissions standards for anode refining. We conclude that anode refining is part of the source category and emits HAP emissions. Therefore, pursuant to CAA section 112(d)(2) and (3), the Agency is proposing to revise the 2002 major source NESHAP to include emission limits for new and existing anode refining point sources. We have anode refining point source test data

from only one source, and because there are less than 30 sources in the category, the MACT floor is based on the average performance of the best 5 sources (in this case, the upper predictive limit (UPL) for the best single source because the Agency only has test data from one source). Using available test data, we are proposing a MACT floor PM limit as a surrogate for particulate metal HAP, which includes, but is not limited to, antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, and selenium compounds. This approach is consistent with the approach used to limit metal HAP emissions from the other copper smelting processes. A detailed analysis and documentation of the MACT floor calculations can be found in the technical document, *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category*. The MACT floor emissions limit was calculated based on the average of the emissions tests, accounting for variability using the 99 percent UPL. The MACT floor limit for the anode refining point source emissions for existing and new sources is 5.8 milligrams per dry standard cubic meter (mg/dscm).

We identified one BTF option to further reduce PM emissions from anode refining furnaces point sources. The BTF option would require the two facilities to each install and operate a wet electrostatic precipitator (ESP) in addition to their existing controls (baghouses). We estimated that emissions of lead would be reduced by about 0.8 tpy and arsenic emissions would be reduced by about 0.3 tpy. For the 2 existing facilities to comply with this BTF standard, we estimated capital costs of $72 million and annualized costs of $9.6 million for a cost effectiveness of $8.7 million per ton of HAP metal reduced. Regarding new sources, the MACT floor control technology would be a baghouse since the current best performing source is controlled with a baghouse, and the BTF control option for new sources would also be the same as existing (*i.e.*, new source BTF option is based on the addition of a Wet ESP on top of the

baghouse). Therefore, we assume the costs for a new source would also be about the same (*i.e.*, $38 million capital, with annualized costs of $4.8 million). The Agency cannot estimate a precise cost effectiveness number because it would depend on unknown factors (such as concentration of HAP metals in the ore and/or other input materials used by a new source). Therefore, the Agency assumes the cost effectiveness for new sources would be roughly the same as for existing sources described above. Based on this analysis, the Agency is not proposing this BTF option for existing or new sources because of the relatively high costs and poor cost effectiveness.

Based on the analyses described above, the Agency is proposing to revise the 2002 NESHAP to include the following MACT floor-based emission limits for anode refining point sources:

- For existing anode refining point sources located at primary copper smelting facilities, we are proposing a PM emissions limit of 5.8 mg/dscm.
- For new anode refining point sources located at primary copper smelting facilities, we are proposing a PM emissions limit of 5.8 mg/dscm.

We propose that compliance with the PM emissions limit for anode refining will be demonstrated through an initial compliance test followed by a compliance test at least once every year.

2. Process Fugitive Roof Vents

The major source NESHAP currently does not include standards for process fugitive emissions from the rooflines of smelting furnaces, converters, or anode refining operations, with the exception of an opacity limit for converter roof vents that applies during testing. We note that some of these rooflines are among the main sources driving risks as described in the discussion of the risk results in section IV.B. Pursuant to CAA section 112(d)(2) and (3), the EPA is

proposing to revise the 2002 NESHAP to include emission limits for rooflines for smelting furnaces, converters, and anode refining at existing and new sources

For smelting furnace and converter rooflines, we evaluated the potential to establish MACT floor emissions limits for PM, as a surrogate for HAP metals, which includes, but is not limited to, antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, and selenium compounds, based on available test data. While the Agency only had test data for one of the two facilities (*i.e.*, Freeport), the Agency used those data for calculating MACT floor PM limits for converters and smelting furnaces using the UPL methodology. Establishing PM as a surrogate for HAP metals is consistent with the approach used to limit metal HAP emissions from the other copper smelting processes in the current NESHAP and for many other source categories (*i.e.*, Ferroalloys Production, Integrated Iron and Steel Manufacturing, Iron and Steel Foundries). Based on our analyses, we calculated a MACT floor emissions limit of 1.7 lbs/hr PM for process fugitive emissions for existing and new converter rooflines and a MACT floor limit of 4.3 lbs/hr PM for existing and new smelting furnaces rooflines.

The EPA also evaluated BTF PM limits for smelting furnace and converter rooflines based on the potential addition of capture and control equipment designed to achieve approximately 90 percent reduction in process fugitive emissions. With regard to smelting furnaces, based on available information, we estimate that 1.2 tpy year of HAP metals are emitted from the smelting flash furnace at Asarco. Freeport has two smelting furnaces. Freeport already has primary and secondary capture systems that capture and control process fugitives, resulting in total estimated HAP metal emissions from both furnaces of 0.626 tpy based on available test data, or about half of the emissions from Asarco's furnace. Asarco has primary capture and control and some secondary capture and control, but based on available reported

emission estimates, Asarco emits significantly more HAP metals than Freeport. For the BTF option, we evaluated the potential to add enhanced, improved capture and control equipment to achieve about 90 percent reduction of HAP metal emissions from the Asarco smelting flash furnace (*i.e.*, reduce estimated HAP metal emissions from 1.2 tpy to about 0.12 tpy). To achieve 90 percent reduction of process fugitives from the rooflines, the Agency assumes additional secondary capture and/or enhanced capture (*e.g.*, hooding, duct work, fans, etc.) would be needed for at least one operation (*i.e.*, matte tapping/pouring). We think another significant source of fugitives is the material transfer operation, which includes movement of a large ladle containing very hot liquid matte from the flash furnace tapping/pouring operation by an overhead crane to the converters after each tapping/pouring operation. To capture these fugitive emissions from the material transfer operations, we assume a roof ventilation capture system would be needed. We also assume a new baghouse (or other PM collection control device) would be needed to handle these additional exhaust gases. Another potential source of fugitives is the pouring/tapping of slag, but we are assuming 90 percent reduction could be achieved by adding a secondary capture and/or enhanced capture system to reduce fugitive emissions from at least one operation, such as the matte tapping/pouring, without adding capture and control equipment to the slag operation. Therefore, no costs are estimated for capturing fugitives from the slag pouring process.

Furthermore, to comply with this BTF option for smelting furnaces, we estimate Freeport would also need to reduce HAP emissions. If the standard was based on total emissions from smelting furnaces, we estimate Freeport would need to achieve 80 percent reduction (*e.g.*, from 0.626 to 0.12 tpy, which is the target level described above for the Asarco smelting furnace). To achieve this level of additional reductions of process fugitive emissions, we assume Freeport

would need to install two roof ventilation capture systems, one for each of its two furnaces. Further details of this beyond the floor analysis are provided in the technical memo *Evaluation of Beyond-the-floor and Ample Margin of Safety Control Options and Costs for Process Fugitive Emissions from Smelting Furnaces and Converters, and for Point Source Emissions from Anode Refining Furnaces and for the Combined Emissions Stream Emitted from the Freeport Aisle Scrubber*, which is available in the docket for this action.

Based on this analysis, the Agency estimates the BTF PM limit of 0.12 tpy for existing sources would have total capital costs of $26,501,600 and annualized costs of $5,443,937 and would achieve about 1.53 tpy reduction of HAP metals, with cost effectiveness of $3,445,529 per ton of HAP metal reduction. With regard to new sources (*i.e.*, new furnaces), since the MACT Floor limit is based on test data from Freeport, the Agency assumes the BTF controls for a new furnace would be similar to the BTF controls described above for Freeport (*i.e.*, need to install a roof ventilation capture system on top of whatever controls they need to meet the MACT Floor level of control for each new furnace). Based on costs estimated for Freeport, and applying this to a potential new source, the estimated costs for BTF option for a new furnace would be $3,700,000 capital and annualized costs of $600,000 and achieve about 0.25 tpy metal HAP reduction, with cost effectiveness of $2,400,000 per ton of HAP. Further information and details regarding the MACT floor and BTF analyses are provided in the memorandum titled *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category*, and in the costs memo cited above, which are available in the docket for this proposed action.

With regard to converters, Asarco has three converters and Freeport has four converters. Asarco already has primary, secondary and tertiary capture and controls, and the reported total estimated HAP emissions are 0.0000022 tpy. On the other hand, Freeport has primary and

secondary capture and controls, but no tertiary controls, and the total estimated HAP emissions from Freeport converters are 0.115 tpy. Therefore, we considered proposing a BTF option for existing converters for the source category that would require reductions at Freeport based on installation of tertiary controls which would be similar to the tertiary capture and controls on the converters at Asarco or the roof ventilation capture system described in the BTF analysis above for Freeport smelting furnaces. Given that all four converters at Freeport are in the same building, we assume that one such system would be sufficient to achieve about 80 percent reduction of fugitives. We assume Freeport could route these additional emissions to current control devices, since they already have two such control systems (*i.e.*, scrubbers). Therefore, we are not including an additional baghouse for this potential BTF control option. Based on the analysis described above, the Agency estimates this potential BTF standard for existing converters would have total capital costs of $3,697,200 and annualized costs of $599,663, and achieve about 0.09 tpy reduction of HAP metals, with cost effectiveness of $6,662,928 per ton of HAP metal reduction.

With regard to potential BTF standards for process fugitive emissions from roof vents for new converters, it is difficult to determine the appropriate standard because of a number of issues and uncertainties. First, based on reported emissions described above, Asarco has substantially lower HAP metal emissions as compared to Freeport. However, we have no test data for Asarco, so we have low confidence in these reported emissions estimates. Second, as described above, the current NESHAP prohibits new sources from using batch converters. Therefore, we assume any new converter would be a continuous converter, and we have no test data or even estimates of process fugitive emissions from continuous converter building roof vents. Based on this lack of information, we assume the BTF limit and associated costs for process fugitives for new

sources would be the same as the BTF limit and associated costs for existing sources described in the paragraph above.

The EPA also evaluated the potential to establish MACT floor limits, or BTF limits, for HAP metals based on establishing additional opacity limits in the NESHAP for each affected source. For example, we considered proposing opacity limits consistent with the state air permits and opacity limits in the Consent Decree (CD) for Asarco as potential MACT standards in addition to, or instead of, the MACT floor PM limits. The opacity limits are not expected to result in emission reductions. Instead, the opacity would be monitored to ensure that the process equipment and control devices are operating properly. Furthermore, there would be no additional costs associated with establishing these opacity limits, since the limits would be consistent with what the facilities are already complying with under the state air permits or a CD. There is variability in opacity limits in the state air permits and CD and uncertainty as to what specific opacity limits represent MACT floor and BTF for each of the processes. These opacity limits are described in detail in the memorandum titled *Opacity Standards for Major Primary Copper Smelting Facilities*, which is available in the docket.

Based on the above analyses, we are proposing the MACT floor PM emissions limits as a surrogate for metal HAP for converter and smelting furnace roof vents. The Agency is not proposing the BTF limits for converters or smelting furnaces because of the high costs and poor cost effectiveness and uncertainties in the estimates of emissions, emissions reductions and costs. Furthermore, the Agency is not proposing the opacity limits at this time due to variability in opacity limits in the state air permits and CD and uncertainty as to what specific opacity limits represent MACT floor and BTF for each of the processes. Nevertheless, the EPA solicits comments regarding the opacity limits, including whether it would be appropriate to establish

opacity limits (such as the opacity limits in the state air permits and CD) in the NESHAP in addition to, or instead of, the numeric PM MACT floor emissions limits described above, and, if so, an explanation as to how or why these opacity limits reflect MACT floor, or BTF, levels of control. The Agency also solicits comments, data and other information regarding the MACT Floor analyses and BTF analyses, and our proposed determinations described above.

With regard to process fugitive emissions from anode refining roof vents, we estimate that Freeport emits 5.22 tpy of total metal HAP, comprised mainly of lead (4.09 tpy) and arsenic (0.622 tpy), and that Asarco emits 0.1076 tpy of total metal HAP. To develop a proposed standard for this source, we initially calculated a MACT floor emissions limit for PM of 15.2 lbs/hr based on available test data and application of the UPL methodology. For this standard, PM serves as a surrogate for all particulate HAP metals, similar to the other PM limits in the NESHAP.

Subsequently, we evaluated a potential BTF PM emissions limit for the anode refining roof vents, which would be set at a level approximately 90 percent lower than the MACT floor limit. Based on these analyses, which are described in detail in the *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category* memorandum, which is available in the docket, the BTF emissions limit for PM is 1.6 lbs/hr. Based on available data, to comply with this BTF limit, we expect the Freeport facility would need to install improved capture systems, including hoods, ductwork, and fans, and one additional baghouse to reduce process fugitive emissions from anode refining roof vents. We anticipate the improved capture systems would need to be applied to four units, including the two anode refining furnace pouring operations, the anode casting wheel, and the holding vessel. However, the facility might identify other methods or approaches to reduce these emissions, such as applying these equipment to only a subset of

the four units, limiting the input of certain raw materials that have relatively high HAP metal content (such as acid plant sludge) into the process, and/or converting their holding vessel into an enclosed, controlled anode refining furnace. The Agency expects that the capture, control and/or other measures the facility adopts to reduce metal HAP emissions from roof vents on anode refining buildings to meet the BTF limit will also significantly reduce human health risks (*e.g.*, due to lead and arsenic emissions) as discussed below in section IV.C.2.

The Agency estimates that total costs for Freeport to comply with this BTF PM emissions limit would be capital costs of $5,887,000 and annualized costs of $1,558,000, and would achieve about 4.25 tpy reduction of lead and arsenic emissions, with cost effectiveness of $367,000 per ton of lead and arsenic reduction. Lead and arsenic account for more than 90 percent of the HAP metal emissions from the roof vents on the anode refining building at Freeport. This cost effectiveness estimate is within the range of cost effectiveness values that EPA has historically considered acceptable for lead when compared to similar prior rulemakings. For example, in the 2012 Secondary Lead Smelting RTR, EPA accepted a cost effectiveness up to about $1.3M/ton for metal HAP (mainly Pb, based on 2009 dollars). The EPA's consideration of the cost effectiveness estimate of $367,000 per ton of lead and arsenic (noted above) also reflects fact-specific circumstances for addressing lead and arsenic emissions from the Primary Copper Smelting source category. For example, in other instances when the focus is on controlling other pollutants, such as PM, the agency would compare to other cost-effectiveness values. It is also important to note that cost effectiveness is but one factor we consider in assessing the cost of the emission reduction at issue here. See NRDC v. EPA, 749 F.3d 1055, 1060 (D.C. Cir. April 18, 2014) (''Section 112 does not command EPA to use a particular form of cost analysis.''). We also consider other factors in assessing the cost of the emission reduction

as part of our BTF analysis, including, but not limited to, total capital costs, annual costs and costs compared to total revenues (*e.g.,* costs to revenue ratios). As explained in section V.D., the estimated total annualized costs for Freeport are about 0.016 percent of the annual revenue of the facility's ultimate parent company in 2019. Furthermore, based on Freeport's existing permit, background information in a consent order with the state of Arizona (which are available in the docket), and discussions with facility representatives, improvements to their anode refining capture and control systems are already being considered. Because estimated HAP metals emissions from Asarco are much lower, they would not be expected to incur additional control costs to meet the BTF limit. However, Asarco would have new costs for compliance testing and recordkeeping and reporting, as described below. Overall, the EPA concludes that these costs are not economically significant and the cost effectiveness is within the range accepted in other NESHAP for these types of HAP metals (*e.g.*, Secondary Lead RTR Proposed Rule, 76 FR 99, 29032, May 19, 2011, and the Final rule, 77 FR 3, 556, January 5, 2012).

The Agency also considered proposing a BTF lead emissions limit in addition to, or instead of, the PM limit since lead is the primary HAP metal emitted from the anode refining roof vents. For example, the Agency considered a possible lead limit of approximately 0.26 lbs/hr as a potential BTF MACT limit for anode refining process fugitive emissions, which is described in the MACT Floor memo cited above. However, there is some uncertainty with this analysis. It was not clear how best to apply the EPA's UPL methodology to the available lead emissions data to appropriately account for variability and determine a lead UPL limit that would reflect the MACT floor level of control, and to then subsequently determine what lead limit would represent a 90 percent reduction from the lead MACT Floor. The EPA expects the costs and reductions for such a lead BTF limit would be the same as the costs and reductions for the

BTF option for PM described in the above paragraph. If the Agency was to establish such a lead limit instead of a PM limit, it would also serve as a surrogate for all HAP metals, similar to the Secondary Lead Smelting NESHAP, which established emissions limits for lead that serve as surrogates for all particulate HAP metals. Due to the uncertainties with the analysis of lead emissions and methodology used to develop the lead UPL limit, the Agency is not proposing this lead limit at this time. However, the EPA solicits comments regarding this potential lead limit and whether it would be appropriate to establish such a lead limit in addition to, or instead of, the PM limit, and if so, why?

Further information and details regarding the derivation of the MACT floor and BTF limits are provided in the memorandum titled *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category.* Further information and details regarding the cost estimates for Freeport to comply with the BTF limits for the anode refining process fugitives roof vents are described in the memorandum *Development of Estimated Costs for Enhanced Capture and Control of Process Fugitive Emissions from Anode Refining Operations at Freeport*, which is available in the docket for this proposed action.

Based on the analyses described above, the Agency is proposing a BTF emissions limit for PM of 1.6 lbs/hr for anode refining process fugitive emissions at existing and new sources.

In summary, based on the analyses described above, the Agency is proposing to revise the 2002 NESHAP to include the following emission limits for process fugitive HAP metal emissions from roof vents of smelting furnaces, converters, and anode refining processes located at primary copper smelting facilities, as follows:

- For existing and new converter operations located at primary copper smelting facilities, the Agency is proposing a PM emissions limit of 1.7 lbs/hr for process fugitive roof vents.

- For existing and new smelting furnaces located at primary copper smelting facilities, the Agency is proposing a PM emissions limit of 4.3 lbs/hr for process fugitive roof vents.
- For existing and new anode refining operations located at primary copper smelting facilities, the Agency is proposing a PM emissions limit of 1.6 lbs/hr for process fugitive roof vents.

The Agency is proposing that compliance with these emissions limits for smelting furnaces, converters and anode refining will be demonstrated through an initial compliance test followed by a compliance test at least once every year. Moreover, facilities will need to monitor various control parameters (*e.g.,* fan speed, amperage, pressure drops, and/or damper positioning) on a continuous basis to ensure the fugitive capture system and controls are working properly.

With regard to testing and recordkeeping costs, the Agency estimates Asarco will have total costs of about $95,000 per year for all the testing and recordkeeping and reporting to demonstrate compliance with these proposed three new standards for the process fugitive emissions roof vents for the converters, smelting furnaces and anode refining processes. As mentioned above, Freeport will have no new testing costs since they already conduct this testing per ADEQ requirements.

3. Mercury

As mentioned above, the 2002 NESHAP does not include emission limits for mercury. The source category emits an estimated 55 pounds of mercury annually with 45 pounds per year emitted from the Freeport facility. Because of the temperatures of exhaust gas streams encountered at primary copper smelting operations, much of the mercury emitted is in vapor form, not in a particulate form. The vapor form of mercury is not captured by the controls used to

reduce PM emissions. Therefore, the PM limits do not serve as a surrogate for mercury. Pursuant to CAA section 112(d)(2) and (3), the Agency is proposing to revise the 2002 NESHAP to include emission limits for mercury.

Initially the Agency calculated MACT floor limits based on test data from both of the primary copper smelting facilities. A detailed analysis and documentation of the MACT floor calculations can be found in the technical document, *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category*, available in the docket.

The MACT floor emissions limit for existing sources was calculated based on the average of all the emissions tests from both facilities, accounting for variability using the 99 percent UPL. A MACT floor based on the 99 percent UPL for the combined facility-wide limit for existing sources is 0.01 lbs/hr. Based on available data, the Agency concludes that both facilities would be able to meet the MACT floor limit with no additional controls.

For new sources, the Agency calculated a MACT floor limit of 0.00097 lbs/hr based on emissions data from the best performing (or lowest emitting) facility, which is Asarco.

We then evaluated and considered a BTF option to further reduce emissions of mercury from existing furnaces and converters. Based on available test data, the Agency estimates that the acid plant is by far the largest source of mercury emissions at Freeport, accounting for about 64 percent of the total, with an estimated 29 lbs/yr of mercury emissions. The BTF option for existing sources would require the Freeport facility to install and operate an activated carbon injection (ACI) system and a polishing baghouse on the combined stack emissions release point, the acid plant. The Agency estimates the ACI system would achieve approximately 90 percent reduction of mercury from the acid plant stack (*i.e.,* 26 lbs/yr reduction of mercury). Therefore,

the BTF emissions limit would be 0.0043 lbs/hr, which reflects a 90 percent reduction from the acid plant portion of the UPL MACT floor level of 0.01 lbs//hr described above.

The EPA estimates that these controls would achieve 26 pounds of mercury reductions per year (*i.e.,* 90 percent reduction of emissions from the acid plant), at a capital cost of $1.5 million and annualized costs of $714,000 (in 2019 dollars) for a cost effectiveness of $27,500 per pound of mercury reduced. After considering both the MACT floor and BTF options for existing sources, the EPA is proposing the BTF facility-wide emissions limit for mercury of 0.0043 lbs/hr for existing sources. The EPA is proposing this BTF limit for mercury because mercury is a highly toxic, persistent and bioaccumulative HAP and the estimated cost effectiveness is within the range of cost effectiveness values the EPA has previously considered acceptable for this HAP after correcting to dollar year values. For example, in the 2012 Mercury and Air Toxics (MATS) final rule, EPA finalized a BTF standard for mercury that had cost effectiveness of $22,496 per pound (based on 2007 dollars), which would be about $27,500 per pound based on 2019 dollars (see *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, December 2011, on pages 1-9 and 1-10, available at: *https://www.epa.gov/mats/epa-announces-mercury-and-air-toxics-standards-mats-power-plants-technical-information*).

A detailed analysis and documentation of the BTF option for the Primary Copper Smelting major source NESHAP and cost calculations can be found in the technical document, *Estimated Costs for Beyond-the-floor Controls for Mercury Emissions from Primary Copper Smelting Facilities*, available in the docket for this action.

With regard to new sources, as described above, the MACT floor for new sources (*i.e.,* 0.00097 lbs/hr) is already significantly lower than the BTF limit for existing sources (*i.e.,* 0.0043 lbs/hr). The EPA evaluated a potential BTF option to further reduce emissions of mercury from

new furnaces and converters. This analysis is very similar to that described above for existing furnaces and converters, which would require the installation and operation of at least one ACI system plus a polishing baghouse on a combined emissions stream from the converter and furnace. Therefore, the EPA assumes the costs for a beyond the floor option for a new source could be the same as shown above for Freeport. With regard to numerical emissions limit, if the Agency assumes the same percentage reduction from the new source MACT floor (*i.e.,* 0.00097 lbs/hr) that the Agency described above for existing sources, that would result in a BTF limit for new sources of 0.00042 lbs/hr.

However, with regard to reductions, it is impossible to accurately estimate potential reductions in mercury from a new source without knowing more information regarding a potential new source. For example, mercury emissions are highly dependent on the concentration of mercury in the ore and mercury concentrations can vary significantly across different ore bodies. If the EPA assumes a new source would have similar ore as Asarco, which has much lower mercury emissions compared to Freeport, the costs for controls could be similar to those estimated for Freeport above. However, the emissions reductions would be far lower, and therefore the controls would probably not be cost effective. If, on the other hand, the ore was similar to Freeport's, it may not be feasible for such a facility to achieve a limit of 0.00042 lbs/hr) with these types of controls. For example, if such a facility had characteristics similar to Freeport, they would likely need to achieve far greater reductions than 90 percent from the acid plant to achieve a limit of 0.00042 lbs/hr, which would require additional controls beyond the ACI system and polishing baghouse described above.

Given these uncertainties described above, and the fact that the new source MACT floor limit (*i.e.,* 0.00097 lbs/hr) is already significantly lower than the BTF limit for existing sources

of 0.0043 lbs/hr, the Agency is proposing a MACT floor limit for mercury for new sources of 0.00097 lbs/hr. More details are provided in the memorandums titled *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category* and *Estimated Costs for Beyond-the-floor Controls for Mercury Emissions from Primary Copper Smelting Facilities*, which are available in the docket for this action.

Based on the analysis described above, the Agency is proposing to revise the 2002 NESHAP to include the following emission limits for mercury:

- For existing primary copper smelting facilities, the Agency is proposing a facility-wide BTF emissions limit for mercury of 0.0043 lbs/hr.
- For new primary copper smelting facilities, the Agency is proposing a facility-wide MACT Floor emissions limit for mercury of 0.00097 lbs/hr.

The EPA is proposing that compliance with the mercury emissions limits for existing sources will be demonstrated through an initial compliance test for each of the affected sources (*e.g.*, furnaces, converters, anode refining) within 3 years of publication of the final rule followed by a compliance test at least once every year. The actual number of tests required will depend on the specific configurations of the emissions capture and control equipment and number of release points at each facility. For affected facilities that commence construction or reconstruction after **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, owners or operators must comply with all requirements of the subpart, including all the amendments being proposed, no later than the effective date of the final rule or upon startup, whichever is later.

The EPA solicit comments, information and data regarding the proposed standards for mercury, and the relevant technical analyses described above, as well as the proposed compliance dates and testing requirements.

4. New Source Limits for Converters in the Major Source NESHAP

The current requirement for new copper converters is that the NESHAP prohibits the use of batch copper converters. By default, new copper converters covered by the NESHAP would need to be continuous converters, or some other unknown non-batch converter technology, but the rule does not include an actual standard for new converters. Therefore, pursuant to CAA section 112(d)(2) and (3), the Agency is proposing to revise the 2002 NESHAP to include emission limits for new converters. We note that there are no existing continuous converters in the major source category, and, therefore, the Agency is not establishing an emissions limit for existing sources. The Agency is proposing a PM with a diameter less than 10 micrometers (PM_{10}) emissions limit as a surrogate for metal HAP based on PM_{10} test data from the Kennecott facility which is an area source subject to 40 CFR part 63, subpart EEEEEE, area source rule. Therefore, the limit is based on the performance of the best similar source, which is the Kennecott primary copper smelting facility. The proposed input-based emissions limit would require the discharge of total PM_{10} to be no greater than 0.031 pounds of PM_{10} per ton of copper concentrate feed charged to the smelting vessel. A detailed discussion of the selection of the new source limit can be found in the preamble to the proposed rule for subpart EEEEEE (71 FR 59307, 59310, October 6, 2006). The calculation of the limit of 0.031 lbs of PM_{10} per ton of copper concentrate feed is described in the technical memo titled: *Draft MACT Floor Analyses for the Primary Copper Smelting Source Category*.

We then evaluated whether there are any potential BTF options to further limit PM_{10} emissions from new converters; however, we did not identify any BTF options. Therefore, we are proposing a limit of 0.031 pounds of PM_{10} per ton of copper concentrate feed charged to the smelting vessel.

The EPA proposes that compliance with the PM_{10} emissions limit for new converters would be demonstrated through an initial compliance test followed by a compliance test at least once every year.

B. What are the results of the risk assessment and analyses?

1. Chronic Inhalation Risk Assessment Results

Table 1 of this preamble provides a summary of the results of the inhalation risk assessment for the source category. The two facilities in this major source category are located in Arizona in a rural, desert environment that is, for the most part, sparsely populated. More detailed information on the risk assessment can be found in the document titled *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule*, available in the docket for this rule.

Table 1. Primary Copper Smelting Major Source Category Inhalation Risk Assessment Results

Number of Facilities[1]	Maximum Individual Cancer Risk (in 1 million)[2] based on…		Population at Increased Risk of Cancer ≥ 1-in-1 Million based on…		Annual Cancer Incidence (cases per year) based on…		Maximum Noncancer HI and 3-month Lead Concentration (ug/m^3) [3]		Maximum Screening Acute Noncancer HQ[4] based on…
	Actual Emissions	Allowable Emissions	Actual Emissions	Allowable Emissions	Actual Emissions	Allowable Emissions	Actual Emissions	Allowable Emissions	Actual Emissions
2	80	90	26,125	29,001	0.003	0.003	HI =1 (arsenic) developmental Pb Conc: 0.17	HI =1 (arsenic) developmental Pb Conc: 0.24	HQ (REL) = 7 (Arsenic)

[1] Number of facilities evaluated in the risk analysis.

[2] Maximum individual excess lifetime cancer and noncancer risk due to arsenic emissions from the source category, 71 percent from the anode refining roofline at Freeport and 23 percent from anode furnaces and converters point source emissions from the Aisle Scrubber at Freeport.

[3] The max 3-month off-site lead concentration is compared to the lead (Pb) NAAQS standard of 0.15 ug/m^3 based upon actual and allowable emissions from the source category. The Pb NAAQS standard was developed to address all exposure pathways (inhalation and ingestion).

[4] The maximum estimated off-site acute exposure concentration was divided by available short-term dose-response values to develop an array of HQ values. HQ values shown use the lowest available acute dose-response value, which in most cases is the REL. There are no other acute health benchmarks for arsenic other than the 1-hour REL.

Results of the inhalation risk assessment based on actual emissions indicate that the cancer MIR is 80-in-1 million. The total estimated cancer incidence from this source category is 0.003 excess cancer cases per year, or one excess case every 333 years, with arsenic compounds contributing 95 percent of the cancer incidence for the source category. Approximately 26,125 people of the 46,460 people in the model domain are estimated to have cancer risks above 1-in-1 million from HAP emitted from this source category. The HEM-4 model predicted the maximum chronic noncancer HI value for the source category is equal to 1 (developmental), driven by emissions of arsenic from the anode refining roofline at Freeport and the anode furnaces and secondary converter point source emissions emitted through the Aisle Scrubber at Freeport.

Results of the inhalation risk assessment based on MACT-allowable emissions indicate that the cancer MIR is 90-in-1 million. The total estimated cancer incidence from this source category is 0.003 excess cancer cases per year, or one excess case every 333 years, with arsenic contributing 90 percent and cadmium contributing 8 percent of the cancer incidence for the source category. Approximately 29,001 people are estimated to have cancer risks above 1-in-1 million from exposure to HAP emissions allowed under the NESHAP. The HEM-4 model predicted the maximum chronic noncancer HI value for the source category is equal to 1 (developmental), driven by emissions of arsenic from the anode refining roofline and the anode furnaces and converters. No individuals are estimated to have exposures that result in a noncancer HI above 1 at allowable emission rates.

A refined modeling analysis was conducted at the facility with the highest annual concentration of lead to characterize ambient concentrations of lead for 3-month intervals. The maximum 3-month concentration was predicted for each off-site receptor. The concentrations were then compared to the Lead (Pb) NAAQS of 0.15 ug/m^3. The maximum 3-month off-site

modeled concentration was 0.17 ug/m^3 for actual emissions and 0.24 ug/m^3 for allowable emissions, and these results occurred near the Freeport facility. The lead standard is based on exposure to all pathways (inhalation and ingestion) due to lead emitted to the air and includes an adequate margin of safety to be protective of all sub-populations at risk, especially children. Lead concentrations above the standard increase the risk of developmental effects for children. Model results indicate that, based on actual emissions, a single census block (about five people) has the potential to be exposed to lead concentrations greater than the lead NAAQS. For allowable emissions, the analysis predicts that eight census blocks (about 50 people) have modeled lead concentrations greater than the lead NAAQS. While the EPA examines the potential for lead risks and exposure by comparing ambient levels directly to the NAAQS, the noncancer risks predicted for this category from arsenic are also associated with developmental effects. Thus, while the Agency did not combine the risk of developmental effects from exposure to lead with the hazard associated with exposure to arsenic, the Agency would expect their combined hazard to be greater than each of the individual exposures and hazards presented above.

2. Screening Level Acute Risk Assessment Results

To better characterize the potential health risks associated with estimated worst-case acute exposures to HAP, and in response to a key recommendation from the SAB's peer review of the EPA's RTR risk assessment methodologies, the Agency examined a wider range of available acute health metrics than the Agency does for our chronic risk assessments. This is in acknowledgement that there are generally more data gaps and uncertainties in acute reference values than there are in chronic reference values. By definition, the acute REL represents a health-protective level of exposure, with effects not anticipated below those levels, even for

repeated exposures. However, the level of exposure that would cause health effects is not specifically known. Therefore, when an REL is exceeded and an AEGL-1 or ERPG-1 level is available (*i.e.*, levels at which mild, reversible effects are anticipated in the general public for a single exposure), the Agency typically uses them as an additional comparative measure, as they provide an upper bound for exposure levels above which exposed individuals could experience effects. As the exposure concentration increases above the acute REL, the potential for effects increases.

A review of all modeled off-site receptors for the Primary Copper Smelting source category identified exceedance of the 1-hour REL for arsenic, resulting in an HQ of 7 for arsenic. This is for actual baseline emissions. Satellite imagery for this location identifies it as a residential location approximately 4,200 meters northeast of the Freeport facility. It is also important to note that the primary source of the arsenic emissions from the anode furnace/converter and anode refining roofline was modeled with an hourly emissions multiplier of 3 times the annual average emissions rate. There are no AEGL or ERPG levels available for arsenic. No other HAP exposure concentrations exceeded acute benchmarks. Further details on the acute HQ estimates are provided in Appendix 10 of the risk report for this source category.

3. Multipathway Risk Screening

For this source category both facilities reported emissions of lead, which are compared to the lead NAAQS, and emissions of PB-HAP, which are compared to the Tier 1 screening threshold emission rate for each PB-HAP based upon a combined fisher/farmer scenario with upper-bound ingestion rates. The two facilities within this source category both reported emissions of carcinogenic PB-HAP (arsenic) and emissions of non-carcinogenic PB-HAP (cadmium and mercury) that exceeded their respective Tier 1 screening threshold emission rates.

For facilities that exceed the Tier 1 multipathway screening threshold emission rate for one or more PB-HAP, we use additional facility site-specific information to perform a Tier 2 multipathway screening assessment. For the Tier 2 screening, the farmer and fisher scenarios are not combined as they are in the Tier 1 screening. Instead, the farmer and fisher scenarios are treated as separate individuals with the fisher scenario based upon modeled impacts to local lakes within 50 kilometers of the facility. Further details on the tiered multipathway screening methodology can be found in Appendix 6 of the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule.*

For arsenic, both facilities had Tier 2 SVs (cancer) greater than 1, with a maximum SV of 3,000 for the farmer scenario, a maximum SV of 1,000 for the rural gardener scenario, and a maximum SV of 100 for the fisher scenario. For cadmium, the Tier 2 screening assessment for both the farmer and gardener (rural) scenarios resulted in maximum Tier 2 SVs (noncancer) of 4. For the fisher scenario, Tier 2 noncancer SVs were greater than 1 for mercury compounds and cadmium compounds for one facility with a maximum noncancer SV of 20 for mercury and the maximum noncancer SV of 10 for cadmium.

Based upon these results, a Tier 3 screening assessment was conducted for both the fisher and gardener (rural) scenarios. A Tier 3 screening analysis was performed for arsenic, cadmium, and mercury emissions. In the Tier 3 screen for the fisher scenario, lakes near the facilities were reviewed on aerial photographs. As a result of this assessment, the features that were initially identified as lakes driving the Tier 2 screening risks for the fisher scenario were found to be tailings basins (not lakes), which are not fishable. After the tailings basins were removed from the fisher scenario analysis, the maximum cancer SV for arsenic emissions was 30, the maximum

noncancer SV for mercury emissions was 4, and the maximum noncancer SV for cadmium emissions was 4.

The Tier 3 gardener (rural) scenario was refined with the placement of the garden at the MIR residential receptor location approximately 4 km northeast of the facility versus the worst-case near-field location. Based on these Tier 3 refinements to the gardener scenario, the maximum Tier 3 cancer SV of 1,000 (rounded to 1 significant figure) remained the same for arsenic emissions, while the maximum noncancer SV decreased from 4 to 3 for cadmium emissions. An exceedance of a screening threshold emission rate or SV in any of the tiers cannot be equated with a risk value or an HQ (or HI). Rather, it represents a high-end estimate of what the risk or hazard may be. For example, an SV of 2 for a non-carcinogen can be interpreted to mean that the Agency is confident that the HQ would be lower than 2. Similarly, a Tier 2 cancer SV of 7 means that we are confident that the cancer risk is lower than 7-in-1 million. Our confidence comes from the conservative, or health-protective, assumptions encompassed in the screening tiers: the Agency chooses inputs from the upper end of the range of possible values for the influential parameters used in the screening tiers, and the Agency assumes that the exposed individual exhibits ingestion behavior that would lead to a high total exposure.

The EPA determined that it is not necessary to go beyond the Tier 3 lake and gardener analysis or conduct a site-specific assessment for arsenic, cadmium, and mercury. The EPA compared the Tier 2 screening results to site-specific risk estimates for five previously assessed source categories. These are the five source categories, assessed over the past 4 years, which had characteristics that make them most useful for interpreting the Primary Copper Smelting screening results. For these source categories, the EPA assessed fisher and/or gardener risks for arsenic, cadmium, and/or mercury by conducting site-specific assessments. The EPA used

AERMOD for air dispersion and Tier 2 screens that used multi-facility aggregation of chemical loading to lakes where appropriate. These assessments indicated that cancer and noncancer site-specific risk values were at least 50 times lower than the respective Tier 2 screening values for the assessed facilities, with the exception of noncancer risks for cadmium for the gardener scenario, where the reduction was at least 10 times (refer to EPA Docket ID: EPA-HQ-OAR-2017-0015 and EPA-HQ-OAR-2019-0373 for a copy of these reports).[30]

Based on our review of these analyses, if the Agency was to perform a site-specific assessment for the Primary Copper Smelting Source Category, the Agency would expect similar magnitudes of decreases from the Tier 2 SVs. As such, based upon the conservative nature of the screens and the level of additional refinements that would go into a site-specific multipathway assessment, were one to be conducted, we are confident that the HQ for ingestion exposure, specifically cadmium and mercury through fish ingestion, is less than 1. For arsenic, maximum cancer risk posed by fish ingestion would also be reduced to levels below 1-in-1 million, and maximum cancer risk under the rural gardener scenario would decrease to 20-in-1 million or less. Also, based upon the arid climate of the area and the hypothetical nature/location of the garden, estimated risks from this scenario seem unlikely. Further details on the Tier 3 screening assessment can be found in Appendix 10 - 11 of *Residual Risk Assessment for the Primary*

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[30] EPA Docket records (EPA-HQ-OAR-2017-0015): *Appendix 11 of the Residual Risk Assessment for the Taconite Manufacturing Source Category in Support of the Risk and Technology Review 2019 Proposed Rule; Appendix 11 of the Residual Risk Assessment for the Integrated Iron and Steel Source Category in Support of the Risk and Technology Review 2019 Proposed Rule; Appendix 11 of the Residual Risk Assessment for the Portland Cement Manufacturing Source Category in Support of the 2018 Risk and Technology Review Final Rule; Appendix 11 of the Residual Risk Assessment for the Coal and Oil-Fired EGU Source Category in Support of the 2018 Risk and Technology Review Proposed Rule;* and EPA Docket: (EPA-HQ-OAR-2019-0373): *Appendix 11* of the *Residual Risk Assessment for Iron and Steel Foundries Source Category in Support of the 2019 Risk and Technology Review Proposed Rule.*

Copper Smelting Major Source Category in Support of the Risk and Technology Review 2021 Proposed Rule.

In evaluating the potential for adverse health effects from emissions of lead, the EPA compared modeled maximum 3-month lead concentrations to the secondary NAAQS level for lead of (0.15 $\mu g/m^3$) over a 2-year period. The highest off-site 3-month average lead concentration based upon actual emissions was 0.17 $\mu g/m^3$. The highest concentration based on allowable emissions was 0.24 $\mu g/m^3$. Both results are above the lead NAAQS standard, indicating a potential for adverse health effects from multipathway exposure to lead. For further information on the modeling and monitoring analysis for lead refer to section IV.B.1 (Chronic Inhalation Risk Assessment Results) and section IV.B.6 (Monitor to Model Analysis for Arsenic and Lead).

4. Environmental Risk Screening Results

As described in section III.A of this document, the Agency conducted an environmental risk screening assessment for the primary copper source category for the following pollutants: arsenic, cadmium, and mercury. In the Tier 1 screening analysis for PB-HAP (other than lead, which was evaluated differently), arsenic, cadmium, divalent mercury and methyl mercury exceeded at least one ecological benchmark, requiring a Tier 2 screen.

A Tier 2 screening assessment was performed for arsenic, cadmium, divalent mercury and methyl mercury. Arsenic, divalent mercury, and methyl mercury had no Tier 2 exceedances for any ecological benchmark. Two facilities contributing emissions to the same lake had cadmium emissions that resulted in Tier 2 exceedances for fish no-observed-adverse-effect level (avian piscivores), fish geometric-maximum-allowable-toxicant level (avian piscivores), and fish lowest-observed-adverse-effect level (avian piscivores) benchmarks with a

maximum SV of 3.[31]

A Tier 3 screening analysis was performed for cadmium emissions. In the Tier 3 screen, lakes near the facilities were reviewed on aerial photographs. As a result of this assessment, the waterbody that was initially identified as a lake that was driving the Tier 2 environmental screening risks for cadmium was found to be a tailings basin and was removed from the analysis. After environmental impacts that had been estimated for the tailings basin were removed from the analysis, there were no exceedances of cadmium environmental screening benchmarks in Tier 3. For lead, the Agency estimated an exceedance of the secondary lead NAAQS at one census block at a lead concentration of 0.17 ug/m^3. The exceeded census block constitutes less than 0.1 percent of the modeled area around the facility. Therefore, based on the limited extent of the lead exceedance and the other results of the environmental risk screening analysis, the Agency does not expect an adverse environmental effect as a result of HAP emissions from this source category.

5. Facility-Wide Risk Results

The source category includes all the emissions at the facility. Thus, the facility-wide risk is the same as the risk posed by the actual emissions from the source category, refer to Table 1, with no change in incidence or risk drivers.

6. Monitor to Model Analysis for Arsenic and Lead

A monitor to model comparison analysis was conducted for the monitors located at both primary copper smelting facilities to characterize the effectiveness of the emissions modeling and for purposes of risk characterization. Monitoring data collected from both sites represent

[31] The two facilities in the multipathway analysis are within the same model domain and contribute cadmium emissions to a common lake with the Freeport facility contributing > 99 percent of the cadmium loading to the target lake (USGS ID:26665).

current process operations at the facilities including process fugitives as well as background contributions from historic activity such as road dust and re-entrainment. A review of emission inventories for the area indicates both plants are the primary contributor of arsenic and lead emissions for their locations. Monitoring samples are collected on a one in 6-day schedule for a 24-hour continuous period. This schedule and the number of active source-driven monitors provide an indication of what emission sources may be contributing to the monitor but still do not provide enough temporal resolution to apportion the emissions to a specific source. Because the sample is collected over a 24-hour period, this apportionment is further complicated by factors such as varying surface winds (wind speed and wind direction) that occur throughout the day as well as unexpected changes in production or upset events that may occur at the plant.

The Hayden area of Gila and Pinal Counties in Arizona is currently classified as nonattainment for the 2010, 1-hour primary SO_2 NAAQS; 2008 lead NAAQS; and 1987 PM-10 NAAQS. Asarco is the only source of lead and SO_2 emissions in the Hayden nonattainment area. Emission reductions required under a CD with the EPA were designed to bring the Asarco facility into compliance with the NESHAP by December 2018. In addition, revisions to the state implementation plan (SIP) were intended to provide for attainment with the SO_2 and lead NAAQS by the attainment dates of October 2018 and October 2019, respectively. A review of 2019 monitoring data from four total suspended particulates (TSP) lead monitors and five particulate (PM-10) monitors in the area around Asarco that measure arsenic and other metals were compared to model results. The modeled concentrations predicted in the above analysis for Asarco were two to five times lower than the monitor concentrations. Refer to Table 2 for comparisons and the respective ambient air concentrations and risk values. Monitor 23 (4th Street and Hillcrest Avenue) was identified as the critical monitor due to its close proximity (within

100 meters) of the modeled MIR location for Asarco. Based upon the 2019 arsenic monitoring data from Monitor 23, excess cancer risks were equal to 90-in-1 million compared to a model-predicted monitor value of 50-in-1 million for Asarco. Monitor values also indicate a chronic noncancer HQ of 1 from arsenic.

The Miami area of Gila County, Arizona, was classified as nonattainment for the 2010, 1-hour primary SO_2 NAAQS in August 2013. Freeport is the only source of lead and SO_2 emissions in the Miami nonattainment area. Emission reductions required under a revision to the SIP were designed to provide for attainment of the SO_2 NAAQS by October 2018. The 2019 monitoring data from the lead NAAQS (TSP) monitor were compared to model results, with modeled concentrations being in close agreement to monitored concentrations. Refer to Table 2 for comparisons of the annual monitored concentrations. AQS Monitor (04-007-8000) is located at the Miami golf course (SR 188 and US 60) and is the only operating monitor for the area. This monitor is located approximately 1,400 meters southwest of the MIR location from the HEM-4 model run. Based on the model analysis presented above, the monitor is located such that the maximum off-site modeled lead concentration may be up to a factor of four times higher than measured at the golf course site. Thus, based on the modeling analysis presented in this risk assessment, the predicted off-site ambient concentrations near the Freeport facility may approach or exceed the maximum lead 3-month average NAAQS of 0.15 ug/m^3.

Table 2. Monitor to Model Comparison for Primary Copper Smelting Source Category for Arsenic and Lead

	Annual Average Conc. (ug/m^3)		Cancer Risk (xx-in-1 million)		HQ	
Site	**Model**	**Monitor**	**Model**	**Monitor**	**Model**	**Monitor**
Asarco Monitor 23 (As) [1, 2]	0.011	0.022	50	90	0.8	1.4
Asarco Monitor 23 (Pb) [1, 2]	0.025	0.098	NA	NA	NA	NA
Freeport NAAQS Monitor (Pb)[2]	0.026	0.022	NA	NA	NA	NA

[1] The Asarco Monitor 23 is located off-site and within 100 meters of the modeled MIR residential location.
[2] The monitor and modeling data were based upon emission estimates and monitoring data collected for the 2019 calendar year.

With regard to emissions estimates used for the modeling analysis, as discussed in section II.C above, the Agency has higher confidence and less uncertainty with the Freeport emissions as compared to Asarco because the Agency has multiple test results for both point and non-point (*i.e.*, fugitive) sources of emissions for Freeport. However, for Asarco, the Agency only has test data for the point source emissions. The EPA has no test data for the non-point emissions. For Asarco, the non-point (fugitive) emissions estimates are based on emission factors and various calculations.

7. How is baseline risk distributed across demographic groups?

To examine the potential for any environmental justice issues that might be associated with the source category, EPA performed a baseline demographic analysis to identify how risk is distributed among different demographic groups of the populations living within 5 km and within 50 km of the two major source facilities. The methodology and the results of the baseline demographic analysis are presented in the technical report, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Source*

Category Operations, which is available in the docket. This report is discussed in this section regarding estimated impacts under the existing standards (*i.e.,* baseline). In the analysis, we evaluated the distribution of HAP-related cancer and noncancer risks from the primary copper smelting major source category across different demographic groups within the populations living near facilities.[32] With regard to the Kennecott area source facility, we note that Kennecott is located in a very remote area. The closest residence is estimated to be at least 3 miles from the smelting facility. Furthermore, as described in section III.C of this preamble, ambient monitoring for lead was conducted for about 7 years in the vicinity of Kennecott by Utah DAQ which demonstrated that the likelihood of violating the NAAQS for lead was so low, it would no longer be necessary to run the monitor. Therefore, we did not conduct a demographic analysis for Kennecott.

The results of the baseline demographic analyses, which reflect an average for the two major sources, are summarized in Table 3 below. These results, for various demographic groups, are based on the estimated risk from actual emissions levels for the population living within 50 km of the facilities.

[32] Demographic groups included in the analysis are: White, African American, Native American, other races and multiracial, Hispanic or Latino, children 17 years of age and under, adults 18 to 64 years of age, adults 65 years of age and over, adults without a high school diploma, people living below the poverty level, people living two times the poverty level, and linguistically isolated people.

Table 3. Primary Copper Smelting Source Category Baseline Demographic Risk Analysis Results

	Nationwide [1]	Population with Cancer Risk at or Above 1-in-1 Million Due to Primary Copper Smelting [2]
Total Population	328,016,242	26,125
White and Minority by Percent		
White[3]	60	36
All Other Races	40	64
Minority by Percent		
African American	12	0.7
Native American	0.7	27
Hispanic or Latino (includes white and nonwhite)	19	33
Other and Multiracial	8	3
Income by Percent		
Below Poverty Level	13	27
Above Poverty Level	87	73
Education by Percent		
Over 25 and without High School Diploma	12	20
Over 25 and with a High School Diploma	88	80
Linguistically Isolated by Percent		
Linguistically Isolated	5	3

[1] The nationwide population is based on the Census' 2015-2019 American Community Survey five-year average and includes Puerto Rico.
[2] Demographics within HEM4 model domain (50km) of facilities in source category.
[3] We use the term White throughout as shorthand to refer to what Census calls White alone (i.e., single race) who are not Hispanic or Latino (i.e., NHWA). Minority is used throughout to refer to the rest of the population (i.e., all but NHWA). Minority is made up of four groups: African American is used here to refer to what Census calls "Black or African American alone," Native American here refers to what Census calls "American Indian and Alaska Native alone," Hispanic or Latino is the term as used by Census, and Other and Multiracial here refers to the remainder of the minority population.

The results of the primary copper smelting source category baseline demographic analysis indicate that emissions from the major source category expose approximately 26,125 people to a cancer risk at or above 1-in-1 million. No person is exposed to a chronic noncancer TOSHI greater than 1. As shown in Table 3, the average percentages of the at-risk population in the Native American, Hispanic, Below Poverty Level, and Over 25 without High School Diploma demographic groups are significantly greater than their respective nationwide

percentages. Note, for one facility, Asarco, the baseline demographic analysis indicates that of the population with risks at or above 1-in-1 million, 73 percent are Hispanic, which is significantly greater than the nationwide percentage, 19 percent, as described further in the demographic analysis technical report cited above. Thus, the elevated cancer risks associated with emissions from the major source category disproportionately affect communities with environmental justice concerns, including low-income residents, Native Americans, and Hispanics living near these facilities.

With regard to acute noncancer risks, the acute screening analysis completed for this proposed rule is a conservative approach that applies health protective assumptions that every process releases its peak hourly emissions at the same hour, that the reasonable worst-case dispersion conditions occur at that same hour, and that an individual is present at the location of maximum HAP concentration for that hour. Estimating population risks or the number of individuals exposed to acute events that exceed the arsenic acute 1-hour REL would be problematic due to the nature of the screening assessment, especially for a specific hour in which this event would occur. Due to this uncertainty, we did not complete a demographics analysis for acute noncancer risks.

With regard to lead, the modeled exceedances of the lead NAAQS based on estimated actual emissions were estimated to occur only in a small area near Freeport and we did not have precise demographic information for that specific area. Therefore, we did not conduct a demographics analysis for lead.

Nevertheless, since the potential acute risks from arsenic emissions, and the highest estimated exposures due to lead emissions, are from the same facility and sources that drive the cancer risks for the source category, we expect that the demographic make-up of the exposed

populations living near the facility (who could have potential acute risks and higher lead exposures due to these emissions) would be similar to the profiles presented in Table 3 above.

C. What are our proposed decisions regarding risk acceptability, ample margin of safety, and adverse environmental effect?

1. Risk Acceptability

As explained in section III of this preamble, the EPA sets standards under CAA section 112(f)(2) using "a two-step standard-setting approach, with an analytical first step to determine an 'acceptable risk' that considers all health information, including risk estimation uncertainty, and includes a presumptive limit on maximum individual risk (MIR) of approximately 1-in-10 thousand" (see 54 FR 38045, September 14, 1989). In this proposal, the EPA estimated risks based on actual and allowable emissions from the primary copper smelting major source category under the current NESHAP.

The estimated inhalation cancer risk to the individual most exposed to allowable emissions from the source category is 90-in-1 million. The estimated inhalation cancer risk to the individual most exposed to actual emissions from the source category is 80-in-1 million. The estimated incidence of cancer due to inhalation exposures is 0.003 excess cancer cases per year, or one excess case every 333 years. The estimated number of people to have cancer risk above 1–in-1 million from HAP allowed to be emitted from the facilities in this source category is 29,001.

Based on allowable lead emissions, the maximum 3-month off-site modeled concentration was estimated to be as high as 0.24 ug/m^3, above the lead NAAQS of 0.15 ug/m^3. Further, based on actual lead emissions, the maximum 3-month off-site modeled concentration was estimated to be 0.17 ug/m^3, above the lead NAAQS of 0.15 ug/m^3. The lead standard is based upon exposure through all pathways (inhalation and ingestion) with an adequate margin of

safety to be protective of all sub-populations at risk, including and especially children. Lead concentrations above the NAAQS increase the risk of developmental effects for children. While the Agency examined the potential risk from lead exposure by comparing ambient levels directly to the NAAQS, the noncancer risks predicted for this category from arsenic are also associated with developmental effects. Thus, while the Agency did not combine the risk of developmental effects from exposure to lead with the hazard index associated with exposure to arsenic, the Agency would expect the combined exposures and hazards to be greater than each of the individual exposures and hazards presented above.

The multipathway risk assessment results indicated a maximum Tier 3 cancer risk of 1000-in-1 million based on the rural gardener scenario and a maximum Tier 3 noncancer HQ of 4 for the fisher scenario. Based upon past experience with site-specific assessments, the Agency would expect a minimum decrease by a factor of 50 for the above risks. Also, due to the arid climate of the area and the hypothetical nature/location of the garden, estimated upper-end ingestion rates for this scenario seem unlikely for this area. Further, the Agency estimated that the HQs for ingestion exposure, specifically for cadmium and mercury through fish ingestion, are less than 1.

The acute risk screening assessment of reasonable worst-case inhalation impacts indicates a maximum off-site acute HQ (REL) of 7, located at a residential location.

Considering all of the health risk information and factors discussed above, including the uncertainties discussed in section III of this preamble, the EPA proposes that the risks for this source category under the current MACT provisions are unacceptable. This proposed determination is largely based on the estimated exceedances of the lead NAAQS described above along with the maximum acute HQ of 7 for arsenic, which indicate there are significant risks of

noncancer health effects for people near the facility. Also contributing to this proposed determination, although to a lesser extent, are the inhalation cancer MIRs due to arsenic, with an estimated MIR of 80-in-1 million for actual emissions and 90-in-1 million for allowable emissions, which are approaching the presumptive level of unacceptability of 100-in-1 million (described above in this preamble).

2. Proposed Controls to Address Unacceptable Risk

As discussed in section IV.C.1 above, the Agency is proposing that baseline risks (actual emissions) are unacceptable. The largest contributors to these unacceptable risks are the metal HAP (mainly lead and arsenic) emissions from the anode refining process fugitive emissions roof vents at Freeport, which constitute about 71 percent of the MIR. As described in section IV.A above, under the section 112(d)(2)/(d)(3) of the CAA, the Agency is proposing BTF emissions limits for PM, as a surrogate for metal HAP, for the anode refining process fugitive emissions roof vents, which the Agency estimates will reduce HAP metal emissions from this source by about 90 percent at Freeport. The EPA evaluated whether these reductions will further reduce cancer risks and noncancer hazards to an acceptable level by conducting a "post-control" risk assessment to estimate what the risks will be after implementation of the BTF PM emissions limit. Based on that analysis, the Agency estimates the inhalation cancer MIR will be reduced from 80-in-1 million to 30-in-1 million at Freeport with 20,566 people exposed to a cancer risk greater than or equal to 1-in-1 million, a 21 percent reduction when compared to cancer risk from actual emissions. The chronic noncancer HI will remain well below 1 and the maximum off-site acute HQ based on the 1-hour REL will be reduced from 7 to 2. Further, the maximum 3-month lead ambient concentration will be reduced below the NAAQS from 0.17 $\mu g/m^3$ to 0.073 ug/m^3. However, the modeled cancer MIR for the source category would be 60-in-1 million, since the

EPA expects the BTF limit will achieve no reductions from Asarco. Based on these results, the Agency is proposing that the emissions reductions that will be achieved by the BTF emissions limit for PM for anode refining process fugitive roof vents (described in section IV.A above) will be sufficient to achieve acceptable risks.

Therefore, to reduce risks to a level that would be considered acceptable, under section 112(f) of the CAA, the Agency is proposing the exact same emissions limit for anode refining roof vents that the Agency is proposing as a BTF limit for the roof vents in buildings housing anode refining under CAA section 112(d)(2) and (d)(3) (which is described in more detail above in section IV.A.2). This is expected to require additional capture and control systems to reduce process fugitive emissions at the Freeport facility. The estimated emissions at Asarco are considerably lower than at Freeport. Asarco is not expected to have to install additional capture and control systems to comply with the proposed limits for anode refining roof vents, although they would incur costs for emissions testing. For anode refining roof vents, under section 112(f)(2) of the CAA, the Agency is proposing the following risk-based emission limits:

- For existing and new anode refining operations located at primary copper smelting facilities, the Agency is proposing an emissions limit for PM of 1.6 lbs/hr for anode refining roof vents.

With regard to demographic impacts, due to the fact that the EPA is proposing that risks from emissions of air toxics from this major source category are unacceptable at baseline and since EPA is proposing new standards (as described above) which are expected to reduce risks to an acceptable level, EPA performed a post-control demographic analysis to identify how the estimated risks would be distributed among different demographic groups of the populations living within 5 km and within 50 km of the two major source facilities after the additional

controls (described above) are in place. The methodology and the results of the post-control demographic analysis are presented in the technical report, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Post-Control Source Category Operations*, which is available in the docket.

This post-control demographic report indicates that for the major source category as a whole, average cancer risk for demographic groups would decrease as follows as a result of additional capture and control systems at the Freeport facility: Hispanic or Latino (4-in-1 million to 3-in-1 million); Native American (2-in-1 million to 1-in-1 million); African American (10-in-1 million to 5-in-1 million); Other and Multiracial (5-in-1 million to 3-in-1 million); people living below the poverty level (4-in-1 million to 2-in-1 million); people 25 years old and older without a high school diploma (4-in-1 million to 2-in-1 million); and people living in linguistic isolation (4-in-1 million to 2-in-1 million). For the total population exposed to emissions from the source category, average cancer risk would be reduced from 4-in-1 million to 2-in-1 million.

3. Ample Margin of Safety Analysis.

After identifying controls that would reduce risk to an acceptable level, the Agency next considered whether additional measures are required to provide an ample margin of safety to protect public health. In the ample margin of safety analysis, the Agency evaluated the cost and feasibility of available control technologies and other measures (such as work practices) that could be applied to the source category to further reduce the risk due to emissions of HAP.

With regard to additional controls considered under the ample margin of safety analysis, as described in section IV.B.1, another emission point contributing significantly to risks at Freeport is the Aisle Scrubber, which is used to control the combination of secondary emissions from the converter plus the emissions exiting the baghouse used to control primary anode

refining point source emissions. Therefore, the Agency estimated the costs to install an additional PM control device (*e.g.*, a wet ESP) and the emissions and risks reductions that would be achieved. Based on that analysis, we estimate these controls would have capital costs of $50M and annualized costs of $13M and achieve about 7.6 tpy of metal HAP with cost effectiveness of $1.7M per ton of metal HAP. Based on risk modeling, the Agency estimates the addition of these controls (in addition to the controls for anode roof vent process fugitives described above) would reduce the maximum 3-month ambient lead concentration near Freeport from 0.073 ug/m^3 to 0.024 ug/m^3, the inhalation cancer MIR near Freeport would be reduced from 30 to 20-in-1 million, with 17,350 people exposed to a cancer risk greater than or equal to 1-in-1 million, a 34 percent reduction when compared to cancer risk from actual emissions. The maximum off-site acute HQ would remain the same with an HQ = 2. The additional control options changed the maximum acute off-site location, resulting in a lower potential for exposure. The acute arsenic HQ is based upon an REL, the acute REL represents a health-protective level of exposure, with effects not anticipated below those levels, even for repeated exposures; however, the level of exposure that would cause health effects is not specifically known. As the exposure concentration increases above the acute REL, the potential for effects increases. Based upon an acute HQ value of 2 for arsenic emissions based on the REL, and given the protective nature of the REL (as described previously in this preamble, in section III.C.3.c) and without any additional acute health benchmarks to apply to further characterize the potential for severe or reversible effects it is reasonable to assume that acute health risks from arsenic for this source category would be low.

Given the relatively high estimated capital costs, uncertainties, and moderate risk reductions that would be achieved for populations living near these facilities, the Agency is not

proposing these additional controls for the Aisle Scrubber at this time. Nevertheless, the Agency is soliciting comments regarding our analysis (including the costs, costs effectiveness, and risk reductions) and whether the EPA should establish more stringent standards to reduce HAP metal emissions from the Aisle Scrubber.

The EPA also evaluated an option to reduce risks from the Asarco facility. In this case the Agency evaluated the potential to reduce process fugitive HAP metal emissions from the flash smelting furnace roof vents by installing hoods, ducts, fans, and an additional baghouse. Under this option, the Agency estimated capital costs of $19,107,200, annualized costs of $4,244,610, and approximately 1.08 tpy reduction of HAP metals, with cost effectiveness of $3,537,000 per ton of HAP metals. These controls would reduce the modeled inhalation cancer risk for Asarco (primarily due to arsenic emissions) from 60-in-1 million to about 10-in-1 million. These controls would also reduce lead emissions and associated risk from lead exposures from Asarco to some extent. However, given the relatively high estimated capital costs, annualized costs, poor cost effectiveness, uncertainties, and limited risk reductions that would be achieved for populations living near these facilities, we are not proposing these additional controls for the flash smelting furnace at Asarco at this time. Nevertheless, we are soliciting comments regarding our analysis (including the costs, cost effectiveness, and risk reductions) and whether the EPA should establish more stringent standards to reduce HAP metal emissions from the Flash Furnace at Asarco.

In addition to the controls described above, the Agency also evaluated the potential to propose additional work practices to reduce fugitive dust emissions, consistent with Asarco's current consent decree. The additional work practices the Agency identified include the following:

- Routine cleaning of paved roads with a sweeper, vacuum or wet broom (in accordance with applicable recommendations by the manufacturer of the street sweeper, vacuum, or wet broom), with such cleaning to occur no less frequently than on a daily basis unless the roads have sufficient surface moisture such that fugitive dust is not generated.
- Chemical dust suppressants will be applied not less frequently than once per month at slag haul roads and not less frequently than every 6 weeks on all other unpaved roads unless the roads have sufficient surface moisture such that fugitive dust is not generated.
- Copper concentrate storage, handling, and unloading operations.
- The cargo compartment of all trucks or other motor vehicles (*e.g.,* front-end loaders) when transporting bulk quantities of fugitive dust materials must be maintained to ensure:

  (i) The floor, sides, and/or tailgate(s) are free of holes or other openings.

  (ii) All loads of trucks containing copper concentrate arriving at the facility are covered with a tarp to prevent spills and fugitive emissions.

  (iii) Trucks are loaded only to such a level as to prevent spillage over the side.

  (iv) A speed limit of 15 mph is required.

  (v) All dust producing material internally transferred or moved by truck at the facility is covered with a tarp to prevent spills and fugitive emissions.
- Revert crushing operations and crushed revert storage.
- Scrubber liquid blowdown drying operations.
- Other site-specific sources of fugitive dust emissions that the Administrator or delegated permitting authority designate to be included in your fugitive dust control plan.

- For any element of the fugitive dust control plan that requires new construction at the facility, the owner or operator shall complete such construction, in accordance with the specifications and schedule set forth in the approved fugitive dust control plan.
- The fugitive dust control plan must be reviewed, updated (if necessary), and then approved by the permitting authority with each application for the Title V operating permit renewal pursuant to part 70 or part 71 of this chapter and with each permit application for the construction or modification of lead-bearing fugitive dust generating sources.

Since the facilities already need to implement most of these work practices per the consent decrees or state air permits, we expect there will be very minimal additional costs if these work practices are also incorporated into the NESHAP. The only additional costs would be a slight increase related to recordkeeping and reporting requirements. Furthermore, the Agency concludes that these additional work practices will achieve unquantified reductions of fugitive dust HAP metal emissions and associated human health risks. Therefore, under CAA section 112(f), as part of our ample margin of safety determination, the Agency is proposing that the facilities will need to develop and implement a more robust fugitive dust plan than currently required by the NESHAP. This plan would require, at a minimum, the specific work practices described above, but also could include other practices identified by the facilities (or the permitting authority to minimize these fugitive dust emissions).

Finally, EPA considered the impact of the proposed standards on the distribution of post-control risks as outlined in the technical report, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Post-Control Source Category Operations.* The baseline risk analysis indicated the potential for elevated

cancer risks associated with emissions from the major source category to disproportionately affect communities with environmental justice concerns, including low-income residents, Native Americans, and Hispanics living near these facilities. EPA also noted that the potential acute risks from arsenic emissions, and the highest estimated exposures due to lead emissions, are associated with the Freeport facility. The post-control analysis indicated that with the addition of controls proposed in this rulemaking, the cancer risks will be reduced from an estimated maximum individual excess cancer risk at Freeport from 80-in-1 million to 30-in-1 million, and noncancer risks will also be reduced significantly, substantially reducing risk among highly exposed individuals and reducing some of the risk disparities identified in the baseline (pre-control) scenario. Furthermore, the maximum modeled excess cancer risk for any person near Asarco is 60-in-1 million. As a result, EPA concludes that the proposed standards provide an ample margin of safety to protect public health and notes that for the major source category as a whole, average cancer risk for each demographic group will be reduced.

In summary, based on our ample margin of safety analysis, we are not proposing additional controls for the combined emissions stream from the anode refining furnace and secondary converter operations or the flash furnaces, as described above. Furthermore, the Agency did not identify any additional controls or measures to further reduce process fugitive emissions from the anode refining roof vents beyond those controls being proposed under the acceptability section (described above). However, the Agency is proposing additional work practices to limit fugitive dust emissions as part of the ample margin of safety analysis. Overall, the Agency proposes that with the additional controls for the anode refining furnace process fugitive roof vents described above (under the acceptability section), and the additional fugitive dust work practice standards being proposed based on our ample margin of safety analysis, the

NESHAP will provide an ample margin of safety to protect public health. The acute arsenic HQ of 2 is based upon an REL, the acute REL represents a health-protective level of exposure, with effects not anticipated below those levels, even for repeated exposures; however, the level of exposure that would cause health effects is not specifically known. As the exposure concentration increases above the acute REL, the potential for effects increases. Based upon an acute HQ value of 2 for arsenic emissions, without any additional acute health benchmarks to apply to further characterize the potential for severe or reversible effects it is reasonable to assume that acute health risks from arsenic for this source category would be low.

4. Adverse Environmental Effect

Based on the results of the environmental risk screening analysis, the Agency does not expect an adverse environmental effect as a result of HAP emissions from this source category.

D. What are the results and proposed decisions based on our technology review?

Under the technology review, the EPA searched, reviewed, and considered several sources of information to determine whether there have been developments in practices, processes, and control technologies as required by section 112(d)(6) of the CAA. The EPA researched practices, processes, and control technologies through a literature review to identify advancements in processes and control technologies in the primary copper smelting industry with a view toward identifying "developments" in practices, processes, and control. In conducting the technology review, the Agency examined information in the RBLC to identify technologies in use and determine whether there have been relevant developments in practices, processes, or control technologies. The RBLC is a database that contains case-specific information on air pollution technologies that have been required to reduce the emissions of air pollutants from stationary sources. Potential developments in the industry were discussed with representatives of

the primary copper smelting companies. In addition, state permits as well as recent consent decrees or consent orders between the EPA or the ADEQ and primary copper smelters were reviewed to assess control technologies at primary copper smelting plants. To identify developments, the Agency evaluated whether there were improvements in processes and control technologies available at the time the standards were promulgated that could reduce emissions of the regulated pollutants. We also evaluated whether there were processes and control technologies that were not available at the time the standards were promulgated that could reduce emissions of the regulated pollutants.

Concentrate dryers are used at the Kennecott Utah facility and the Asarco Hayden plant. The Freeport-McMoRan Miami smelter uses a wet feed and has no dryer. PM control at the Kennecott dryer consists of a baghouse and a scrubber. PM emissions from the Asarco dryers are controlled using baghouses.

Smelting furnaces at Asarco are controlled by a venturi scrubber followed by a wet gas cleaning system and an acid plant. Process gases from the Kennecott smelting furnace are exhausted to a waste heat boiler and then to an ESP, a wet scrubber, and a wet ESP. The off-gas from the Freeport smelting furnace is routed through a waste heat boiler where entrained dust settles out and is then routed to an ESP.

Matte drying and grinding are performed at the Asarco and Freeport facilities. Emissions are controlled using baghouses.

The two major sources, Asarco and Freeport, use batch converters. Controls include combinations of baghouses, scrubbers, and ESPs. Process gases at the Kennecott continuous converter are exhausted to a waste heat boiler, an ESP, a wet scrubber, and then to a wet ESP.

Slag cleaning emissions at Kennecott are vented to scrubbers. The slag cleaning furnace at Asarco has been decommissioned and the slag is allowed to cool and is sent back for additional processing for additional copper recovery. At the Freeport facility, the slag is sent to an electric furnace, and off-gas from the furnace is cooled with water sprays and then ducted to the acid plant.

Exhaust gases from anode refining furnaces are controlled by baghouses. Secondary gas systems typically exhaust to either a baghouse, a baghouse and a scrubber, or a scrubber and wet ESP.

All three primary copper smelting facilities operate under a fugitive dust control plan. Controls include the use of water sprays, chemical dust suppressants, placing material stockpiles below grade, and installing wind screens or wind fences around the source.

1. 40 CFR Part 63, Subpart QQQ

The current NESHAP for major source primary copper smelting facilities (40 CFR part 63, subpart QQQ) establishes numeric emission limits for PM, a surrogate for metal HAP, for copper concentrate dryers, smelting furnaces, slag cleaning vessels, and existing copper converters. The standard for new converters prohibits batch converters. An opacity limit applies to the converter building during performance testing. A fugitive dust control plan is required for the control of fugitive emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with all applicable emission limitations, work practice standards, and operation and maintenance requirements in this subpart. The requirements apply to primary copper smelters that are (or are part of) a major source of HAP emissions and that use batch copper converters.

As part of the technology review for the major source category, the Agency identified previously unregulated processes and pollutants, and are regulating them under CAA section 112(d)(2) and (3), as described in section IV.A, above; these new provisions also are being proposed under CAA section 112(f)(2), as described in section IV.C, above. With regard to the emissions sources at major primary copper smelting facilities, including sources of fugitive dust emissions, the Agency did not identify any developments in practices, processes, or control technologies beyond those described under the ample margin of safety analysis above.

2. 40 CFR Part 63, Subpart EEEEEE

The current NESHAP for area source primary copper smelting facility (40 CFR part 63, subpart EEEEEE) establishes numeric emission limits for PM (a surrogate for metal HAP), emitted from copper concentrate dryers, smelting vessels, converting vessels, matte drying and grinding plants, secondary gas systems, and anode refining departments. This subpart also requires work practices to ensure the capture of gases and fumes from the transfer of molten materials and their conveyance to control devices, provisions to monitor PM emissions for initial and continuous compliance, work practice standards, and operation and maintenance. With regard to the emissions sources at the area source primary copper smelting facility, including sources of fugitive dust emissions, the Agency did not identify any developments in practices, processes, or control technologies.

For more details, refer to the document, *Technology Review for the Primary Copper Smelting Source Category*, which is available in Docket ID No. EPA-HQ-OAR-2020-0430.

E. What other actions are we proposing?

In addition to the proposed actions described above, the EPA is proposing additional revisions to the NESHAP. The EPA is proposing revisions to the SSM provisions of the MACT

rule in order to ensure that they are consistent with the decision in *Sierra Club v. EPA*, 551 F. 3d 1019 (D.C. Cir. 2008), in which the court vacated two provisions that exempted sources from the requirement to comply with otherwise applicable CAA section 112(d) emission standards during periods of SSM. The Agency is proposing various other changes to the NESHAP, including the following: (1) require electronic reporting of performance test results and notification of compliance reports; (2) revising the applicability under section 63.1441 to clarify that the NESHAP applies to major source smelting facilities that use any type of converter, not just batch converters; (3) revising the testing requirements under section 63.1450 to clarify that facilities must test for filterable particulate, not total particulate, (4) adding test methods for mercury, PM10 and fugitive PM and updating test methods that are incorporated by reference; and (5) revising the definitions under section 63.1459 by changing the term "smelting furnace" to "smelting vessel" to be consistent with the definition in the area source rule, subpart EEEEEE. Our analyses and proposed changes related to these issues are discussed below.

1. SSM

In its 2008 decision in *Sierra Club v. EPA*, 551 F.3d 1019 (D.C. Cir. 2008), the court vacated portions of two provisions in the EPA's CAA section 112 regulations governing the emissions of HAP during periods of SSM. Specifically, the court vacated the SSM exemption contained in 40 CFR 63.6(f)(1) and 40 CFR 63.6(h)(1), holding that under section 302(k) of the CAA, emissions standards or limitations must be continuous in nature and that the SSM exemption violates the CAA's requirement that some section 112 standards apply continuously.

The EPA is proposing the elimination of the SSM exemptions in these rules. Consistent with *Sierra Club v. EPA*, the Agency is proposing standards in these rules that apply at all times. The Agency is also proposing several revisions to Table 1 to subpart QQQ and Table 1 to

subpart EEEEEE (the General Provisions Applicability Tables) as is explained in more detail below. For example, the Agency is proposing to eliminate the incorporation of the General Provisions' requirement that the source develop an SSM plan. The EPA is also proposing to eliminate and revise certain recordkeeping and reporting requirements related to the SSM exemption as further described below.

The EPA has attempted to ensure that the provisions the Agency is proposing to eliminate are inappropriate, unnecessary, or redundant in the absence of the SSM exemption. The EPA specifically is seeking comments on whether the Agency has successfully done so.

In proposing the standards in these rules, the EPA has considered startup and shutdown periods and, for the reasons explained below, is not proposing alternative standards for those periods. The associated control devices are operational before startup and during shutdown of the affected sources at primary copper smelting facilities. Therefore, we expect that emissions during startup and shutdown would be no higher than emissions during normal operations. We know of no reason why the existing standards should not apply at all times.

Periods of startup, normal operations, and shutdown are all predictable and routine aspects of a source's operations. Malfunctions, in contrast, are neither predictable nor routine. Instead they are, by definition, sudden, infrequent, and not reasonably preventable failures of emissions control, process, or monitoring equipment. (40 CFR 63.2) (Definition of malfunction). The EPA interprets CAA section 112 as not requiring emissions that occur during periods of malfunction to be factored into development of CAA section 112 standards and this reading has been upheld as reasonable by the court in *U.S. Sugar Corp. v. EPA*, 830 F.3d 579, 606-610 (2016). Under CAA section 112, emissions standards for new sources must be no less stringent than the level "achieved" by the best controlled similar source and for existing sources generally

must be no less stringent than the average emission limitation "achieved" by the best performing 12 percent of sources in the category. There is nothing in CAA section 112 that directs the Agency to consider malfunctions in determining the level "achieved" by the best performing sources when setting emission standards. As the court has recognized, the phrase "average emissions limitation achieved by the best performing 12 percent of" sources "says nothing about how the performance of the best units is to be calculated." *Nat'l Ass'n of Clean Water Agencies v. EPA*, 734 F.3d 1115, 1141 (D.C. Cir. 2013). While the EPA accounts for variability in setting emissions standards, nothing in CAA section 112 requires the Agency to consider malfunctions as part of that analysis. The EPA is not required to treat a malfunction in the same manner as the type of variation in performance that occurs during routine operations of a source. A malfunction is a failure of the source to perform in a "normal or usual manner" and no statutory language compels the EPA to consider such events in setting CAA section 112 standards.

Similarly, although standards for area sources are not required to be set based on "best performers," the EPA is not required to consider malfunctions in determining what is "generally available."

As the court recognized in *U.S. Sugar Corp*, accounting for malfunctions in setting standards would be difficult, if not impossible, given the myriad different types of malfunctions that can occur across all sources in the category and given the difficulties associated with predicting or accounting for the frequency, degree, and duration of various malfunctions that might occur. *Id.* at 608 ("the EPA would have to conceive of a standard that could apply equally to the wide range of possible boiler malfunctions, ranging from an explosion to minor mechanical defects. Any possible standard is likely to be hopelessly generic to govern such a wide array of circumstances."). As such, the performance of units that are malfunctioning is not

"reasonably" foreseeable. See, *e.g., Sierra Club v. EPA*, 167 F.3d 658, 662 (D.C. Cir. 1999) ("The EPA typically has wide latitude in determining the extent of data-gathering necessary to solve a problem. The EPA generally defers to an agency's decision to proceed on the basis of imperfect scientific information, rather than to 'invest the resources to conduct the perfect study.'"). See also, *Weyerhaeuser v Costle*, 590 F.2d 1011, 1058 (D.C. Cir. 1978) ("In the nature of things, no general limit, individual permit, or even any upset provision can anticipate all upset situations. After a certain point, the transgression of regulatory limits caused by 'uncontrollable acts of third parties,' such as strikes, sabotage, operator intoxication or insanity, and a variety of other eventualities, must be a matter for the administrative exercise of case-by-case enforcement discretion, not for specification in advance by regulation."). In addition, emissions during a malfunction event can be significantly higher than emissions at any other time of source operation. For example, if an air pollution control device with 99 percent removal goes off-line as a result of a malfunction (as might happen if, for example, the bags in a baghouse catch fire) and the emission unit is a steady state type unit that would take days to shut down, the source would go from 99 percent control to zero control until the control device was repaired. The source's emissions during the malfunction would be 100 times higher than during normal operations. As such, the emissions over a 4-day malfunction period would exceed the annual emissions of the source during normal operations. As this example illustrates, accounting for malfunctions could lead to standards that are not reflective of (and significantly less stringent than) levels that are achieved by a well-performing non-malfunctioning source. It is reasonable to interpret CAA section 112 to avoid such a result. The EPA's approach to malfunctions is consistent with CAA section 112 and is a reasonable interpretation of the statute.

Although no statutory language compels the EPA to set standards for malfunctions, the EPA has the discretion to do so where feasible. For example, in the Petroleum Refinery Sector Risk and Technology Review, the EPA established a work practice standard for unique types of malfunction that result in releases from pressure relief devises (PRDs) or emergency flaring events because the EPA had information to determine that such work practices reflected the level of control that applies to the best performers. 80 Fed. Reg. 75178, 75211-14 (Dec. 1, 2015). The EPA will consider whether circumstances warrant setting standards for a particular type of malfunction and, if so, whether the EPA has sufficient information to identify the relevant best performing sources and establish a standard for such malfunctions. The Agency also encourages commenters to provide any such information.

Based on the EPA's knowledge of the processes and engineering judgment, malfunctions in the Primary Copper Smelting source category are considered unlikely to result in a violation of the standard. Affected sources at primary copper smelting plants are controlled with add-on air pollution control devices which will continue to function in the event of a process upset. Also, processes in the industry are typically equipped with controls that will not allow startup of the emission source until the associated control device is operating and will shut down the emission source if the associated controls malfunction. Furnaces used in primary copper smelting, which are the largest sources of HAP emissions, typically operate continuously for long periods of time with no significant spikes in emissions. These minimal fluctuations in emissions are controlled by the existing add-on air pollution control devices used at all plants in the industry.

In the unlikely event that a source fails to comply with the applicable CAA section 112(d) standards as a result of a malfunction event, the EPA would determine an appropriate response based on, among other things, the good faith efforts of the source to minimize

emissions during malfunction periods, including preventative and corrective actions, as well as root cause analyses to ascertain and rectify excess emissions. The EPA would also consider whether the source's failure to comply with the CAA section 112(d) standard was, in fact, sudden, infrequent, not reasonably preventable, and was not instead caused, in part, by poor maintenance or careless operation. 40 CFR 63.2 (Definition of malfunction).

If the EPA determines in a particular case that an enforcement action against a source for violation of an emission standard is warranted, the source can raise any and all defenses in that enforcement action and the federal district court will determine what, if any, relief is appropriate. The same is true for citizen enforcement actions. Similarly, the presiding officer in an administrative proceeding can consider any defense raised and determine whether administrative penalties are appropriate.

In summary, the EPA interpretation of the CAA, particularly section 112, is reasonable and encourages practices that will avoid malfunctions. Administrative and judicial procedures for addressing exceedances of the standards fully recognize that violations may occur despite good faith efforts to comply and can accommodate those situations. *U.S. Sugar Corp. v. EPA*, 830 F.3d 579, 606-610 (2016).

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.6(e)(1)(i) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." Section 63.6(e)(1)(i) describes the general duty to minimize emissions. Some of the language in that section is no longer necessary or appropriate in light of the elimination of the SSM exemption. The Agency is proposing instead to add general duty regulatory text at 40 CFR 63.1447(a) (subpart QQQ) that reflects the general duty to minimize emissions while eliminating

the reference to periods covered by an SSM exemption. The general duty to minimize emissions at existing area sources (subpart EEEEEE), including periods of SSM, are contained in sections 63.11147(c) and 63.11148(f). The general duty to minimize emissions at new sources are being proposed in 63.11149(c)(3). The current language in 40 CFR 63.6(e)(1)(i) characterizes what the general duty entails during periods of SSM. With the elimination of the SSM exemption, there is no need to differentiate between normal operations, startup and shutdown, and malfunction events in describing the general duty. Therefore, the language the EPA is proposing for subpart QQQ and subpart EEEEEE do not include that language from 40 CFR 63.6(e)(1).

The EPA is also proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.6(e)(1)(ii) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." Section 63.6(e)(1)(ii) imposes requirements that are not necessary with the elimination of the SSM exemption or are redundant with the general duty requirement being added at 40 CFR 63.1447(a) (subpart QQQ) and that are already required for existing sources in 40 CFR 63.11147(c) and 63.11148(f) and are proposed for new sources in 63.11149(c)(3).

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.6(e)(3) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." Generally, these paragraphs require development of an SSM plan and specify SSM recordkeeping and reporting requirements related to the SSM plan. As noted, the EPA is proposing to remove the SSM exemptions. Therefore, affected units will be subject to an emission standard during such events. The applicability of a standard during such events will

ensure that sources have ample incentive to plan for and achieve compliance and, thus, the SSM plan requirements are no longer necessary.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.6(f)(1) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." The current language of 40 CFR 63.6(f)(1) exempts sources from non-opacity standards during periods of SSM. As discussed above, the court in *Sierra Club v. EPA* vacated the exemptions contained in this provision and held that the CAA requires that some CAA section 112 standards apply continuously. Consistent with *Sierra Club v. EPA*, the EPA is proposing to revise standards in these rules to apply at all times.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart EEEEEE) entry for 40 CFR 63.6(h)(1) by changing the "yes" in the column titled "Applies to Subpart EEEEEE" to a "no." The entry for 40 CFR 63.6(h) in Table 1 to subpart QQQ is already a "no.' The current language of 40 CFR 63.6(h)(1) exempts sources from opacity standards during periods of SSM. As discussed above, the court in *Sierra Club* vacated the exemptions contained in this provision and held that the CAA requires that some CAA section 112 standard apply continuously. Consistent with *Sierra Club*, the EPA is proposing to revise standards in this rule to apply at all times.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.7(e)(1) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." Section 63.7(e)(1) describes performance testing requirements. The EPA is instead proposing to add a performance testing requirement at 40 CFR 63.1450(a) and (b) (subpart

QQQ) and 63.11148(e)(3) (subpart EEEEEE). The performance testing requirements the Agency is proposing to add differ from the General Provisions performance testing provisions in several respects. The regulatory text does not include the language in 40 CFR 63.7(e)(1) that restated the SSM exemption and language that precluded startup and shutdown periods from being considered "representative" for purposes of performance testing. As in 40 CFR 63.7(e)(1), performance tests conducted under this subpart should not be conducted during malfunctions because conditions during malfunctions are often not representative of normal operating conditions. The EPA is proposing to add language that requires the owner or operator to record the process information that is necessary to document operating conditions during the test and include in such record an explanation to support that such conditions represent normal operation. Section 63.7(e) requires that the owner or operator make such records "as may be necessary to determine the condition of the performance test" available to the Administrator upon request but does not specifically require the information to be recorded. The regulatory text the EPA is proposing to add to these provisions builds on that requirement and makes explicit the requirement to record the information.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.8(c)(1)(i) and (iii) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." The cross-references to the general duty and SSM plan requirements in those subparagraphs are not necessary in light of other requirements of 40 CFR 63.8 that require good air pollution control practices (40 CFR 63.8(c)(1)) and that set out the requirements of a quality control program for monitoring equipment (40 CFR 63.8(d)).

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.8(d)(3) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." The final sentence in 40 CFR 63.8(d)(3) refers to the General Provisions' SSM plan requirement which is no longer applicable. The EPA is proposing to add to the rules at 40 CFR 63.1456(a)(4)(iii) in subpart QQQ and 63.11149(b)(3) in subpart EEEEEE text that is identical to 40 CFR 63.8(d)(3) except that the final sentence is replaced with the following sentence: "The program of corrective action should be included in the plan required under §63.8(d)(2)."

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.10(b)(2)(i) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." Section 63.10(b)(2)(i) describes the recordkeeping requirements during startup and shutdown. These recording provisions are no longer necessary because the EPA is proposing that recordkeeping and reporting applicable to normal operations will apply to startup and shutdown. In the absence of special provisions applicable to startup and shutdown, such as a startup and shutdown plan, there is no reason to retain additional recordkeeping for startup and shutdown periods.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.10(b)(2)(ii) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." Section 63.10(b)(2)(ii) describes the recordkeeping requirements during a malfunction. The EPA is proposing to add such requirements to 40 CFR 63.1456 (subpart QQQ) and 40 CFR 63.11149(g) (subpart EEEEEE). The regulatory text the Agency is proposing to add differs from

the General Provisions it is replacing in that the General Provisions requires the creation and retention of a record of the occurrence and duration of each malfunction of process, air pollution control, and monitoring equipment. The EPA is proposing that this requirement apply to any failure to meet an applicable standard and is requiring that the source record the date, time, and duration of the failure rather than the "occurrence." The EPA is also proposing to add a requirement that sources keep records that include a list of the affected source or equipment and actions taken to minimize emissions, an estimate of the quantity of each regulated pollutant emitted over the standard for which the source failed to meet the standard, and a description of the method used to estimate the emissions. Examples of such methods would include product-loss calculations, mass balance calculations, measurements when available, or engineering judgment based on known process parameters. The EPA is proposing to require that sources keep records of this information to ensure that there is adequate information to allow the EPA to determine the severity of any failure to meet a standard, and to provide data that may document how the source met the general duty to minimize emissions when the source has failed to meet an applicable standard.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.10(b)(2)(iv) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." When applicable, the provision requires sources to record actions taken during SSM events when actions were inconsistent with their SSM plan. The requirement is no longer appropriate because SSM plans will no longer be required. The requirement previously applicable under 40 CFR 63.10(b)(2)(iv)(B) to record actions to minimize emissions and record

corrective actions is now applicable by reference to 40 CFR 63.1456 (subpart QQQ) and 40 CFR 63.11149.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.10(b)(2)(v) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." When applicable, the provision requires sources to record actions taken during SSM events to show that actions taken were consistent with their SSM plan. The requirement is no longer appropriate because SSM plans will no longer be required.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.10(c)(15) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." The EPA is proposing that 40 CFR 63.10(c)(15) no longer apply. When applicable, the provision allows an owner or operator to use the affected source's SSM plan or records kept to satisfy the recordkeeping requirements of the SSM plan, specified in 40 CFR 63.6(e), to also satisfy the requirements of 40 CFR 63.10(c)(10) through (12). The EPA is proposing to eliminate this requirement because SSM plans would no longer be required, and therefore 40 CFR 63.10(c)(15) no longer serves any useful purpose for affected units.

The EPA is proposing to revise the General Provisions table (Table 1 to subpart QQQ and Table 1 to subpart EEEEEE) entry for 40 CFR 63.10(d)(5) by changing the "yes" in the column titled "Applies to Subpart QQQ" and in the column titled "Applies to Subpart EEEEEE" to a "no." Section 63.10(d)(5) describes the reporting requirements for SSM. To replace the General Provisions reporting requirement, the EPA is proposing to add reporting requirements to 40 CFR 63.1455 (subpart QQQ) and 40 CFR 63.11147, 63.11148, and 63.11149 (subpart

EEEEEE). The replacement language differs from the General Provisions requirement in that it eliminates periodic SSM reports as a stand-alone report. The Agency is proposing language that requires sources that fail to meet an applicable standard at any time to report the information concerning such events in the semi-annual or other reporting period deviation or excess emission report already required under these rules. The Agency is proposing that the report must contain the number, date, time, duration, and the cause of such events (including unknown cause, if applicable), a list of the affected sources or equipment, an estimate of the quantity of each regulated pollutant emitted over any emission limit, and a description of the method used to estimate the emissions.

Examples of such methods would include product-loss calculations, mass balance calculations, measurements when available, or engineering judgment based on known process parameters. The EPA is proposing this requirement to ensure that there is adequate information to determine compliance, to allow the EPA to determine the severity of the failure to meet an applicable standard, and to provide data that may document how the source met the general duty to minimize emissions during a failure to meet an applicable standard.

The EPA will no longer require owners or operators to determine whether actions taken to correct a malfunction are consistent with an SSM plan, because plans would no longer be required. The proposed amendments therefore eliminate any cross reference to 40 CFR 63.10(d)(5)(i) that contains the description of the previously required SSM report format and submittal schedule from this section. These specifications are no longer necessary because the events will be reported in otherwise required reports with similar format and submittal requirements.

2. Electronic Reporting

The EPA is proposing that owners and operators of Primary Copper Smelting facilities submit electronic copies of required performance test reports, through the EPA's Central Data Exchange (CDX) using the Compliance and Emissions Data Reporting Interface (CEDRI). A description of the electronic data submission process is provided in the memorandum *Electronic Reporting Requirements for New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) Rules*, available in the docket for this action. The proposed rule requires that performance test results collected using test methods that are supported by the EPA's Electronic Reporting Tool (ERT) as listed on the ERT website at the time of the test be submitted in the format generated through the use of the ERT or an electronic file consistent with the xml schema on the ERT website, and other performance test results be submitted in portable document format (PDF) using the attachment module of the ERT. Similarly, performance evaluation results of continuous emissions monitoring systems (CEMS) measuring relative accuracy test audit (RATA) pollutants that are supported by the ERT at the time of the test must be submitted in the format generated through the use of the ERT or an electronic file consistent with the xml schema on the ERT website, and other performance evaluation results be submitted in PDF using the attachment module of the ERT.

Additionally, the EPA has identified two broad circumstances in which electronic reporting extensions may be provided. These circumstances are (1) outages of the EPA's CDX or CEDRI, which preclude an owner or operator from accessing the system and submitting required reports, and (2) force majeure events, which are defined as events that will be or have been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevent an owner or operator from complying with the requirement to submit a report electronically. Examples of force majeure events are acts of

nature, acts of war or terrorism, or equipment failure or safety hazards beyond the control of the facility. The EPA is providing these potential extensions to protect owners and operators from noncompliance in cases where they cannot successfully submit a report by the reporting deadline for reasons outside of their control. In both circumstances, the decision to accept the claim of needing additional time to report is within the discretion of the Administrator, and reporting should occur as soon as possible.

The electronic submittal of the reports addressed in this proposed rulemaking will increase the usefulness of the data contained in those reports, is in keeping with current trends in data availability and transparency, will further assist in the protection of public health and the environment, will improve compliance by facilitating the ability of regulated facilities to demonstrate compliance with requirements and by facilitating the ability of delegated state, local, tribal, and territorial air agencies and the EPA to assess and determine compliance, and will ultimately reduce burden on regulated facilities, delegated air agencies, and the EPA. Electronic reporting also eliminates paper-based, manual processes, thereby saving time and resources, simplifying data entry, eliminating redundancies, minimizing data reporting errors, and providing data quickly and accurately to the affected facilities, air agencies, the EPA, and the public. Moreover, electronic reporting is consistent with the EPA's plan to implement Executive Order 13563 and is in keeping with the EPA's agency-wide policy developed in response to the White House's Digital Government Strategy. For more information on the benefits of electronic reporting, see the memorandum *Electronic Reporting Requirements for New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) Rules*, referenced earlier in this section.

3. Other Changes

As mentioned above, we are also proposing four minor changes to major source NESHAP to clarify an applicability provision, update and clarify the testing requirements for PM, add a test method for mercury, and revise a definition. These changes are explained further in the following paragraphs.

The EPA is proposing to revise the applicability description under section 63.1441 to clarify that the NESHAP applies to major source smelting facilities that use any type of converter, not just batch converters because the current definition limits applicability to only major sources that use batch converters. The major source NESHAP should apply to any Primary Copper major source regardless of what type of converter they use. Therefore, we are proposing this change.

With regard to revisions to testing requirements, the Agency is proposing to revise the wording in section 63.1450 for clarification that the facilities must test for filterable particulate, not total particulate. The test methods in 63.1450(a) have not changed for PM from the existing regulation. The methods in the existing regulation (Methods 5, 5D, and 17) are methods for filterable PM. Total PM includes filterable PM and condensable PM. The condensable PM test method (Method 202) is not included in the existing regulation for the emission standards set in 2002. In addition, the Agency is proposing to add the appropriate test methods for mercury, PM10 and fugitive PM and updating test methods that are incorporated by reference because the affected facilities will need to know what test methods they need to use to demonstrate compliance with the new standards.

Finally, the EPA is proposing to revise the definitions under section 63.1459 by changing the term “smelting furnace” to “smelting vessel” to be consistent with the definition in the area source rule, subpart EEEEEE because we think it is appropriate that both rules include the

broader definition of smelting vessel, which is already in the area source rule. The specific definition is as follows: Smelting vessel means a furnace, reactor, or other type of vessel in which copper ore concentrate and fluxes are smelted to form a molten mass of material containing copper matte and slag. Other copper-bearing materials may also be charged to the smelting vessel.

F. What compliance dates are we proposing?

The EPA is proposing that existing facilities must comply with the BTF PM limits for the anode refining process fugitive roof vents within 2 years after promulgation of the final rule. The EPA is proposing 2 years for compliance because we expect the facility will need this much time to design and construct the necessary capture and control equipment described above. The reason the Agency is not proposing more than 2 years is because these controls are needed to achieve acceptable risks pursuant to CAA section 112(f), and section 112(f) only allows up to 2 years to comply with standards promulgated pursuant section 112(f).

For the new facility-wide mercury limits, new PM limits for anode refining point sources, and new PM limits for converter and smelting furnace roof vents, the Agency is proposing that existing facilities must comply within 1 year after promulgation of the final rule. For all other changes proposed in this action the Agency is proposing that existing facilities must comply within 180 days after promulgation of the final rule. All new or reconstructed facilities must comply with all requirements in the final rule upon startup. Our experience with similar industries that are required to convert reporting mechanisms, install necessary hardware and software, become familiar with the process of submitting performance test results electronically through the EPA's CEDRI, test these new electronic submission capabilities, reliably employ electronic reporting, and convert logistics of reporting processes to different time-reporting

parameters shows that a time period of a minimum of 90 days, but more typically 180 days, is generally necessary to successfully complete these changes. Our experience with similar industries further shows that this sort of regulated facility generally requires a time period of 180 days to read and understand the amended rule requirements, evaluate their operations to ensure that they can meet the standards during periods of startup and shutdown as defined in the rule and make any necessary adjustments, adjust parameter monitoring and recording systems to accommodate revisions, and update their operations to reflect the revised requirements.

From our assessment of the time frame needed for compliance with the revised requirements, the EPA considers the periods of 2 years, 1 year, and 180 days to be the most expeditious compliance period practicable for each of the standards described above, respectively, and, thus, is proposing that existing affected sources be in compliance with all of this regulation's revised requirements within these timeframes.

For the MACT floor PM limit, the EPA is proposing in the subpart QQQ rule for anode refining point sources, we are proposing a compliance period of 1 year. Although this is a new requirement, the major source facilities are currently meeting the limit and the Agency expects minimal impact.

For the proposed BTF limit for mercury for existing sources in subpart QQQ, the Agency is proposing a compliance period of 3 years. The EPA is providing 3 years to comply with the mercury standard because the facilities need time to hire a consultant to design the new control systems, establish contracts with construction companies and/or air pollution control installation experts to reconfigure equipment, and build and install new duct work, fans, and control systems. The facilities also need time to establish contracts with testing companies and arrange for and conduct the performance testing.

For affected facilities that commence construction or reconstruction after **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, owners or operators must comply with all requirements of the subpart, including all the amendments being proposed, no later than the effective date of the final rule or upon startup, whichever is later.

For the proposed subpart QQQ PM standard for new converters, the Agency is proposing that all new or reconstructed facilities must comply with this requirement upon startup. As no new converters are expected to come online in the near future, the Agency does not expect there to be an issue with the proposed compliance period.

V. Summary of Cost, Environmental, and Economic Impacts

A. What are the affected sources?

The Primary Copper Smelting source category includes any facility that uses a pyrometallurgical process to extract copper from copper sulfide ore concentrates, native ore concentrates, or other copper bearing minerals. There are currently three copper smelting facilities in the United States: two are major sources and one is an area source. No new copper smelting facilities are currently being constructed or are planned in the near future.

1. 40 CFR Part 63, Subpart QQQ

The affected sources subject to 40 CFR part 63, subpart QQQ, the major source NESHAP, are copper concentrate dryers, smelting furnaces, slag cleaning vessels, copper converter departments, and fugitive emission sources.

2. 40 CFR Part 63, Subpart EEEEEE

Under 40 CFR part 63, subpart EEEEEE, the area source NESHAP, the affected sources are copper concentrate dryers, smelting vessels, converting vessels, matte drying and grinding plant, secondary gas systems, anode refining furnaces, and anode shaft furnaces.

B. What are the air quality impacts?

1. 40 CFR Part 63, Subpart QQQ

The proposed amendments in this action would achieve about 4.26 tpy reduction of HAP metals emissions (primarily lead, arsenic and cadmium from anode refining operations and mercury from furnaces and converters). In this action, the Agency is also proposing additional work practices that the Agency thinks will achieve some additional unquantified HAP emissions reductions. These proposed amendments will also reduce risks to public health and the environment, as described above in this preamble.

Furthermore, the Agency is proposing new standards for process fugitive PM emissions from furnaces and converters. The EPA does not expect to achieve reductions in emissions with these new standards. However, these standards will ensure that the emissions remain controlled and minimized moving forward. The proposed amendments also include removal of the SSM exemptions.

2. 40 CFR Part 63, Subpart EEEEEE

There are no air quality impacts resulting from the proposed amendments under 40 CFR part 63, subpart EEEEEE.

C. What are the cost impacts?

1. 40 CFR Part 63, Subpart QQQ

As described above, the proposed standards for anode refining process fugitive emissions and BTF standard for mercury will require estimated capital costs of $7,331,000 and annualized costs of $2,299,000 for the Freeport facility (2019 dollars). The Asarco facility will incur estimated costs of about $95,000 per year to complete compliance testing for all the proposed emissions standards. Freeport already conducts annual testing of these units pursuant to state

ADEQ requirements; therefore, the Agency does not expect Freeport to incur new testing costs. With regard to the proposed electronic reporting requirements, which will eliminate paper-based manual processes, the EPA expects a small initial unquantified cost to transition to electronic reporting, but that these costs will be offset with savings over time such that ultimately there will be an unquantified reduction in costs to the affected facilities.

2. 40 CFR Part 63, Subpart EEEEEE

With regard to the proposed electronic reporting requirements, which will eliminate paper-based manual processes, the EPA expects a small initial unquantified cost to transition to electronic reporting, but that these costs will be offset with savings over time such that ultimately there will be an unquantified reduction in costs to the affected facilities.

D. What are the economic impacts?

1. 40 CFR Part 63, Subpart QQQ

The net present value of the estimated cost impacts of the proposed revisions to the Primary Copper Smelting NESHAP is $18.2 million, discounted at a 7 percent rate over an 8-year analytic time frame from 2022 to 2029 in 2019 dollars. Using a 3 percent discount rate, the net present value of the estimated cost impacts is $19.6 million.

As described previously in this preamble, the Agency estimates the new standards for anode refining fugitive emissions and mercury will result in annualized costs of about $2.3 million for the Freeport facility. Based on our research, the estimated annualized costs for Freeport are about 0.016 percent of the annual revenue of the facility's ultimate parent company in 2019. For the Asarco facility, the estimated annualized costs of the proposed rule (*i.e.*, $95,000 in testing costs) were less than 0.01 percent of 2019 revenues for the facility's ultimate parent company. Financial data was not available for the individual facilities.

We have data which estimates that the amount of copper produced by U.S. smelters was 563,000 metric tons in 2016 and 315,000 metric tons in 2020.[33] This decrease may have been in part due to the fact that Asarco's smelting operation was shut down for the entire year of 2020 and could have been further impacted by labor and supply issues related to COVID-19. We are not able to determine exactly how much the three U.S. facilities produced individually or the share of the domestic market they represent. Furthermore, we do not have the detailed information needed to determine what percentage of the copper consumed in the U.S. comes from these facilities as opposed to being imported, how much of the production of these facilities is exported, or what the market impacts would be.

The economic impacts of this proposed rule were determined by comparing the annualized costs estimated for each facility to the annual revenues of the facility's ultimate parent company to obtain cost to sales ratios. This is EPA's typical method for determining economic impacts, because parent companies are assumed to be able to shift resources across their operations to address regulatory compliance needs. Since the estimated cost impacts for the facilities' ultimate parent companies are minimal, EPA anticipates there to be no significant economic impacts on the individual facilities due to the proposed revisions.

2. 40 CFR Part 63, Subpart EEEEEE

There are no significant economic impacts anticipated due to the proposed revisions under 40 CFR part 63, subpart EEEEEE.

E. What are the benefits?

1. 40 CFR Part 63, Subpart QQQ

[33] *USGS National Minerals Information Center – Copper Statistics and Information* available at: *https://www.usgs.gov/centers/nmic/copper-statistics-and-information*

As described above, the proposed amendments would result in significant reductions in emissions of HAP metals, especially lead and arsenic. The proposed amendments also revise the standards such that they apply at all times, which includes SSM periods. Furthermore, the proposed requirements to submit reports and test results electronically will improve monitoring, compliance, and implementation of the rule.

2. 40 CFR Part 63, Subpart EEEEEE

The proposed amendments under 40 CFR part 63, subpart EEEEEE revise the standards such that they apply at all times, which includes SSM periods. Furthermore, the proposed requirements to submit reports and test results electronically will improve monitoring, compliance, and implementation of the rule.

VI. Request for Comments

The EPA solicits comments on this proposed action. In addition to general comments on this proposed action, the Agency is also interested in additional data that may improve the emissions estimates, risk assessments, control and cost impacts analyses, and other analyses. The EPA is specifically interested in receiving any improvements to the data used in the site-specific emissions profiles used for risk modeling. Such data should include supporting documentation in sufficient detail to allow characterization of the quality and representativeness of the data or information. Section VII of this preamble provides more information on submitting data. The EPA is also specifically interested in receiving comments and data on the economic impacts of the proposed rule changes to individual facilities.

VII. Submitting Data Corrections

The site-specific emissions profiles used in the source category risk and demographic analyses and instructions are available for download on the RTR website at

https://www.epa.gov/stationary-sources-air-pollution/primary-copper-smelting-national-emissions-standards-hazardous-air. The data files include detailed information for each HAP emissions release point for the facilities in the source category.

If you believe that the data are not representative or are inaccurate, please identify the data in question, provide your reason for concern, and provide any "improved" data that you have, if available. When you submit data, the Agency requests that you provide documentation of the basis for the revised values to support your suggested changes. To submit comments on the data downloaded from the RTR website, complete the following steps:

1. Within this downloaded file, enter suggested revisions to the data fields appropriate for that information.

2. Fill in the commenter information fields for each suggested revision (*i.e.*, commenter name, commenter organization, commenter email address, commenter phone number, and revision comments).

3. Gather documentation for any suggested emissions revisions (*e.g.*, performance test reports, material balance calculations).

4. Send the entire downloaded file with suggested revisions in Microsoft® Access format and all accompanying documentation to Docket ID No. EPA-HQ-OAR-2020-0430 (through the method described in the **ADDRESSES** section of this preamble).

5. If you are providing comments on a single facility or multiple facilities, you need only submit one file for all facilities. The file should contain all suggested changes for all sources at that facility (or facilities). The Agency requests that all data revision comments be submitted in the form of updated Microsoft® Excel files that are generated by the Microsoft® Access file.

These files are provided on the project website at *https://www.epa.gov/stationary-sources-air-pollution/ primary-copper-smelting-national-emissions-standards-hazardous-air*.

VIII. Incorporation by Reference

The EPA proposes to amend 40 CFR 63.14 to incorporate by reference for three VCS.

- ANSI/ASME PTC 19.10-1981, Flue and Exhaust Gas Analysis [Part 10, Instruments and Apparatus], issued August 31, 1981, IBR requested for §63.1450(a)(iii), (b)(iii), (d)(iii), and (e)(iii). This method is an approved alternative to EPA Method 3B manual portion only, not the instrumental portion. The ANSI/ASME document is available from the American Society of Mechanical Engineers (ASME) at *http://www.asme.org*; by mail at Two Park Avenue, New York, NY 10016-5990; or by telephone at (800) 843-2763.
- ASTM D7520-16, Standard Test Method for Determining the Opacity of a Plume in the Outdoor Ambient Atmosphere, approved April 1, 2016, IBR requested for 40 CFR 63.1450(e)(1)(vii). This method is an acceptable alternative to the EPA's Method 9 under specific conditions stated in 40 CFR 63.1450(e)(1)(vii). The ASTM documents are available from the American Society for Testing and Materials (ASTM) at *https://www.astm.org*; by mail at l00 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; or by telephone at (610) 832-9500.
- ASTM D6784-02, (Reapproved 2009), Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), (Approved April 1, 2008). IBR requested for 40 CFR 63.1450(d)(1)(v). This method is an acceptable alternative to the EPA's Method 29 as a method for measuring mercury applies to concentrations approximately 0.5 to 100 $\mu g/Nm^3$.

The following standard, referenced in the regulatory text, is already approved for incorporation by reference: ASTM D4536-96.

IX. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at *https://www.epa.gov/laws-regulations/laws-and-executive-orders*.

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is a significant regulatory action that was submitted to OMB for review. Any changes made in response to OMB recommendations have been documented in the docket (Docket ID No. EPA-HQ-OAR-2020-0430).

B. Paperwork Reduction Act (PRA)

1. 40 CFR Part 63, Subpart QQQ

The information collection activities in this proposed rule have been submitted for approval to OMB under the PRA. The information collection request (ICR) document that the EPA prepared has been assigned EPA ICR number 1850.10. You can find a copy of the ICR in the docket for this rule, and it is briefly summarized here.

The EPA is proposing amendments that require electronic reporting of results of performance tests and CEMS performance evaluations, fugitive dust plans and notification of compliance reports, remove the requirement to submit certain information related to the malfunction exemption, and impose other rule revisions that affect reporting and recordkeeping requirements for primary copper smelting facilities, such as requirements to submit new performance test reports and to maintain new operating parameter records to demonstrate

compliance with new standards. This information would be collected to assure compliance with 40 CFR part 63, subpart QQQ.

Respondents/affected entities: Owners or operators of primary copper smelting facilities.

Respondent's obligation to respond: Mandatory (40 CFR part 63, subpart QQQ).

Estimated number of respondents: Two (total).

Frequency of response: Initial, semiannual, and annual.

Total estimated burden: The annual recordkeeping and reporting burden for facilities to comply with all of the requirements in the NESHAP is estimated to be 5,500 hours (per year). Burden is defined at 5 CFR 1320.3(b).

Total estimated cost: The annual recordkeeping and reporting burden for facilities to comply with all of the requirements in the NESHAP is estimated to be $750,000 (per year), of which $130,000 is for this rule, and $620,000 is for the other costs related to continued compliance with the NESHAP. There are no annualized capital or operation & maintenance costs.

2. 40 CFR Part 63, Subpart EEEEEE

The information collection activities in this proposed rule have been submitted for approval to OMB under the PRA. The ICR document that the EPA prepared has been assigned EPA ICR number 2240.07. You can find a copy of the ICR in the docket for this rule, and it is briefly summarized here.

The EPA is proposing amendments that require electronic reporting of results of performance tests and CEMS performance evaluations and notification of compliance reports, remove the malfunction exemption, and impose other revisions that affect reporting and recordkeeping for primary copper smelting facilities. This information would be collected to assure compliance with 40 CFR part 63, subpart EEEEEE.

Respondents/affected entities: Owners or operators of primary copper smelting facilities.

Respondent's obligation to respond: Mandatory (40 CFR part 63, subpart EEEEEE).

Estimated number of respondents: One (total).

Frequency of response: Initial, semiannual, and quarterly.

Total estimated burden: The annual recordkeeping and reporting burden for facilities to comply with all of the requirements in the NESHAP is estimated to be 9 hours (per year). Burden is defined at 5 CFR 1320.3(b).

Total estimated cost: The annual recordkeeping and reporting burden for facilities to comply with all of the requirements in the NESHAP is estimated to be $1,060 (per year). There are no annualized capital or operation & maintenance costs.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for the EPA's regulations in 40 CFR are listed in 40 CFR part 9.

Submit your comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden to the EPA using the docket identified at the beginning of this rule. You may also send your ICR-related comments to OMB's Office of Information and Regulatory Affairs via email to *OIRA_submission@omb.eop.gov*, Attention: Desk Officer for the EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after receipt, OMB must receive comments no later than **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The EPA will respond to any ICR-related comments in the final rule.

C. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. This action will not impose any requirements on small entities. Based on the Small Business Administration size category for this source category, no small entities are subject to this action.

D. Unfunded Mandates Reform Act (UMRA)

This action does not contain any unfunded mandate as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local, or tribal governments or the private sector.

E. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

This action does not have tribal implications as specified in Executive Order 13175. Thus, Executive Order 13175 does not apply to this action. However, consistent with the EPA policy on coordination and consultation with Indian tribes, the EPA will offer government-to-government consultation with tribes as requested.

G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks and 1 CFR Part 51

This action is not subject to Executive Order 13045 because the EPA does not believe the environmental health or safety risks addressed by this action present a disproportionate risk to children. This action's health and risk assessments are contained in sections III and IV of this preamble and further documented in the document titled *Residual Risk Assessment for the*

Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule, which is available in the docket for this proposed rule (Docket ID No. EPA-HQ-OAR-2020-0430).

H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This action is not a "significant energy action" because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. As described in more details in sections IV.A and V.D of this preamble, new standards are proposed for 40 CFR part 63, subpart QQQ to limit mercury emissions, and PM emissions from anode refining furnaces and process roof vents. The proposed limits would have minimal impacts on the affected facilities because they mostly already meet the limits. One facility will have to improve their capture and control systems, which they were already planning to do as referenced in a consent order with the state of Arizona.

I. National Technology Transfer and Advancement Act (NTTAA)

This rulemaking involves technical standards. Therefore, the EPA conducted searches for National Emission Standards for Hazardous Air Pollutants: Primary Copper Smelting Residual Risk and Technology Review and Primary Copper Smelting Area Source Technology Review through the Enhanced NSSN Database managed by the American National Standards Institute (ANSI). The Agency also contacted VCS organizations and accessed and searched their databases. Searches were conducted for the EPA Methods 1, 1A, 2, 2A, 2C, 2D, 2F, 2G, 3, 3A, 3B, 4, 5, 5B, 9, 17, 22, 29, 30A, 30B of 40 CFR part 60, appendix A, and EPA Method 201A appendix M, 40 CFR part 51. No applicable VCS were identified for EPA Methods 1A, 2A, 2D, 2F, 2G, 5B, 5D, 22, 30A, 30B.

During the search, if the title or abstract (if provided) of the VCS described technical sampling and analytical procedures that are similar to the EPA's reference method, the EPA considered it as a potential equivalent method. All potential standards were reviewed to determine the practicality of the VCS for this rule. This review requires significant method validation data which meets the requirements of the EPA Method 301 for accepting alternative methods or scientific, engineering and policy equivalence to procedures in the EPA reference methods. The EPA may reconsider determinations of impracticality when additional information is available for particular VCS.

Three VCS were identified as an acceptable alternative to the EPA test methods for the purposes of this rule. The VCS ANSI/ASME PTC 19-10-1981 Part 10 (2010), "Flue and Exhaust Gas Analyses" is an acceptable alternative to the EPA Method 3B manual portion only and not the instrumental portion. The ANSI/ASME PTC 19-10-1981 Part 10 (2010) method incorporates both manual and instrumental methodologies for the determination of O2 content. The manual method segment of the O2 determination is performed through the absorption of O2. The VCS ASTM D7520-16 "Standard Test Method for Determining the Opacity of a Plume in the Outdoor Ambient Atmosphere" is an acceptable alternative to the EPA Method 9 with the following conditions:

1. During the digital camera opacity technique (DCOT) certification procedure outlined in section 9.2 of ASTM D7520-16, you or the DCOT vendor must present the plumes in front of various backgrounds of color and contrast representing conditions anticipated during field use such as blue sky, trees, and mixed backgrounds (clouds and/or a sparse tree stand).

2. You must also have standard operating procedures in place including daily or other frequency quality checks to ensure the equipment is within manufacturing specifications as outlined in section 8.1 of ASTM D7520-16.

3. You must follow the record keeping procedures outlined in §63.10(b)(1) for the DCOT certification, compliance report, data sheets, and all raw unaltered JPEGs used for opacity and certification determination.

4. You or the DCOT vendor must have a minimum of four (4) independent technology users apply the software to determine the visible opacity of the 300 certification plumes. For each set of 25 plumes, the user may not exceed 15 percent opacity of anyone reading and the average error must not exceed 7.5 percent opacity.

5. This approval does not provide or imply a certification or validation of any vendor's hardware or software. The onus to maintain and verify the certification and/or training of the DCOT camera, software and operator in accordance with ASTM D7520-16 and this letter is on the facility, DCOT operator, and DCOT vendor.

The VCS ASTM D6784-02(2008) reapproved, "Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method)" is an acceptable alternative to the EPA Methods 101A and Method 29 (portion for mercury only) as a method for measuring mercury applies to concentrations approximately 0.5 – 100 μg/Nm^3. The ASTM D6784-02 method is used to determine elemental, oxidized, particle-bound and total mercury emissions from coal-fired stationary sources with concentrations ranging from approximately 0.05 to 100 ug/dscm.

The search identified 189 VCS that were potentially applicable for these rules in lieu of the EPA reference methods. After reviewing the available standards, the EPA determined that

199 candidate VCS (ASTM D3154-00 (2014), ASTM D3464-96 (2014), ASTM 3796-09 (2016), ISO 10780:1994 (2016), ASME B133.9-1994 (2001), ISO 10396:(2007), ISO 12039:2001(2012), ASTM D5835-95 (2013), ASTM D6522-11, CAN/CSA Z223.2-M86 (R1999), ISO 9096:1992 (2003), ANSI/ASME PTC-38-1980 (1985), ASTM D3685/D3685M-98-13, CAN/CSA Z223.1-M1977, ISO 10397:1993, ASTM D6331 (2014), EN13211:2001, CAN/CSA Z223.26-M1987) identified for measuring emissions of pollutants or their surrogates subject to emission standards in the rule would not be practical due to lack of equivalency, documentation, validation data and other important technical and policy considerations. Additional information for the VCS search and determinations can be found in the memorandum, *Voluntary Consensus Standard Results for National Emission Standards for Hazardous Air Pollutants: Primary Copper Smelting Residual Risk and Technology Review and Primary Copper Smelting Area Source Technology Review*, which is available in the docket for this action.

Under 40 CFR 63.7(f) and 40 CFR_63.8(f) of subpart A of the General Provisions, a source may apply to the EPA to use alternative test methods or alternative monitoring requirements in place of any required testing methods, performance specifications or procedures in the final rule or any amendments.

The EPA welcomes comments on this aspect of the proposed rulemaking and, specifically, invites the public to identify potentially applicable VCS and to explain why such standards should be used in this regulation.

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898 (59 FR 7629, February 16, 1994) directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. The EPA believes that this proposed action would not have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, and/or indigenous peoples, as specified in Executive Order 12898.

The EPA defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The EPA further defines the term fair treatment to mean that "no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental, and commercial operations or programs and policies."[34] In implementing its environmental justice-related efforts, the Agency has expanded the concept of fair treatment to consider not only the distribution of burdens across all populations, but also the distribution of reductions in risk from EPA actions, when data allow.[35] As described in section IV.B.7 of this action and shown in Table 3, EPA evaluated the demographic characteristics of communities located near the major source facilities and

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[34] U.S.EPA. Office of Environmental Justice *Plan EJ 2014*, September 2011. Available at *https://nepis.epa.gov/Exe/ZyPDF.cgi/P100DFCQ.PDF?Dockey=P100DFCQ.PDF*
For more information, see the EPA's Environmental Justice website, *http://www.epa.gov/environmentaljustice/*

[35] U.S. EPA. June 2016. *Technical Guidance for Assessing Environmental Justice in Regulatory Actions*. Available at: *https://www.epa.gov/sites/production/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf*

determined that elevated cancer risks associated with emissions from these facilities disproportionately affect Native American, Hispanic, Below Poverty Level and Over 25 without High School Diploma individuals living nearby. As part of its environmental justice analysis, EPA evaluated whether the proposed action for the Primary Copper Smelting Major Source Category would address the existing disproportionately high and adverse human health effect on these individuals and EPA further evaluated the projected distribution of reductions in risk resulting from the proposed action.

This proposed action is projected to reduce the number of individuals in these groups who live in proximity of the Freeport facility that have risk equal to or greater than 1-in-1 million. EPA estimates that there are approximately 24,412 people within 50 km of the Freeport facility with risk equal to or greater than 1-in-1 million (prior to controls); an estimated 6,835 of these people are Native American, 7,812 are Hispanic or Latino, and 6,591 are individuals below the poverty level. However, as described in section IV.B, we also estimate that no person has an increased cancer risk greater than 90-in-1 million. This proposed action would reduce the number of Native American individuals with cancer risk equal to or above 1-in-1 million to an estimated 2,724, would reduce the number of Hispanic or Latino individuals with cancer risk equal to or above 1-in-1 million to an estimated 7,198, and would reduce the number of individuals below the poverty level with cancer risk equal to or above 1-in-1 million to an estimated 4,475. There would be no reduction in the number of individuals with modeled cancer risk greater than 1-in-1 million at Asarco, since EPA estimates the proposed limit will achieve no quantified emissions reductions for Asarco.

Based upon these reductions, approximately 20,566 people within a 50-km radius of the modeled facilities would be exposed to a cancer risk greater than or equal to 1-in-1 million as a

result of emissions from Primary Copper Smelting post-control source category operations. This represents a 21 percent reduction in the total population at risk when compared to actual emissions without controls. Furthermore, as described in section IV.C.3, after implementation of this proposed action, the maximum modeled lifetime increased cancer risk due to HAP emissions from the two major source primary copper smelting facilities for any individual is estimated to be 60-in-1 million. The demographic analysis based on post-control emissions is provided in the report *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Post-Control Source Category Operations*, available in docket EPA-HQ-OAR-2020-0430, part of the rules and guidelines for 40 CFR part 63, subpart QQQ).

The above risk-based demographic report indicates that for the major source category as a whole there will be a reduction in average cancer risk for each demographic group within a 50 kilometer radius of the modeled facilities as a result of proposed standards to reduce emissions at the Freeport facility, specifically: Hispanic or Latino (4-in-1 million to 3-in-1 million); Native American (2-in-1 million to 1-in-1 million); African American (10-in-1 million to 5-in-1 million); Other and Multiracial (5-in-1 million to 3-in-1 million); people living below the poverty level (4-in-1 million to 2-in-1 million); people 25 years old and older without a high school diploma (4-in-1 million to 2-in-1 million); and people living in linguistic isolation (4-in-1 million to 2-in-1 million). For the total population exposed to emissions from the major source category, average cancer risk would be reduced from 4-in-1 million to 2-in-1 million.

This action's health and risk assessments and related decisions are described in section IV of this action. The detailed documentation for these assessments is contained in the *Residual Risk Assessment for the Primary Copper Smelting Major Source Category in Support of the 2021 Risk and Technology Review Proposed Rule.* The methodology and the results of the baseline

and post-control demographic analyses are presented in the technical reports, *Risk and Technology Review – Analysis of Demographic Factors for Populations Living Near Primary Copper Smelting Source Category Operations and Risk and Technology Review - Analysis of Demographic Factors For Populations Living Near Primary Copper Smelting Post-Control Source Category Operations,* respectively. These reports are available in the docket for this proposed rule (Docket ID No. EPA-HQ-OAR-2020-0430).

List of Subjects in 40 CFR Part 63

Environmental protection, Air pollution control, Hazardous substances, Incorporation by reference, Reporting and recordkeeping requirements.

Michael S. Regan,

Administrator.

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December 23, 2021

Michael S Regan, Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

By email to: Regan.Michael@epa.gov

Dear Administrator Regan,

I am pleased to convey to you the attached *draft* Petition Seeking A Phaseout of New and Removal of Legacy Fossil Fuel Greenhouse Gas Emissions. Petitioners submit here in draft form in aid of pre-filing consultation, pursuant to 50 FR 46825 (Nov. 13, 1985). In that notice, your Agency advises, in part, that:

> [p]ersons considering filing petitions under section 21 of TSCA are . . . encouraged. . . to consult with the Agency prior to filing a petition formally. This will enable petitioners to determine what information the Agency already has on the problem, what action it has taken or is taking, what particular information the Agency may need to make its decision, and what alternatives to Federal regulation may exist.

Pre-filing Petitioners include:

- Climate Protection and Restoration Initiative (CPR Initiative), a non-profit organization
- Climate Science, Awareness and Solutions, Inc. (CSAS), a non-profit organization
- Donn J. Viviani, PhD, President of the Board of Directors of CPR Initiative and a retired U.S. Environmental Protection Agency scientist
- John Birks, PhD, Chief Scientist at 2B Technologies and Professor Emeritus of the University of Colorado
- James E. Hansen, PhD, Director of CSAS and former Director of the NASA Goddard Institute of Space Studies

Petitioners and I look forward to consulting with you. We are setting-aside at least 10 business days for the purpose, before we proceed to file formally.

Please let me know how we might best proceed.

Thank you very much for your assistance.

Sincerely yours,

Dan Galpern
Attorney for Petitioners

Copy to:

Victoria Arroyo, Associate Administrator for Policy, Arroyo.Victoria@epa.gov

Michal Ilana Freedhoff, Assistant Administrator, Office of Chemical Safety and Pollution Prevention Freedhoff.Michal@epa.gov

Joseph Goffman, Principal Deputy Assistant Administrator Performing Delegated Duties of Assistant Administrator, Office of Air and Radiation (OAR), Goffman.Joseph@epa.gov

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PRE-FILING DRAFT ONLY: NOT FOR WIDE DISTRIBUTION

BEFORE THE ENVIRONMENTAL PROTECTION AGENCY

Petition Seeking A Phaseout of New and Removal of Legacy Fossil Fuel Greenhouse Gas Emissions

TO

Michael S Regan, Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460
Regan.Michael@epa.gov

Submitted on Behalf of Petitioners

Climate Protection and Restoration Initiative (CPR Initiative) a non-profit organization,

Climate Science, Awareness and Solutions (CSAS), a non-profit organization,

Donn J. Viviani,

John Birks, and

James E. Hansen

Submitted for pre-filing review on December 23, 2021
by Daniel M. Galpern

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Petition Seeking A Phaseout of New and Removal of Legacy Fossil Fuel Greenhouse Gas Emissions

Part I: Argument

I. EXECUTIVE SUMMARY **3**

II. PETITIONERS **4**

III. ACTION REQUESTED **5**

IV. STATUTORY AUTHORITY **5**

A. PETITION FOR CIVIL ACTION 8

B. PETITION FOR RULEMAKING 9

(i) Mandatory duty to take action upon a determination *9*

(ii) Evaluation of risk *9*

(iii) Immediate Effect and Unreviewability of Proposed Rule *10*

C. AGENCY ACTION 10

(i) Agency action under TSCA *10*

(ii) Agency Action under other authority *11*

Independent Offices Appropriations Act 11

Clean Air Act §§108-110 12

Clean Air Act §115 13

Comprehensive Environmental Response, Compensation and Liability Act 14

(iii) EPA referral to other agencies for exercise of other authority *15*

IV. SUMMARY OF ARGUMENT **15**

V. PROCEDURAL HISTORY, AND PETITIONERS' BURDEN **16**

A. STREAM OF COMMERCE 17

B. RISK ASSESSMENT 18

VI. CONCLUSION **23**

I. EXECUTIVE SUMMARY

Petitioners are two nonprofit education and advocacy groups, and three scientists. They petition here for action by the federal Environmental Protection Agency ("the Agency") to eliminate the imminent and unreasonable risk of serious or widespread injury to health or the environment stemming from additional and legacy fossil fuel GHG emissions.

The Agency's authority and obligation to undertake the work demanded by petitioners stems from the Toxic Substances Control Act (TSCA, or "the Act").[1] Timely Agency action under the Act also would uphold the nation's obligation under international law, as articulated in the US government's recent Nationally Determined Contribution (NDC) submission to the United Nations Framework Convention on Climate Change (UNFCCC), namely to reduce net US greenhouse gas (GHG) emissions 50-52 percent below 2005 levels, by 2030, and to achieve "100 percent carbon pollution-free electricity" by 2035.[2]

Petitioners agree with the President that present and anticipated impacts from global warming and ocean acidification pose an "existential threat,"[3] and petition here for action to ensure that the atmospheric and oceanic concentrations of relevant GHGs no longer present imminent and widespread risks of serious or widespread injury to health or the environment. In the judgment of Petitioners, this at minimum requires a reduction of atmospheric CO_2 to a concentration below 350 ppm, and a corresponding reduction in the global centration of methane.

The instant petition is based on one central factual predicate and two legal suppositions. As to the first, Petitioners aver that the atmospheric concentrations of key greenhouse gases, including carbon dioxide (CO_2) and methane (CH_4), are already in the danger zone and must be dialed back to eliminate their unlawful imposition. As to the second, under the TSCA the Agency is authorized, upon certain determinations, to take actions to (i) require the phase-out of new emissions and (ii) compel the removal of legacy fossil fuel GHG emissions.

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[1] 15 U.S.C.A. §§ 2601 to 2697, as amended by 130 Stat. 448 (June 22, 2016) (the "Frank R. Lautenberg Chemical Safety for the 21st Century Act").

[2] *The United States of America Nationally Determined Contribution: Reducing Greenhouse Gases in the United States: A 2030 Emissions Target*, submitted pursuant to Article 4 of the Paris Agreement to the United Nations Framework Convention on Climate Change, April 21, 2021, at pages 3 and 6. Available at: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20States%20of%20America%20First/United%20States%20NDC%20April%2021%202021%20Final.pdf.

[3] Fact Sheet, *President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies*, The White House, April 22, 2021. Available at https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/.

II. PETITIONERS

Petitioners are Climate Protection and Restoration Initiative (CPR Initiative), Climate Science, Awareness and Solutions, Inc. (CSAS), Dr. Donn J. Viviani, Dr. John Birks, and Dr. James E. Hansen.

CPR Initiative is a public interest non-profit organization with headquarters in Eugene, Oregon.

CSAS, is a public interest non-profit organization with headquarters in New York, NY.

Donn J. Viviani, PhD, is a retired U.S. Environmental Protection Agency scientist. He was the Director of EPA's Climate Policy Assessment Division in the Office of Policy, Economics and Innovation; served as Chairman of the Great Lakes Water Quality Board's Toxic Substances Committee; and served as a member of the Science Coordinating Committee for the International Joint Commission for the Great Lakes. Dr. Viviani serves as Board President of the Climate Protection and Restoration Initiative.

John Birks, PhD, is Chief Scientist at 2B Technologies, a company he co-founded in 1998 that develops and manufactures new products for air quality measurements. He is Professor Emeritus of the University of Colorado where he and his graduate students carried out research in atmospheric chemistry for 25 years. He is best known for his work in quantifying the rates of chemical reactions that cause the Antarctic Ozone Hole, his co-development of the "nuclear winter" theory with Paul Crutzen in 1982, and the development of miniaturized instruments for air pollution measurements. His current research is focused on the use of low-cost sensors for mobile monitoring of air pollutants in cities, an outgrowth of the AQTreks educational outreach programs his company implemented in several hundred schools around the US. Dr. Birks also serves on the CPR Initiative Board of Directors.

James E. Hansen, PhD, is the former Director of the NASA Goddard Institute of Space Studies. He is the author of the books *Storms of My Grandchildren* and the forthcoming *Sophie's Planet*, and the principal author or co-author of numerous papers on the subject of climate change and Earth's energy imbalance. Dr. Hansen serves as Director of Climate Science, Awareness and Solutions, a program of the Earth Institute, Columbia University, New York, New York, and also as Director of the non-profit organization CSAS. Dr. Hansen also serves on the CPR Initiative Board of Advisors.

Petitioners are represented by attorney Dan Galpern, to whom inquires for further information should be addressed: Law Office of Daniel M. Galpern, 2495 Hilyard Street, Ste. A, Eugene Oregon 97405. (541) 968-7164. dan.galpern@gmail.com.

III. ACTION REQUESTED

This petition is brought pursuant to the First Amendment of the US Constitution, the Administrative Procedure Act (5 U.S.C. §553(e)), and Section 21 of the Toxic Substances Control Act (TSCA), 15 USC §2620.[4] By it, the undersigned request Agency action to eliminate the imminent and unreasonable risk of serious or widespread injury to health or the environment caused by the ongoing disruption of the climate system by fossil fuel GHG emissions.

Accordingly, the undersigned here petition the Administrator for action under Sections 6 (regulatory restrictions), 7 (Imminent Hazards), and 9 (Utilization of Other Law) of the Toxic Substances Control Act, 15 USC §§ 2605, 2606, and 2608 respectively, in order, at minimum, to compel manufacturers (including producers and importers) of fossil fuels to:

(i) phaseout their production, importation, distribution, use and disposal of fossil fuels, as required to ensure the phaseout of associated greenhouse emissions from the intended use of oil, gas and coal, and

(ii) verifiably remove and securely sequester from the environment excess atmospheric greenhouse gases including, at minimum, surfeit atmospheric carbon dioxide (CO_2) and methane (CH_4) or, in the alternative, to pay into an atmospheric carbon abatement fund that EPA shall establish, in an amount sufficient to ensure, with adequate verification, that such removal and secure sequestration will be timely accomplished.

IV. STATUTORY AUTHORITY

In 1992, in the United Nations Framework Convention on Climate Change ("UNFCC" or "the Convention") the United States, along with, eventually, 196 other parties,[5] based on the concern that increasing GHG concentrations will result in "additional warming of the Earth's surface and atmosphere" and "adversely affect natural ecosystems and humankind," committed itself "to achieve. . . stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."[6]

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[4] Any person may petition the Administrator to initiate a proceeding for the issuance, amendment, or repeal of a rule under section 2603, 2605, or 2607 of this title or an order under section 2603 or 2604(e) or (f) of this title. 15 US Code 2020.

[5] In total there are 197 signatories, comprised of 196 nations and one regional economic integration organization (the European Union). *See* https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=IND&mtdsg_no=XXVII-7&chapter=27&Temp=mtdsg3&clang=_en.

[6] UNFCCC Article 2. The full text is available, in English and five other languages, at https://unfccc.int/process-and-meetings/the-convention/status-of-ratification/status-of-ratification-of-the-convention.

In particular, by its signing of the Convention, the United States assumed the obligation to take "precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects,"[7] particularly "threats of serious or irreversible damage," including by "limiting its anthropogenic emissions of greenhouse gases."[8] To secure the Convention's fundamental objectives, in 2015 the US (along with virtually every other nation) signed onto the Paris Agreement to the UNFCCC. We thereby committed to action that would hold "the increase in the global average temperature *to well below* 2°C above pre-industrial levels" and to "efforts to limit the temperature increase to 1.5°C above pre-industrial levels."[9] President Biden's 2021 filing under the Paris Agreement process,[10] then committed the US to achieve an "economy-wide target" for net greenhouse gas emissions of "50-52 percent below 2005 levels in 2030." That US Nationally Determined Commitment also announced a US "goal to reach 100 percent carbon pollution-free electricity by 2035."[11]

The present petition is in furtherance of these international commitments, yet it is based squarely on existing federal law. In particular, Petitioners aim to establish a firm foundation for an effective US decarbonization program. That firm foundation may be constructed pursuant to the clear terms of the Toxic Substances Control Act (TSCA), as amended in 2016, along with related statutes administered in whole or in part by the federal Environmental Protection Agency. On the basis of their review of the relevant science (*see* Part II of the instant petition) Petitioners aver that there is simply no question that additional and legacy fossil fuel GHG emissions present an imminent and unreasonable risk of serious or widespread injury to health or the environment, as must be addressed by the Agency under TSCA.

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[7] UNFCCC Article 3.3.

[8] UNFCCC Article 4.2

[9] Paris Agreement Article 2(1)(a). The full text of the Agreement is available, in English and five other languages, at https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement. In Article 4.1 of the Agreement, nations must reach global peak GHG emissions "as soon as possible," and "undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century."

[10] The United States of America Nationally Determined Contribution Reducing Greenhouse Gases in the United States: A 2030 Emissions Target (filed April 20, 2021), available at https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20States%20of%20America%20First/United%20States%20NDC%20April%2021%202021%20Final.pdf,

[11] *See also* https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/.

Congress enacted the Toxic Substances Control Act in 1976 in recognition that certain chemical substances impose serious risks to health or the environment but are not "single media" problems, and thus require a holistic approach to mitigation and control.[12] In particular, Congress aimed to ensure that the federal Environmental Protection Agency retained "adequate authority to regulate chemical substances . . . which present an unreasonable risk of injury to health or the environment." TSCA §2; 15 USC §2601(b)(2).

Under the Act, "chemical substances" include those with a particular molecular identity, whether occurring in nature or as the result of a chemical reaction. TSCA §3; 15 USC §2602(2). The greenhouse gases CO_2 and CH_4, as well as nitrous oxide (N_2O) and certain fluorinated gases, fit squarely within that definition of chemical substances.[13]

TSCA conveys express authority to the Agency to action where it determines that "the manufacture, processing, distribution in commerce, use or disposal of a chemical substance or mixture, or that any combination of such activities, presents "an unreasonable risk of injury to health or the environment," TSCA §6, or an "imminent and unreasonable risk of serious or widespread injury to health or the environment." TSCA §7. Fossil fuel GHG emissions manifestly present just such imminent and unreasonable risks. Accordingly, the statute, without question, is directly on point.

That GHG emissions present an unreasonable risk of widespread injury to health or the environment has been exhaustively established in credible reports and documents available to the Agency, including many adopted by the Agency or the US Government itself. Petitioners here nonetheless present evidence to support the determinations they request, albeit with the stipulation that the Agency should also credit information available to it, where warranted by their merits, of relevant GHG risks that Petitioners, for reasons of manageability and brevity, do not expressly address nor, by reference, incorporate.

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[12] David Markell, An Overview of TSCA, Its History and Key Underlying Assumptions, and Its Place in Environmental Regulation, 32 WASH. U. J. L. & POL'Y333 (2010), at https://openscholarship.wustl.edu/law_journal_law_policy/vol32/iss1/11/.

[13] *See* US EPA, **Overview of Greenhouse Gases**, available Aug. 5, 2021 at www.epa.gov/ghgemissions/overview-greenhouse-gases.

A. Petition for Civil Action

Pursuant to TSCA §7, 15 USC §2606, the Administrator is authorized to commence a civil action against producers of oil, gas and coal wherein the production and intended use of these fuels release imminently hazardous chemical substances into the environment. 15 USC §2606(a)(1)(B). CO_2, CH_4 and other GHGs are fit subjects for such action since they "present an imminent and unreasonable risk of serious or widespread injury to health or the environment, without consideration of costs or other nonrisk factors." 15 USC §2606 (f).

Where presented with such an action, the court will retain authority to "grant such temporary or permanent relief as may be necessary to protect health or the environment from the unreasonable risk" associated with the manufacture, processing, distribution, use or disposal of fossil fuels and their associated greenhouse gas emissions. 15 USC §2606 (b)(1). Seizure of the oil, gas and coal -- as articles containing the imminently hazardous GHGs – is also within the court's authority. 15 USC 2606(a)(1)(A).

EPA's authority to commence such a civil action to phase out production, release and disposal of imminently hazardous substances is not affected by any prior determination under TSCA Section 6, 15 USC §2605. 15 USC §2606 (a((1)(C).

Upon its filing of a civil action for relief against the imminent and unreasonable risk of serious or widespread injury presented by legacy, current, and otherwise-anticipated greenhouse gas emissions, or "as soon thereafter as may be practicable," the Administrator is required to "initiate a proceeding for the promulgation of a rule" pursuant to 15 USC §2605. 15 USC §2606 (a((1)(C).[14]

Petitioners here request that the Agency commence a civil action to seek temporary and permanent relief, as necessary, to protect public health and the environment from the unreasonable risk associated with the manufacture, processing, distribution, use and disposal of fossil fuels and their associated greenhouse gas emissions.

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[14] In addition, upon the commencement of such civil action against fossil fuel producers, the release of the GHG emissions associated with intended use of fossil fuels, with the possible exclusion of the release or emission of CH_4, become cognizable hazardous substances under the Comprehensive Environmental Response, Compensation and Liability Act (CERLA), 42 USC 9601 (14), with responsible parties then subject to such orders and actions as the President may take "as may be necessary to protect public health and welfare and the environment." 42 USC 9606(a); 42 USC 9601 (22)("release" means "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment," albeit with certain exclusions).

B. Petition for Rulemaking

Irrespective of any such EPA civil action and consequential Agency initiation of rulemaking, as discussed *supra*, Petitioners are entitled, where fossil fuel emissions impose an "unreasonable risk to health and the environment," to petition the Administrator, pursuant to TSCA §21, 15 USC §2620, for a rule, pursuant to TSCA §6, 15 USC §2605, to render the unreasonable risk determination and then for action to constrain and eliminate that risk.

(i) Mandatory duty to take action upon a determination

Pursuant to TSCA §6, 15 USC §2605, where the Administrator determines that "the manufacture, processing, distribution in commerce, use, or disposal of a chemical substance . . . presents an unreasonable risk of injury to health or the environment, the Administrator *shall* by rule" (emphasis added) impose requirements, as necessary, so that the chemical substance "no longer presents such risk."

As employed in the above two paragraphs and herein, the statutory term "manufacture" includes within its meaning "import" and "produce." 15 USC § 2602(9). The term "manufacturer" in this petition therefore includes producers and importers.[15] As also employed there and herein, the statutory term "environment" includes "water, air, and land and the interrelationship which exists among water, air, and land and all living things." 15 USC § 2602(6).

(ii) Evaluation of risk

As indicated, *supra*, the Administrator, in determining whether the production, distribution, use or disposal of a chemical substance "presents an unreasonable risk of injury to health or the environment," must evaluate that risk "without consideration of costs or other nonrisk factors. . . ." 15 USC 2605(a) and 2605(b)(4)(A).

Following that determination, however, the Agency "shall propose" a rule, 15 §2605(c)(1)(A), that considers the effects of such substance on health and the environment, and that considers "the reasonably ascertainable economic consequences of the rule" including, again, impacts on public health and the environment, as well as impacts on the national economy, small business, and technological innovation. 15 §2605(c)(2).

These considerations may be factored in by the Administrator "[i]n selecting among prohibitions and other requirements" for a final rule, §2605 (c)(2)(B), including in evaluating prohibitions or restrictions of use, in assessing whether there are preferable feasible alternatives, and "in setting an appropriate transition period for such action." §2605 (c)(2)(C).

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[15] For completeness, here, we note as well that the term "commerce" includes within its meaning "trade, traffic, transportation." 15 USC § 2602(3).

(iii) Immediate Effect and Unreviewability of Proposed Rule

The Administrator is authorized to declare a proposed rule effective upon publication in the Federal Register where necessary to protect the public interest from a chemical substance whose production, distribution, use, or disposal imposes an unreasonable risk of serious or widespread injury to health or the environment and where, pursuant to 15 USC §2606, a court has granted relief. In this circumstance, the proposed but effective rule will not be considered final agency action for purposes of judicial review. 15 USC §2605(d)(3)(A).

c. Agency Action

If the Agency determines that the risk to health or the environment from past, present and future fossil fuel GHG emissions "could be eliminated or reduced to a sufficient extent" by EPA action *under other statutory authority*, then EPA *must* utilize such other authority. 15 USC §2608(b). On the other hand, if it is in the public interest to take action under TSCA *rather* than under those other authorities, then Agency action under TSCA *must* be undertaken. *Id.*

Where, as pertains here, eliminating the risk to health or the environment to a "sufficient extent" requires action under both such "other statutory authority" and under TSCA, then the Agency should so proceed.

(i) Agency action under TSCA

Pursuant to TSCA, the Agency is able to impose a range of requirements including:

- "prohibiting or otherwise restricting the manufacturing, processing, or distribution in commerce of such substance." 15 USC §2605 (a)(1), and
- prohibiting or otherwise regulating any manner or method of disposal of such substance. 15 USC §2605(a)(6) and 15 USC §2606.[16]

EPA is also able to require manufacturers or processors "to give notice . . . to distributors in commerce" that the agency has determined that fossil fuel GHG emissions present an unreasonable risk of injury to health and the environment." 15 USC 2605(a)(7). As well, under the same subsection of TSCA, EPA can mandate that manufacturers or processors give notice to the public of such determination. *Id.*

[16] Under TSCA, the Agency is also able to prohibit, restrict or limit the production or distribution of a substance for a particular use; limit the volume or concentration of the chemical produced; prohibit or regulate the manner or method of commercial use; require warning labels and/or instructions on containers or products; require record-keeping by producers; and require replacement or repurchase of products already distributed.

(ii) Agency Action under other authority

In general, TSCA commands the Agency to "coordinate actions" taken under TSCA "with actions taken under other Federal laws" that it administers. Petitioners here list several such statutory provisions outside of TSCA about which rulemaking by the Agency would substantially complement efforts under TSCA to eliminate or substantially reduce the substantial risk of injury to health and the environment presented by new and legacy fossil fuel GHG emissions.

Petitioners caution, however, that the present listing is partial, and they reserve the right to supplement as the instant rulemaking proceeds.

Independent Offices Appropriations Act

Under this statute, 31 U.S.C. §9701 (as amended in 1982), EPA or any other federal Agency is authorized to impose "a charge" for "a thing of value" that is provided to any person.[17] This may include "a charge for using the public's air to dispose of carbon dioxide and other wastes," as one former EPA General Counsel has put it.[18] Such a user fee may be based not only on "the costs to the Government," but also the "value of the service or thing to the recipient," the "public policy or interest served" and "other relevant facts." 31 U.S.C. §9701. The full cost to the government component of the user fee should include "all direct and indirect costs."[19] Imposition of a meaningful and rising fee on oil, gas and coal would induce utilities and consumers to switch to carbon-free energy.[20] The International Monetary Fund advises that a

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[17] The term "person" must be read to include the term "corporation." Historical and revision note, US Code, 31 USC §9701 ("The words "(including groups, associations, organizations, partnerships, corporations, or businesses)" are omitted as being included in 'person'," in the statute). See: https://uscode.house.gov/view.xhtml?req=(title:31%20section:9701%20edition:prelim)#sourcecredit.

[18] E. Donald Elliott, *EPA's Existing Authority to Impose a Carbon "Tax,"* 49 ELR 10919 (2019), available at https://www.eli.org/sites/default/files/docs/49.10919.pdf.

[19] OMB Circular No. A-25 at §6(d). Available at https://www.whitehouse.gov/omb/information-for-agencies/circulars/. It may also be based on the "market price" for the resource where "based on competition in open markets."

[20] J. Hansen and D. Galpern, *President Biden Should Impose a Carbon Fee Immediately*, Boston Globe (June 1, 2021), available at https://cprclimate.org/biden-should-impose-a-carbon-fee-immediately/. *See also* Petition to the President at https://cprclimate.org/take-action/.

carbon price may need to rise to at least $75 per ton of CO_2 emissions to induce such meaningful action as is required under the Paris Agreement limits.[21, 22]

Petitioners note that a rising carbon fee in itself would not *directly* prohibit or restrict "the manufacturing, processing, or distribution in commerce, use or disposal" of the fossil fuel GHG emissions, as may be contemplated by Agency action taken pursuant to TSCA, 15 USC 2605(a). However, a rising user fee will at least partly compensate the government (and the public) for the period of time in which EPA continues to a special benefit to fossil fuel producers by its forbearance – that is, the Agency's decision not to immediately exercise its authority to prohibit fossil fuel GHG emissions. During that period of forbearance, the user fee will, if substantial and growing, function in fact to constrain emissions as producers and consumers attend to minimize costs.

Accordingly, Petitioners urge that EPA commence a parallel rule-making to impose a rising fee on the manufacturing, distribution, use and disposal of oil, gas and coal, on the basis of foreseeable GHG emissions, and to align that rule if warranted with the one in development with respect to the instant petition.

Clean Air Act §§108-110

Pursuant to the Clean Air Act, EPA's Administrator is required to periodically revise ambient air quality standards for air pollutants the "emissions of which, in his (sic) judgement, cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare." 42 USC 7408(a)(1). The Agency must then issue air quality criteria, 42 USC 7408(a)(1), and publish national ambient air quality standards (NAAQS) for such pollutants, 42 USC 7408, which standards are then enforced largely through state implementation plans, 42 USC §7410, and via citizen suits. 42 USC §7604.

The materials in Part II of this petition, in conjunction with other material already within the grip of the Agency, more than amply demonstrate that fossil fuel GHG emissions "cause or

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[21] In order to ensure that low and moderate-income families are not disadvantaged by fossil fuel companies that pass on their user fees in the form of increased fuel prices, user fee revenues might be returned to consumers as lump-sum rebates on a roughly per capita basis. Such a scheme would more than offset the higher price burden for low and moderate-income taxpayers. Ian Parry, *Putting a Price on Pollution*, International Monetary Fund (Dec. 2019) available at https://www.imf.org/external/pubs/ft/fandd/2019/12/the-case-for-carbon-taxation-and-putting-a-price-on-pollution-parry.htm.

[22] Rosenberg et. al, "Distributional Implications of A Carbon Tax," Columbia Center on Global Energy Policy (2018), available at https://www.energypolicy.columbia.edu/sites/default/files/pictures/CGEP_Distributional_Implications_CarbonTax.pdf.

contribute to air pollution which may reasonably be anticipated to endanger public health or welfare."

In 2009 the citizen groups 350.org and Center for Biological Diversity petitioned the Agency for a rulemaking to develop a NAAQS for GHG emissions.[23] On the last day of the Trump Administration, EPA rejected that petition, but the Biden Administration is taking another look. For reasons well outlined in a recent article by Eric Laschever,[24] whose reasoning we incorporate by reference here, **Petitioners urge that EPA grant the 350/ CBD petition and commence a parallel rule-making to develop air quality standards for CO_2, CH_4 and other GHGs and to align that rule if warranted with the one in development with respect to the instant petition.**

Clean Air Act §115

Fossil fuel GHG emissions readily mix in the atmosphere, and the ensuing impacts from such emissions stemming from US sources perforce affect every nation. The Clean Air Act anticipated the possibility that such US emissions might impact other nations and that, just as we would wish to have a say in "foreign" emissions that impact the US, the interests of other nations should matter in the formation of US air pollution regulatory policy. Accordingly, in §115 of the Clean Air Act, Congress provided that upon its receipt of information that sources of air pollution in the US cause or contribute to pollution that endangers the health or welfare of a foreign jurisdiction, the Agency then needs to compel states to amend their implementation plans "to prevent or eliminate the endangerment." 42 USC §7415(b).

The materials in Part II of this petition, in conjunction with other material already with the Agency, more than amply demonstrate that fossil fuel GHG emissions from within the United States "cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare in a foreign country."

In 2013, the New York University School of Law's Center for Public Integrity petitioned the EPA for rulemaking to limit such US-based GHG emissions that endanger public health and

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[23] *Petition to Establish National Pollution Limits for Greenhouse Gases Pursuant to the Clean Air Act* (Dec. 2, 2009), http://www.biologicaldiversity.org/programs/climate_law_institute/global_warming_litigation/clean_air_act/pdfs/Petition_GHG_pollution_cap_12-2-2009.pdf.

[24] Environmental Law Institute, *Rebutting Administrator Wheeler's Denial Of A Naaqs For Greenhouse Gases* (2021) available at https://www.eli.org/sites/default/files/files-pdf/51.10923.pdf.

welfare in foreign nations.[25] **Petitioners here urge EPA to grant the Center's petition so as to commence a parallel rule-making pursuant CAA §115, and to align that rule if warranted with the one in development with respect to the instant petition.**

Comprehensive Environmental Response, Compensation and Liability Act

As was discussed *supra*, pursuant to TSCA §7, 15 USC §2606(a), the Administrator is authorized to commence a civil action against producers of oil, gas and coal wherein their manufacture, processing, distribution, use or disposal presents an "an imminent and unreasonable risk of serious or widespread injury to health or the environment, without consideration of costs or other nonrisk factors." *Id.* and 15 USC §2606(f)(definition of "imminently hazardous chemical substance or mixture"). The release of the GHG emissions associated with intended use of such fossil fuels, with the possible exclusion of the release or emission of CH_4, become cognizable hazardous substances under the Comprehensive Environmental Response, Compensation and Liability Act (CERLA), 42 USC 9601 (14), with responsible parties then subject to such orders and actions as the President may take "as may be necessary to protect public health and welfare and the environment." 42 USC 9606(a); 42 USC 9601 (22)("release" means "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment," albeit with certain exclusions).

Independently of TSCA §7, however, the Agency is obligated, pursuant to CERLA §101, 42 USC §9602(a), "to promulgate and revise as may be appropriate regulations designating as hazardous substances . . . such elements, compounds, mixtures, solutions, and substances which, when released into the environment may present substantial danger to the public health or welfare or the environment."

The materials in Part II of this petition, in conjunction with other material already with the Agency, more than amply demonstrate that fossil fuel GHG emissions "may present substantial danger to the public health or welfare or the environment.

Petitioners here urge EPA to promulgate a rule establishing the fossil fuel GHG emissions are hazardous substances under CERCLA in that they when released into the environment they may present substantial danger to the public health or welfare or the environment.

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[25] Institute for Policy Integrity, *Petition for Rulemakings and Call for Information under Section 115, Title VI, Section 111, and Title II of the Clean Air Act to Regulate Greenhouse Gas Emissions* (Feb. 19, 2013) available at https://www.epa.gov/sites/default/files/documents/policy_integrity_omnibus_ghg_petition_under_caa.pdf.

On the basis of the scientific and economic considerations they outline in Part II, *infra*, as well as that which they may later adduce, Petitioners here requisition the Administrator to initiate rulemaking in two phases: (1) for the Agency's determination that fossil fuel GHG emissions present an unreasonable risk to health and the environment, and (2) for the development of a comprehensive set of actions under TSCA or other law administered by the Agency aimed to both (a) phase out, as is feasible and over time, the lion's share of the production, manufacture, processing, and distribution in commerce of fossil fuels and the GHG emissions stemming from their intended use, and (b) to restrict the extent and length of the disposal in the atmosphere and oceans by compelling the timely removal of legacy GHG emissions.

(iii) EPA referral to other agencies for exercise of other authority

If the Administrator determines that action under federal law not administered by EPA *may be sufficient* to eliminate the risk to health and the environment presented by the manufacture, processing, distribution, use or disposal of fossil fuel greenhouse gases, the Administrator *must* inform such other agency or agencies by report that "describes such risk and includes . . .a specification of the activity or combination of activities that the Administrator has reason to believe so presents such a risk." 15 USC § 2608(a). Petitioners aver that there is no reason to think that the authorities administered by other agencies may be sufficient in this regard. Nothing in TSCA, however, precludes the Administrator from so informing any other agency, by report, wherein the control of such activities as they regulate are *necessary, even if insufficient*, to eliminate the risk, **and Petitioners here request that the Agency so inform such agencies by such reports where warranted**.

IV. SUMMARY OF ARGUMENT

This Petition summarizes the relevant factual basis for its conclusion that unabated legacy, current, and otherwise-anticipated fossil fuel emissions are imminently hazardous and present an unreasonable risk of injury to health and the environment.

As discussed more fully within its main body, levels of atmospheric greenhouse gas, most importantly CO_2 and CH_4, have climbed well into the danger zone, placing Earth into a state of energy imbalance that is disrupting the climate system – raising ambient temperature; inducing drought and wildfire in some regions and flooding in others; threatening the inundation of coastal cities and communities; altering atmospheric and oceanic circulation, heat transfer and weather patterns; disturbing ocean-based and terrestrial ecosystems; and driving many already-stressed species to extinction.

The still-enlarging maelstrom of climate impacts was anticipated early on by the U.S. fossil fuel industry but, in any event, it derives largely and unequivocally from fossil fuel emissions.

The basic scientific facts were reaffirmed on August 9, 2021 in the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC). Accordingly, we hereby incorporate by reference, unless expressly distinguished, the relevant conclusions provided in the Summary for Policymakers of *Climate Change 2021: The Physical Science*

Basis, Contribution of Working Group I to the IPCC Sixth Assessment Report. *See* Exhibit 1 to the Petition.

Because of their continued accumulation in the atmosphere, fossil fuel GHG emissions now present a more severe threat than in 2007, when the Supreme Court denominated them to impose a risk that is "serious and well recognized." *Mass v. EPA*, 549 U.S. 497, 521, 127 S. Ct. 1438, 1455 (2007). For his part, as denoted *supra*, President Biden has recognized that the risk these chemicals impose on our nation and the planet is of an "existential" order.

In light of their grievance that legacy, current, and otherwise-anticipated fossil fuel emissions present an imminent and unreasonable risk of serious or widespread injury to health or the environment, Petitioners herein request that the Agency commence a civil action to compel fossil fuel manufactures to timely phase out their production or importation of oil, gas and coal, so as to ensure the phase out of associated greenhouse gas emissions, including from their intended use.

Further in light of those grievances, Petitioners here petition the Administrator for a rulemaking aimed to phase out over time and on a practical schedule the production, manufacture, processing, and distribution in commerce of fossil fuels where substitutes either are, or reasonably can be, made available, so as to phase out the greenhouse gas emissions stemming from their production and intended use, and compel removal of fossil fuel legacy emissions to as to restore and protect the climate system. The actions sought by Petitioners, that is, to phaseout and remove legacy, ongoing, and anticipated fossil fuel greenhouse gas emissions, must continue at least to the point that their atmospheric concentration no longer presents an unreasonable risk of injury to health or the environment.

V. Procedural History, and Petitioners' Burden

This section addresses both TSCA Section 21 requirements and EPA's earlier rejection of a petition by Donn Viviani, one of the current group of Petitioners.[26] The earlier Viviani petition asked the Agency to regulate an aspect of the ocean problem, i.e., ocean acidification caused by CO_2, whereas the current petition seeks the Agency's action with respect to all fossil fuel emissions, and particularly CO_2 and CH_4, for their impact on health and the environment – of which impacts to the ocean comprise one important aspect.

EPA's rejection of the earlier Petition was predicated on the supposition that CO_2 is a mere by-product of industrial activity that does not move in the stream of commerce, that the earlier petition did not provide a coherent regulatory path with its own risk assessment, and that

[26] https://www.epa.gov/sites/production/files/2015-09/documents/co2_tsca_21_petition_response_pre-pub_2015-09-25.pdf. See also: https://www.epa.gov/assessing-and-managing-chemicals-under-tsca

the earlier petition did not prove unreasonable risk.[27] The Agency's own guidance for section 21 petitions[28] does not support the imposition of that burden on petitioners to[29] (*vide infra*) but, in any event, Petitioners here provide more than a sufficient basis for the determination that the manufacture, processing, distribution in commerce, use, or disposal of CO_2 and CH_4 presents an unreasonable risk of injury to health or the environment,

A. Stream of Commerce

The notion that CO_2 can't be both a substance that moves in the stream of commerce and a byproduct of global industrial activity is flatly erroneous.

Fossil fuels are produced and distributed in the stream of commerce in light of their CO_2 production potential. CO_2 is therefore not an inadvertent byproduct, but rather the chemical product deriving from the intended utilization of fossil fuels products. Energy released from its combustion materializes only when its carbon-oxygen double bonds are formed. It is therefore in the instant that CO_2 is formed that the energy deriving from the formation of its double bonds can be captured. After that occurs, the residual CO_2 is either emitted to the atmosphere, there to undermine the prospect of continued human survival, or else recaptured for re-use in the stream of commerce – including for enhanced oil recovery, sustainable fuel generation, other commercial ventures – and for carbon capture and sequestration efforts that aim to satisfy state or federal or international regulatory goals and requirements that increasingly condition the market for fossil fuels.

Petitioners note, as well, that CO_2 is the product that drives the pistons in an internal combustion engine. The pistons are moved only when the carbon in the fuel (gasoline, diesel, or natural gas) is combined with oxygen to form CO_2 – thereby increasing the number of moles of gas and thus the pressure in the pistons, and thus powering the engine to do the required work. In addition, the heat released from forming the carbon-oxygen double bonds expand all the other gases (principally, the N_2) in the piston as well. Again, the CO_2 may then be discarded as (increasingly dangerous) exhaust – but only after it has been employed to power the internal combustion engine.

Petitioners, moreover, challenge the notions that TSCA reaches only chemical substances that are "in commerce" or present no global scale challenge. PCB-contaminated rags and sewage sludge for example, are the subject of TSCA rules, yet neither chemical or mixture is in

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[27]Although not required under section 2620, we have included a more robust discussion of both the risk/economic costs and benefits, regulatory path/ options in this petition, as well.

[28] https://www.complywithtsca.com/tscaonline/pdfs/vol5/sectionV/chapterB/ChBdoc2.pdf Also 50 FR 46825

[29] Policy Letter 11–01, Performance of Inherently Governmental and Critical Functions Office of Management and Budget.

commerce – at least not to the extent of CO_2. And as to global scale, CFCs and dioxin were properly regulated at one time pursuant to TSCA, and were also produced on a global scale. Again, by its terms, TSCA is not constrained to bite-sized problems.

B. Risk assessment

EPA has previously granted, in part, a TSCA Section 21 petition asking that formaldehyde be regulated.[30] That petition did not contain its own risk assessment sufficient to determine an "unreasonable" risk, but in light of the significant risk identified there EPA "decided to initiate a proceeding to investigate whether and what type of regulatory or other action might be appropriate to protect against risks posed by formaldehyde emitted from pressed wood products."[31]

Other risks that have been considered sufficiently "significant" to regulate under TSCA section 2605 are risks from mixed mono and diamides of an organic acid,[32] Triethanolamine salt of a substituted organic acid,[33] Triethanolamine salt of tricarboxylic acid,[34] and Hexavalent chromium-based water treatment chemicals in cooling systems.[35]

The undersigned note that, at the very least, fossil fuel greenhouse gas emissions impose a risk of injury (not to mention actual injury) to health and the environment that is orders of magnitude greater and more far-reaching than the off-gassing of wood products and the other above-referenced risks. EPA therefore may proceed, at minimum, in no less an expedited fashion to reduce and eliminate the risks from greenhouse gases – unless EPA establishes, in response, that Congress under TSCA sought exclusively to tinker at the margins of public health and environmental risk.

EPA and OMB guidance documents may serve as a guide for determining what is required in a Section 21 petition seeking regulation under TSCA Section 6(a), 15 USC §2606(a) ("unreasonable risk of injury to health or the environment). Irrespective of the merits of the earlier petition, the present petition abundantly meets the requirements of that guidance – as well as the dictates of policy in the public interest.

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[30]July 27, 2016 -- EPA finalized a rule to reduce exposure to formaldehyde vapors from certain wood products produced domestically or imported into the United States. *See* https://www.epa.gov/formaldehyde/formaldehyde-emission-standards-composite-wood-products.

[31] *Id.*

[32] CFR 747.115

[33] 40 CFR 747.195

[34] 40 CFR 747.20

[35] 40 CFR 749.68

The guidance states, relevant here, that: "EPA must find that there is a reasonable basis to conclude that the manufacture, processing, distribution in commerce, use, or disposal of a chemical substance or mixture presents or will present an unreasonable risk of injury to health or the environment. The key findings relating to unreasonable risk must be made both when a new regulation is proposed, and when an existing regulation is amended or repealed. Petitioners should provide data to support these findings and describe how the requested section 6 controls would help resolve the problem." 50 FR 46825 (Nov. 13, 1985).

Importantly, here, Petitioners note that the instant petition asks that rulemaking *be initiated*. It is not Petitioners' burden to prescribe in detail the proposal that EPA should issue in response to its findings. Rather, Petitioners are obliged to provide facts to support the unreasonable risk they urge be found by the Administrator. Upon this petition's submittal, EPA is at an early stage in the rule making process,[36] as discussed below, so that EPA here must decide only the question whether it should grant the petition. Much less information, at this stage, is required than that which is needed to assess the full range of alternatives required for final policy choices. Thus, to be clear, Petitioners seek Agency action in two phases: (1) the risk determination, and then (2) a second proceeding on relief and schedule.

EPA section 21 Guidance states that a Petitioner "is *encouraged*,"[37] to supply information that enables *EPA* to determine the unreasonableness of the risk (emphasis added). Accordingly, the failure in a petition to provide any specific piece or type of information cannot serve as a basis for its rejection – particularly where relevant facts as to substantial risks of injury to health and the environment are also reasonably available to the Agency. The instant petition nonetheless provides robust information on risk, costs and benefit, but anything missing can and must – given the enormity of the manifest risks – be ascertained by the Agency in response to its notice of rulemaking and utilizing its ample information-gathering authority.

This petition provides the type of information that EPA routinely uses in cost/benefit assessments: e.g., quantitative estimates of damages such as economic loss; mortality and morbidity from unmitigated climate change and ocean warming and acidification; cost/ton for carbon sequestration and emission reduction; options for CO_2 emissions reduction and sequestration, CH_4 destruction, etc. Climate benefits are included because OMB guidance[38] for cost/benefit analysis specifically calls for the inclusion of ancillary or co-costs and benefits, as

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[36] EPA's Action Development Process. Guidance for EPA Staff for Developing Quality Actions (Revised 2011).

[37] 50 FR 46825

[38] OMB Circular A-4, 2003. President Biden signed Executive Order 14008 on January 27, 2021, reversing the previous Administration requirement that co-benefits be reported separately; accordingly, EPA is now required to take into account in such a rulemaking all global and domestic benefits and effects from fossil fuel greenhouse gases on health and the environment.

do EPA economic assessment guidelines,[39] and these benefits have been included in prior Agency rules.[40]

As Petitioners noted *supra*, the Agency's determination as to "whether a chemical substance presents an unreasonable risk of injury to health or the environment" must be done "without consideration of costs or other nonrisk factors. . . ." 15 §2605(b)(4)(A). This specification was added by amendments signed into law approximately 9 months after the Agency's denial of the earlier petition on acidification submitted byo Petitioner Viviani.[41] Nonetheless, to assist with the Agency's subsequent consideration of factors, including cost, that are relevant to an appropriate rule, Petitioners here provide facts deriving not only from scientific studies of major risks to health and the environment imposed by fossil fuel GHG emissions, but also information that may aid EPA's evaluation of possible methods of risk reduction, including options for reducing atmospheric concentrations of CO_2 and CH_4 through economic incentives, trading, and regulation.

Again, this petition asks EPA to initiate rule making. Only EPA can make the findings required to promulgate a rule, as the courts have determined,[42] and here, under Section 2606 (imminent hazard) the Agency can initiate, develop, and promulgate a proposed rule that will be effective upon promulgation. Specifically, Petitioners here also request that Agency review of the risk presented by fossil fuel GHG emissions to health and the environment be quickly tiered since it is clear that "some type of action" is required.[43] The risks petitioners describe herein clearly meet the Tier 1 Criterion since a proper Agency response requires not only "top actions" by the Administrator, but also by the Assistant, Associate and Regional Administrators.

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[39] Guidelines for Preparing Economic Analyses National Center for Environmental Economics USEPA, May 2014.

[40] *See* e.g., mercury and air toxics (MATS) regulations.

[41] Frank R. Lautenberg Chemical Safety For The 21st Century Act (June 22, 2016), Sec. (3) amending TSCA §6, adding subsection (b)(Risk evaluations), including (b)(4) of which provides, "(A) IN GENERAL.—The Administrator shall conduct risk evaluations pursuant to this paragraph to determine whether a chemical substance presents an unreasonable risk of injury to health or the environment, without consideration of costs or other nonrisk factors. . . ." Available at https://www.congress.gov/114/plaws/publ182/PLAW-114publ182.pdf.

[42] *Citizens for a Better Environment v. Thomas* No. 85 C 8000 (704 F. Supp. 149, 28 ERC 1841) (N.D. Ill. January 10, 1989) ("Section 2620 was adopted by Congress to allow citizens to prod the EPA into action by petitioning for the initiation of rulemaking procedure which must be carried out under the Administrative Procedures Act (APA)[42] and Section 2603(b)(5) procedures.").

[43] EPA's Action Development Process. Guidance for EPA Staff for Developing Quality Actions (Revised 2011). https://yosemite.epa.gov/sab/sabproduct.nsf/5088B3878A90053E8525788E005EC8D8/$File/adp03-00-11.pdf

Unabated global warming deriving from emissions of CO_2 and CH_4 present not merely significant unreasonable risks,[44] but existential risks. EPA has at its disposal overwhelming material, some cited previously, that these risks are significant, including publications of the Intergovernmental Panel on Climate Change, the US Geologic Survey (USGS),[45] the Government Accountability Service (GAO),[46] the Congressional Budget Office (CBO)[47], the US Council of Economic Advisors,[48] the National Center for Atmospheric Research (NCAR),[49] the National Air and Space Administration (NASA),[50] the National Oceanic and Atmospheric Administration (NOAA)[51] and EPA itself,[52, 53] as recently as this year.[54, 55] These agencies, offices and departments have recognized the significant risks imposed by ongoing and legacy fossil fuel emissions, in light of their effect on the land and marine environment, associated human and natural systems and services, human health and welfare, and the economic security of the United States. That material, in combination with those in Part II of the instant petition, overwhelmingly establishes risk that is significant, unreasonable and imminent.

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[44] "Significant risk" is a necessary condition for triggering rule making under the highest Tier of Action EPA's Action Development Process. *Id.*

[45] USGS Fact Sheet 2012 3058

[46] GAO-14-736 Ocean Acidification 2014

[47] Potential Impacts of Climate Change in the United States, CBO. May 2009.

[48] The Cost of Delaying Action to Stem Climate Change, US Council of Economic Advisors, EOP, 2014

[49] Long, Matthew C., Curtis Deutsch, and Taka Ito. "Finding forced trends in oceanic oxygen." Global Biogeochemical Cycles 30.2 (2016): 381-397.

[50] https://climate.nasa.gov/evidence/ last visited 2/20/21

[51] Ocean Acidification, State of the Science Fact Sheet, March, 2013

[52] https://www.epa.gov/ocean-acidification/effects-ocean-and-coastal-acidification-ecosystems

[53] https://www.epa.gov/ocean-acidification/effects-ocean-and-coastal-acidification-marine-life

[54] https://www.epa.gov/climate-indicators/oceans

[55] https://www.epa.gov/cre/sea-level-rise

C. Global Reach

We respond here briefly here to a potential objection, if only for completeness, namely that because US sources account for a minor share of worldwide emissions, action within the United States under TSCA and related authorities may not suffice to lower atmospheric and oceanic concentrations of greenhouse gases, so that the unreasonable risks of injury to health and the environment stemming from global warming and ocean acidification may not be resolved even by diligent action within the nation.

First, Petitioners entirely concede the specific point and yet it simply fails to tell against the petition. While diligent action within the US *may not be* sufficient, it nonetheless *may be sufficient* – depending on the strength of climate action in other major emitting nations (and that of multi-national corporations).

Second, the Toxic Substances Control Act does not so readily let responsible parties, whether it is the government or manufactures of harmful substances, off the hook. Upon the Agency's determination, as here, that fossil fuels and the GHG emissions stemming from their production, distribution, use, or disposal (or any combination of such activities) "presents an unreasonable risk of injury to health or the environment," 15 USC 2605(a), the Agency must apply one or more requirements to such substance or mixture. That obligation is not relaxed where there is no guarantee of success. Rather, it must be done "to the extent necessary so that the chemical substance or mixure no longer presents such risk." *Id.*

A strong suite of climate actions by the United States, undergirded by TSCA and associated other statutes administered by EPA, may be *necessary*, even if insufficient, to stem the tide. Thus, if other nations in total muster a barely sufficient proportionate response, the continuing failure by the US to phase out new GHG emissions and remove a proportionate share of excess legacy GHG emissions – might *itself* substantially undermine prospects of keeping the present overshoot to a minimum. Importantly, this consideration is independent of Petitioners' earlier observation, also relevant in the full picture, that the US bears the most responsibility of any nation for the present surfeit of atmospheric CO_2.

CONCLUSION

By use, reference, and incorporation of some of the relevant literature, Petitioners herein have established that, while additional research is always useful, sufficient information exists to state with high certainty that there are present, imminent, severe, widespread, and increasing injuries to health and the environment from legacy and continuing fossil fuel GHG emissions. The injuries include emissions-induced energy imbalance, heat waves, wildfire, wildfire smoke, drought, ecosystem degradation, species loss, ocean acidification, ocean deoxygenation, ocean warming, ice melt and sea level rise, marine food-web disruption, and increased disease vector. This listing is partial.

Petitioners therefore request the Administrator to undertake legal action pursuant to TSCA §7, 15 USC §2606 (a), to ensure commencement of a timely phase out and removal of continuing and legacy fossil fuel GHG emissions. Petitioners also therefore request the Administrator to initiate a rulemaking proceeding pursuant to 15 USC §2606 (d).

Moreover, Petitioners here request, in the event that the Administrator does not timely act on their request that the Agency itself initiate a rulemaking, that the Agency grant Petitioners' own §2620 petition requesting the Agency to commence rulemaking under §2605. That proceeding must commence with the Agency's determination that the manufacture, processing, distribution in commerce, use, or disposal, "or any combination of such activities," with respect to legacy, current and anticipated fossil fuel GHG emissions present an unreasonable risk to health or the environment, §2605(a), without consideration of costs or other non-risk factors. §2605(b)(4).

Upon the Agency's determination of unreasonable risk, Petitioners here request that the Agency commence a second phase of rulemaking to determine requirements (a) under TSCA to prohibit or otherwise restrict fossil fuels and their GHG emissions, including with respect to their manufacture, processing, distribution in commerce, use, and disposal, and (b) pursuant to other authority that the Agency administers, including but not limited to the IOAA, the CERCLA, the CAA, and the CWA.

If, on the other hand, the Agency deems that the evidence provided herein (including in Part II) does not support Agency action under TSCA, or related federal authorities, then Petitioners request that the Agency explain why not.

And finally, if, in spite of the evidence, the Agency deems TSCA to be legally inapposite or inadequate to ground strong action under which it will (a) phase out new fossil fuel greenhouse gas emissions, and (b) compel removal, or payment for removal, of legacy fossil fuel GHG emissions, then again, Petitioners request that the Agency explain itself. In detail.

Petition Seeking A Phaseout of New, and Removal of Legacy Fossil Fuel Greenhouse Gas Emissions

Part II: Select Scientific and Economic Considerations

I. EARTH'S ENERGY IMBALANCE 2

II. CO_2 EMISSIONS: SOURCES AND REQUIRED REDUCTIONS TO SECURE SAFETY 5

III. METHANE AND OTHER SHORT-LIVED CLIMATE-FORCING POLLUTANTS 9

IV. UNREASONABLE LAND-BASED RISK: A SHORT SURVEY 13

(A) HEAT, DROUGHT, WILDFIRE 13
(B) SEA-LEVEL RISE 19
(C) EXTREME WEATHER 24
(i) Predicted Changes in Frequencies of High Temperature, Precipitation and Drought 24
(ii) Changes in Frequency and Severity of Tropical Storms 27

V. ADDITIONAL OCEAN-BASED RISKS – A SHORT SURVEY 30

(A) ACIDIFICATION 30
(B) OCEAN WARMING 35
(C) OCEAN DEOXYGENATION 38
(D) WIDESPREAD AND SYNERGISTIC OCEAN RISKS 41
(i) Ocean Warming, Deoxygenation and Acidification's Synergistic Ecosystem Impacts 42
(ii) Additional Ocean Impacts 48

VI. RISK REDUCTION METHODS 49

VII. EMISSION REDUCTION AND SEQUESTRATION 57

VIII. RISK REDUCTION COSTS AND BENEFITS 60

(A) SOCIOECONOMIC COSTS, AND BENEFITS 61
(i) US economic risks from unabated climate change 61
(II) A CLOSER LOOK AT OCEAN-BASED ECONOMIC RISKS FROM UNABATED CLIMATE CHANGE 64
a. Sea-level rise economic risks 64
b. Acidification-based economic risks 67
(III) A CLOSER LOOK AT ECONOMIC RISKS OF CLIMATE EXTREMES 70
(IV) ACCOUNTING FOR CLIMATE ACTION CO-BENEFITS 72

I. Earth's Energy Imbalance

Humanity's reliance on fossil fuels to meet fundamental energy needs is imposing an increasing threat to human and natural systems, in large part because of the energy imbalance that fossil fuel emissions have imposed on our planet. More emissions only amplify that imbalance and will press human and natural systems further toward the breaking point, and soon beyond. Accordingly, we must restore nature's energy balance and allow Earth to cool back to a temperature no warmer than the mid-twentieth century.

The implication with respect to the object of this petition is clear: Fossil fuel GHG emissions, particularly CO_2 and CH_4, have induced an energy imbalance that itself presents a current and unreasonable risk of serious and widespread injury to health and the environment, along with an imminent risk of far worse still to come.

Earth has gained substantial energy over the past 4 decades. In a careful international effort, von Schuckmann *et al.* (in a research group that included Petitioner Hansen) was able to calculate that approximately 90 percent of the excess energy is taken up by the ocean – due to its large mass and high heat capacity, with the balance expended in melting ice (3-4%) and stored in the land (5-6%) and in the atmosphere (1-2%)."[1]

Figure 1 below depicts Earth's energy imbalance, a function of more energy arriving by way of solar radiation than escapes back to space from the top of our atmosphere.

[1] Von Schuckmann, *et al.*, *Heat stored in the Earth system: where does the energy go?*, Earth Syst. Sci. Data (September 7, 2020) at https://essd.copernicus.org/articles/12/2013/2020/.

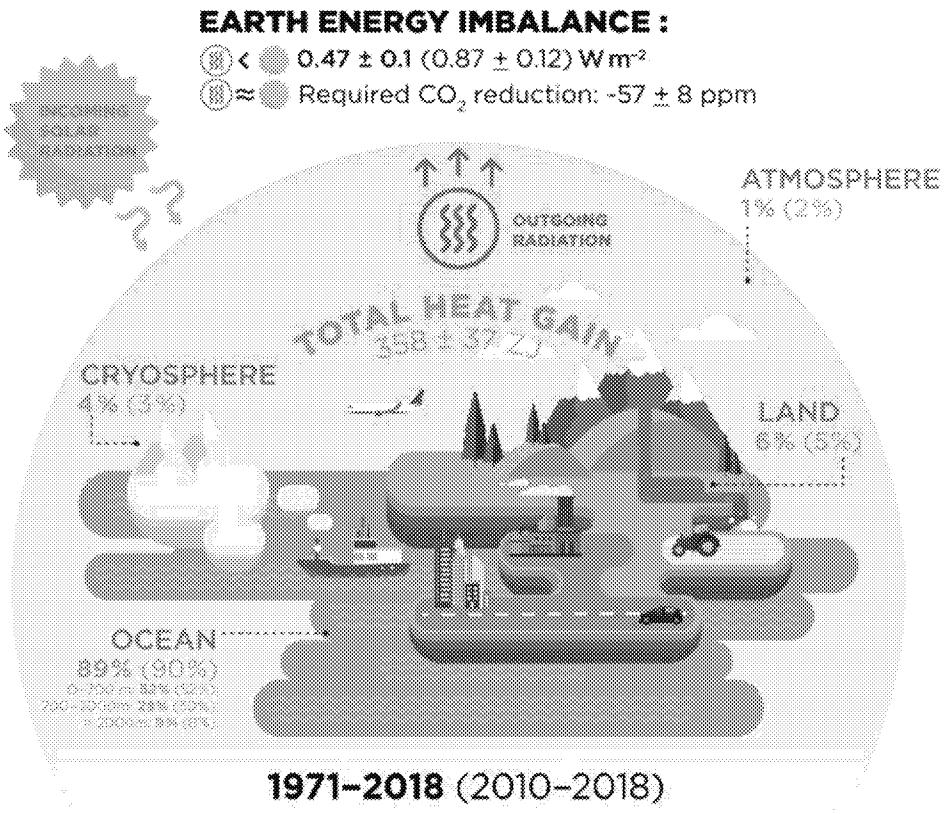

Fig. 1. Schematic presentation of Earth's heat inventory for the current human-caused energy imbalance. Graphic from von Schuckman *et al.*

The image indicates that to restore energy balance we must reduce the atmospheric concentration of CO_2 from 410 ppm to 353 ppm or less. That maximum safe GHG concentration point affirms the conclusion of an earlier study, from 2008, that Petitioner Hansen headed: *Target atmospheric CO_2: Where should humanity aim?*[2] That study concluded: "If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO_2 will need to be reduced from its current 385 ppm to at most 350 ppm." Petitioners hereby incorporate the principal conclusions and reasoning of von Schuckman *et al.* (2020) and Hansen *et al.* (2008) by reference. We also note that the average atmospheric CO_2 concentration has risen from 385 to 416 ppm, an additional 31 ppm, since the publication of the Hansen *et al.* paper in 2008.

Earth's energy imbalance can be measured to a good accuracy because of precise monitoring of the rising global ocean temperature – the ocean being the repository for about 90 percent of the excess energy. The image in Fig. 1 reports that the average imbalance over the period 1971-2018 was 0.47 ±0.1 W/m^2, but Von Schuckmann *et al.* (2020) also report that, in the more recent period of 2010-2018, the imbalance was 0.87 ±0.1 W/m^2. Accordingly, as Petitioner

[2] Hansen et al., Open Atmos. Sci. J. (2008), vol. 2, pp. 217-231, available at https://arxiv.org/abs/0804.1126.

Hansen has also argued in a recent widely distributed communication, "Earth's energy imbalance – which was less than or about half a watt per square meter during 1971-2015 – has approximately doubled to about 1 W/m^2 since 2015."[3]

This increased energy imbalance is the principal cause of global warming acceleration, which Petitioners illustrate in Figure 2 below.

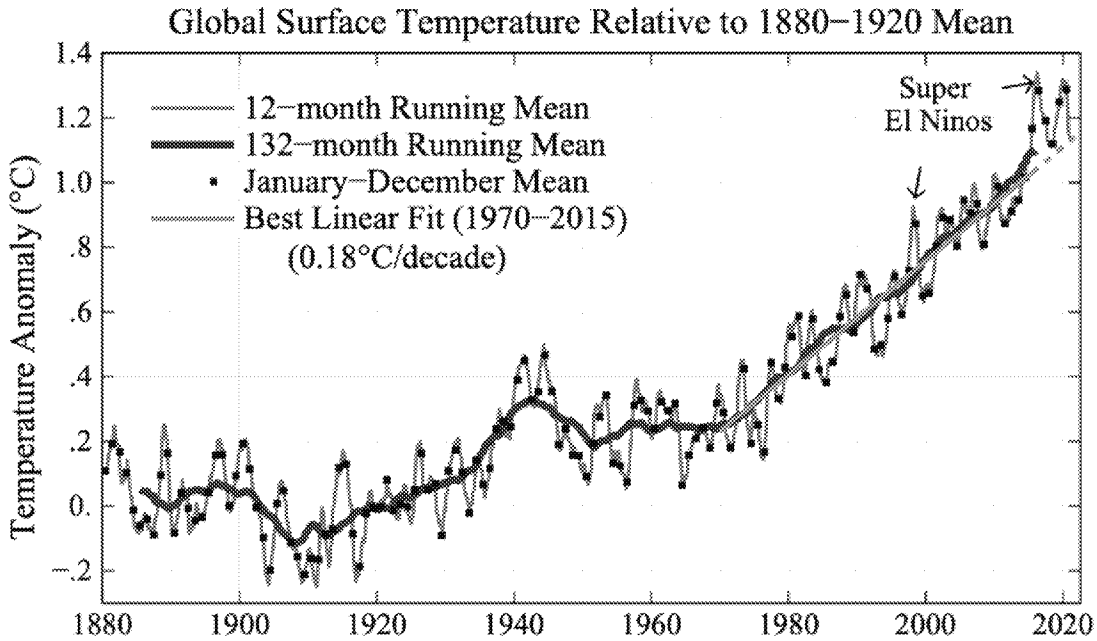

Fig. 2: From Climate Science Awareness and Solutions (CSAS) data pages.[4] Updated 8/13/2021.

The graphic shows global surface temperature relative to 1880-1920. The 1880-1920 mean temperature serves as our best estimate of the preindustrial level, because the small warming effect of human made GHGs that had been added by 1880-1920 was approximately offset by greater than average volcanic activity in 1880-1920. The temperature in 1940-45 shown in the figure may be exaggerated by data inhomogeneity in WW II, but that does not materially distort the picture – which is a sharp rise in warming since 1960.

Global temperature is now well above the range that occurred in the balance of the Holocene, the last 11,700 years, as illustrated in Figure 3 below.

[3] Hansen and Sato, *July Temperature Update: Faustian Payment Comes Due* (Aug. 13, 2021) from http://www.columbia.edu/~mhs119/Temperature/Emails/July2021.pdf.

[4] As also maintained by Makiko Sato, op cit. available at http://www.columbia.edu/~mhs119/Temperature/.

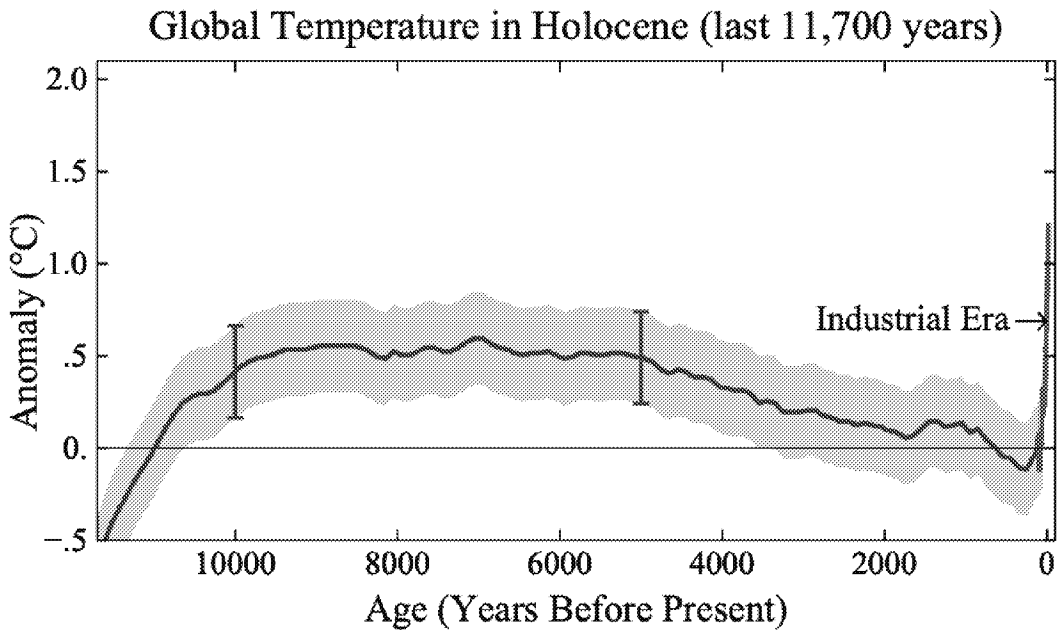

Fig. 3: Centennially smoothed Holocene temperature (C) relative to 1880-1920.
From CSAS data pages.[5]

We should expect the global warming rate for the quarter of a century 2015-2040 to be about double the 0.18°C/decade rate during 1970-2015 (see Fig. 2), unless appropriate countermeasures are taken – including a phaseout of fossil fuel emissions and accelerated removal of excess atmospheric CO_2 and CH_4.

II. CO_2 Emissions: Sources and Required Reductions to Secure Safety

Carbon dioxide emissions began to increase the global average atmospheric concentration beginning with the industrial revolution, in the mid-18th century, when coal began to be used as a fuel for home heating, powering steam engines and eventually for electrical power generation. Petroleum (commonly, "oil"), another fossil fuel, began to contribute to CO_2 emissions at the beginning of the 20th century. Its products, including fuels like gasoline, kerosene, diesel fuel and jet fuel, made automobile and aircraft transportation possible. Natural gas, another fossil fuel extracted from the earth and consisting principally of methane (CH_4) has made heating of homes and commercial buildings convenient because of the ability to transport it from processing plants to end users via pipelines.

These three fossil fuels, coal, petroleum and natural gas, are composed almost entirely of carbon and hydrogen that burn in the presence of oxygen to produce carbon dioxide and water.

The natural carbon cycle, in which carbon dioxide is removed from and returned to the atmosphere by land and ocean plants and bacteria via photosynthesis and respiration, respectively, also functions to return a portion of the CO_2 to soils and deeper earth formations by a wide range of processes. The cycling of carbon among the atmosphere, biosphere, hydrosphere

[5] As also maintained by Makiko Sato at http://www.columbia.edu/~mhs119/Burden_figures/.

and geosphere has many timescales, ranging from one year for seasonal changes in photosynthetic uptake of CO_2 to tens to hundreds of millions of years for exchange of fossilized carbon with the atmosphere and oceans. Over the past two centuries, and especially the past fifty years, humans have introduced an enormous perturbation in the carbon cycle by extracting fossil fuels and burning them to release vast quantities of CO_2 to the atmosphere at an unprecedented rate.[6]

The to-date unceasing commitment to fossil fuels is illustrated in Figure 4 below, showing that while the contribution of carbon-free energy to the global energy supply is growing it yet remains a small fraction of that provided by fossil fuels. Fig. 4 (a). This fact, coupled with continued energy demand, has ensured continually high CO_2 emissions. Fig. 4 (b). Even coal emissions remain near their peak, which surprises people who think of coal as a 19th century fuel. It is still with us, infusing the atmosphere with even more CO_2 than does the consumption of oil or natural gas.

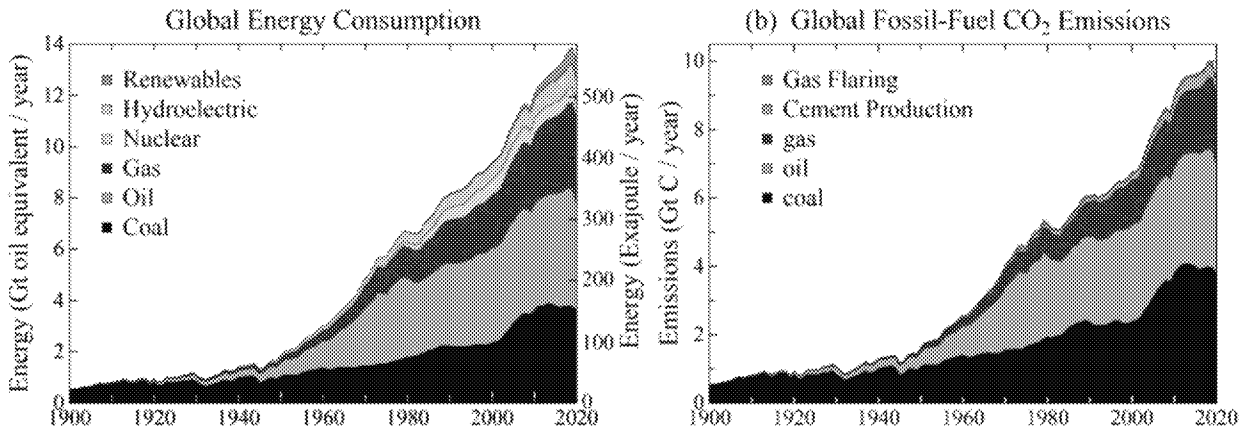

Fig. 4: From CSAS data pages.[7] Updated Aug. 18, 2021.

Accordingly, the extraction and burning of fossil fuels is overwhelming the natural carbon cycle. More than half of fossil fuel emissions is taken up by the Earth system, dissolved in the ocean – raising ocean acidity – and taken up by the biosphere and the soil. The balance of fossil fuel CO_2 emissions, approximately 44%,[8] *remain* in the atmosphere as CO_2, much of it for centuries.[9] Figure 5, below, illustrates the fate of these emissions, the blue area showing the amount (a) and the fraction (b) of the emissions that remains in the air.

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[6] IPPC AR6 WGI, Climate Change 2021, The Physical Basis, p. TS-46.

[7] As maintained by Makiko Sato at www.columbia.edu/~mhs119/CO2Emissions/.

[8] IPPC AR6 WGI, Climate Change 2021, The Physical Basis, p. TS-47.

[9] Unless, that is, a serious effort commences to remove all or a portion of such legacy emissions, as we discuss *infra*.

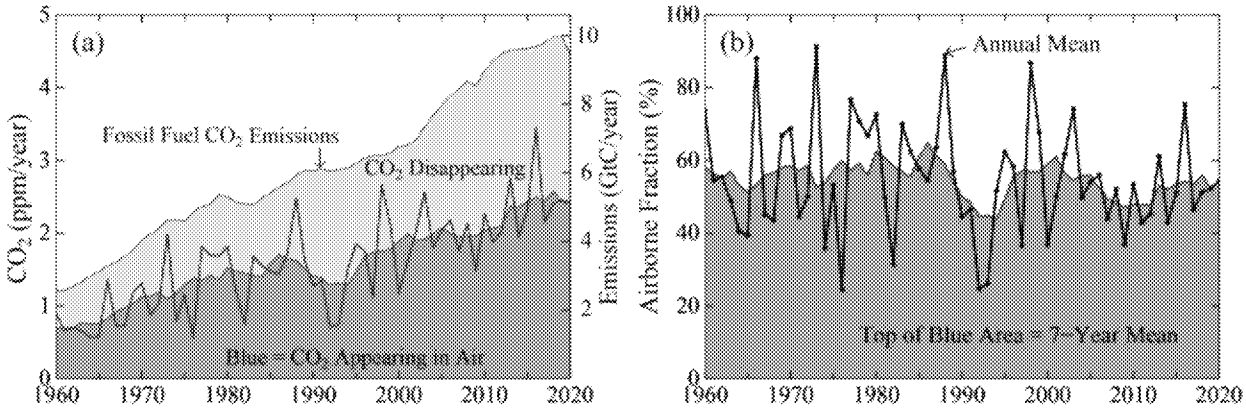

Fig. 5: From CSAS data pages.[10] Updated August 18, 2021.

One result is that the atmospheric CO_2 *concentration* is increasing, year after year after year, as shown in Figure 6 below, with data through April 2021. Indeed, the CO_2 concentration has risen 30 percent over the last six decades, from 316 ppm in 1959 to 416 ppm in 2021.[11]

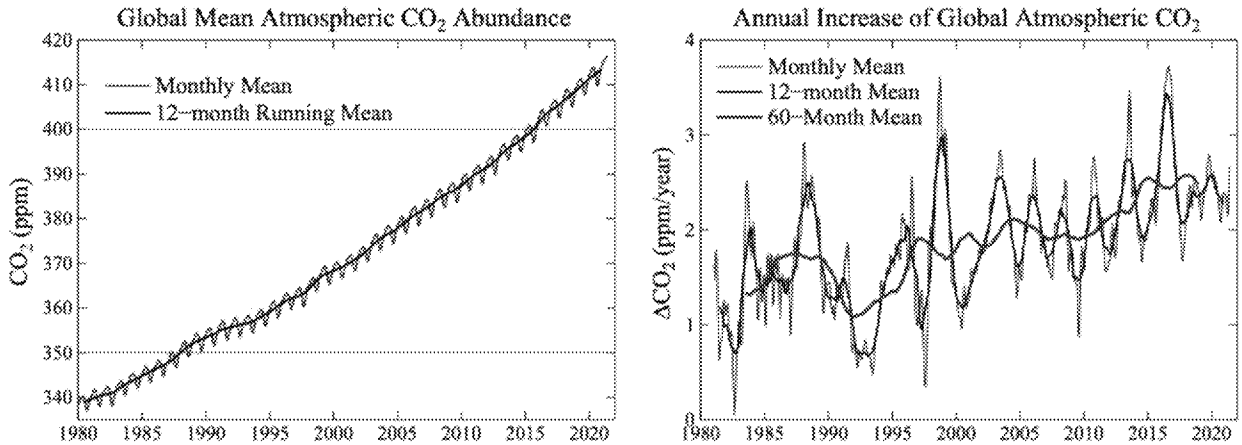

Fig. 6: Atmospheric CO_2 concentration. From CSAS data pages.[12] Updated August 18, 2021.

Moreover, CO_2 is increasing today at least 10 times faster than the most rapid known prior change in Earth's history, that is, the rate of increase characterizing the Paleocene-Eocene Thermal Maximum (about 50 million years ago). The last time the atmospheric CO_2 concentration was this high, according to a 2020 NOAA article, was more than 3 million years

[10] As also maintained by Makiko Sato, at http://www.columbia.edu/~mhs119/GHGs/.

[11] Global Monitoring Laboratory, Mauna Loa CO_2 Annual Mean Data, https://www.esrl.noaa.gov/gmd/ccgg/trends/data.html.

[12] As also maintained by Makiko Sato, at http://www.columbia.edu/~mhs119/GHGs/.

ago, when temperature was 2°–3°C (3.6°–5.4°F) higher than during the pre-industrial era, and sea level was 15–25 meters (50–80 feet) higher than today."[13]

The atmospheric CO_2 concentration has increased by 136 ppm (from 280 ppm to 416 ppm[14]) to date, corresponding to an excess in the atmosphere of ~1.0×10^{18} g (1,000 Petagrams, Pg) of CO_2 – that is, a neat one trillion metric tons. This overburden is currently increasing by about 18 billion metric tons (18 Pg) per year, based on the current trend of CO_2 concentration increasing by ~2.3 ppm/yr.[15] There is a comparably large excess quantity of CO_2 and bicarbonate ion in the oceans that, as discussed below, is already having an adverse effect on marine life. As with other toxic substances regulated by the EPA, much of this legacy CO_2 will need to be removed in order to cool the planet and restore the climate system so that human and natural systems may continue to function as required by our children and future generations.

Because of the long-lived nature of atmospheric CO_2,[16] responsibility for present and future global warming is a matter of cumulative emissions. For this reason, while at present GHG emissions stemming from the US are less than that from China, our nation, with the highest cumulative total (and very high per capita emissions) still bears the lion's share of responsibility for present and future global warming. *See* Figure 7 below.

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[13] Rebecca Lindsay, *Climate Change: Atmospheric Carbon Dioxide*, Aug. 14, 2020 available at https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide.

[14] NOAA Global Monitoring Laboratory, Trends in Atmospheric Carbon Dioxide, as of Aug. 20, 2021, available at https://gml.noaa.gov/ccgg/trends/.

[15] *Id.*

[16] *See* Archer et. al., *Atmospheric Lifetime of Fossil Fuel Carbon Dioxide*, Annu. Rev. Earth Planet. Sci. 2009. 37:117–34, https://www.annualreviews.org/doi/pdf/10.1146/annurev.earth.031208.100206.

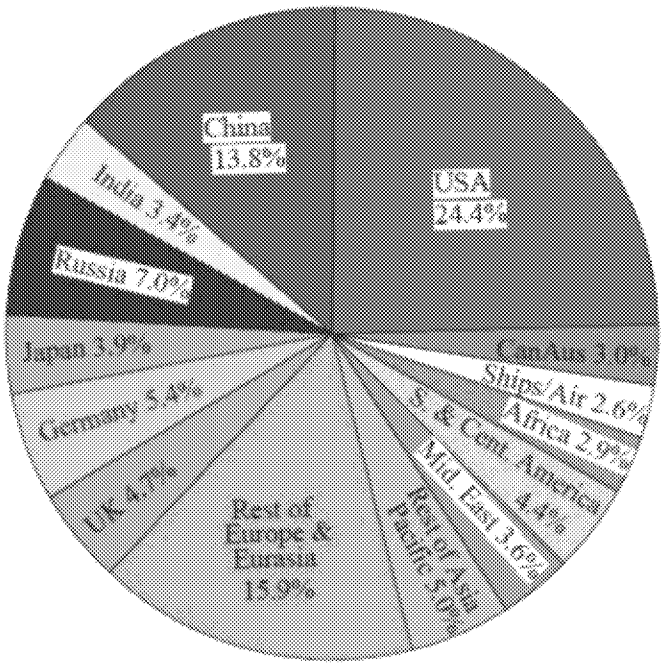

Fig. 7: 1751-2020 Cumulative Emissions (452 Gt).
Source: Climate Science, Awareness and Solutions

III. Methane and Other Short-Lived Climate-forcing Pollutants

Methane (CH_4) is the second most important anthropogenic greenhouse gas. The IPCC estimated that methane contributed about 0.5 °C of warming during the period 2010-2019 in comparison to the period 1850-1900.[17]

Although its concentration in the atmosphere is relatively low, averaging about 1.9 ppm (1891.3 ppb as of April 2021) globally,[18] CH_4 absorbs infrared radiation much more strongly than CO_2 and thus has a much higher *global warming potential (GWP)*. Over a timescale of 20 years, on a mass basis CH_4 is 82.5 times more effective at trapping heat[19] (30.1 times more effective on a molar basis) than CO_2. Like CO_2, the atmospheric methane concentration has been increasing since the industrial revolution, from a level of about 0.73 ppm[20] to its current value of 1.89 ppm, a factor of 2.6. *See* Figure 6 below.

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[17] IPPC AR6 WGI, Climate Change 2021, The Physical Basis, p. SPM-8, Figure SPM.2.

[18] NOAA Global Monitoring Laboratory, Trends in Atmospheric Methane, as of Aug. 20, 2021, available at https://gml.noaa.gov/ccgg/trends_ch4/.

[19] IPPC AR6 WGI, Climate Change 2021, The Physical Basis, p. 7-125.

[20] Nakzawa et al., Differences of the atmospheric CH_4 concentration between the Arctic and Antarctic regions in pre-industrial/pre-agricultural era, *Geophys Res. Lett.* (2020) vol. 20, pp. 943-946, available at https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/93GL00776.

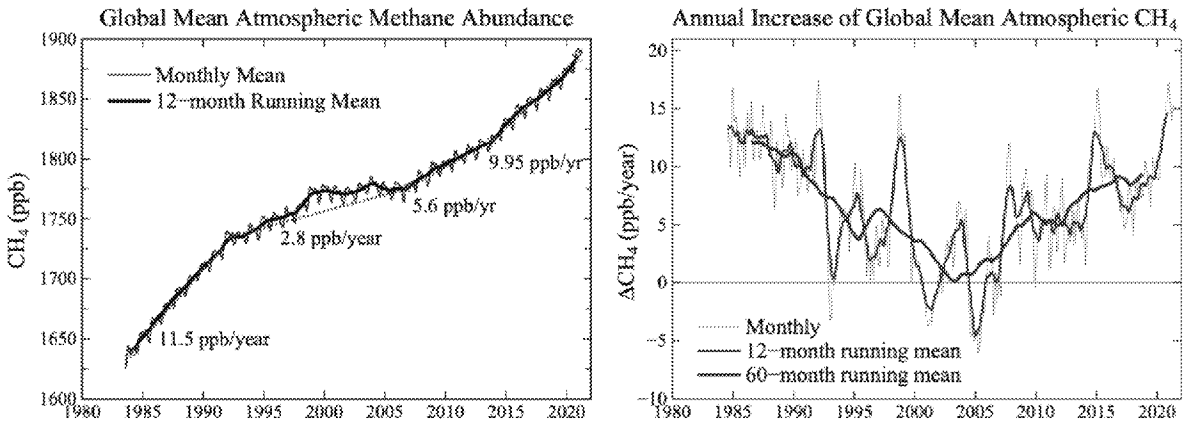

Fig. 8: Atmospheric CH_4 concentration. From CSAS data pages.[21] Updated June 24, 2021.

Since 2006, the annual increase in the global average atmospheric methane concentration has accelerated, increasing by 15.3 ppb or 0.0153 ppm between April 2020 and April 2021,[22] the largest single-year increase during the 36 years for which accurate global measurements have been made. *See* Figure 8. This increase in atmospheric methane is the equivalent (for a 20-year time scale) of ~0.47 ppm of CO_2 for that year. As a result, the effect of increasing emissions of CH_4 on the Earth's radiative balance during this past year amounted to about 20% of that of increasing levels of CO_2.

As with CO_2, there are both natural and anthropogenic sources of methane. Natural sources are dominated by anaerobic bacteria upon metabolism of organic matter, principally in wetlands and to a much lesser extent in the oceans, but also in the guts of termites.

Anthropogenic sources are estimated to outweigh natural sources, with about 62% being anthropogenic.[23] The main anthropogenic sources of methane are landfills, enteric fermentation in ruminants (livestock such as cattle), waste management, rice agriculture, biomass burning and fugitive emissions from oil and gas operations, all of which make major contributions. The sum of all agricultural and waste management contributions to methane emissions constitutes about 65% of anthropogenic emissions while that of emissions from the oil and gas industry contribute about 35%.[24] The latter emissions have likely increased in recent years due to the advent of hydraulic fracturing ("fracking") and the increased production of natural gas. Fugitive emissions of natural gas include purposeful venting of wells, incomplete combustion of methane during

[21] As also maintained by Makiko Sato, at http://www.columbia.edu/~mhs119/GHGs/.

[22] NOAA Global Monitoring Laboratory, Trends in Atmospheric Methane, as of Aug. 20, 2021, available at https://gml.noaa.gov/ccgg/trends_ch4/.

[23] Saunois et al., The global methane budget 2000-2017, *Earth System Science Data* (2020), vol.12, pp. 1561-1623, available at https://essd.copernicus.org/articles/12/1561/2020/.

[24] *Id.*

flaring of wells, and leakage from capped wells, processing facilities and the vast network of pipelines that transport natural gas to end users. According to the EPA, in 2019 U.S. methane emissions from oil and gas emissions amounted to a CO_2 equivalent of 197 million metric tons distributed as 48% gas production, 20% oil production, 6% processing, 19% transmission and storage and 7% distribution.[25]

The excess atmospheric CH_4 due to anthropogenic activities can be calculated as the difference in the current concentration of 1.89 ppm and the pre-industrial concentration of 0.73 ppm. This increase in atmospheric methane of 1.26 ppm corresponds to 3.5 billion metric tons of excess methane in the atmosphere or the GWP equivalent of 0.29 trillion metric tons (0.29 Pg) of CO_2 or about 29% of the current excess burden (1.0 Pg) of CO_2 in the atmosphere.[26]

An important difference between CH_4 and CO_2 is that CH_4 has a much shorter atmospheric lifetime, namely, approximately ten years,[27] due almost entirely to oxidation to CO_2 by the hydroxyl radial.[28] This means that if we were to stop emitting anthropogenic methane to the atmosphere, the burden of legacy CH_4 would be reduced by a factor of 63% every ten years.

In addition to relying on its relatively short lifetime, one possible approach to reducing the effect of legacy CH_4 is to catalytically oxidize atmospheric methane to CO_2, thereby avoiding the necessity of its disposal. This would reduce the 20-year global warming effect of any methane converted to CO_2 by a factor of ~30 and the 100-year effect by a factor of ~9. Oxidation of legacy CH_4 would be much simpler and more energy efficient than removal of legacy CO_2 because no concentration and disposal step is required. Oxidizing the 1.3 ppm of

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[25] U.S. Environmental Protection Agency, Estimates of Methane Emissions by segment in the United States (2021), https://www.epa.gov/natural-gas-star-program/estimates-methane-emissions-segment-united-states/.

[26] Calculated as follows: (Increased fraction of molecules that are CH_4, 1.26×10^{-6}) × (Number of molecules in the atmosphere, 1.04×10^{44}) ÷ (Avagadro's number for molec/mol, 6.022×10^{23}) × (molecular weight of CH_4, 16.04 g/mol) ÷ (g/metric ton, 10^6) = 3.49×10^9 tons of excess CH_4 in the atmosphere. Multiply this by the GWP of 82.5 to obtain 2.88×10^{11} equivalent ton of CO_2 or 0.288 million metric tons of CO_2.

[27] Naik et al., *Preindustrial to present-day changes in tropospheric hydroxyl radical and methane lifetime form the Atmospheric Chemistry and Climate Model Intercomparison Project* (ACCMIP), Atmos. Chem. Phys. (2013), vol. 13, pp. 5277-5298, available at, https://acp.copernicus.org/articles/13/5277/2013/acp-13-5277-2013.pdf.

[28] Fossil fuel CO_2, on the other hand, has an estimated mean atmospheric lifetime on order of tens of thousands of years, according to Archer et. al.: A burst of CO_2 takes 2 to 20 centuries to equilibrate with the ocean, but even after that process completes 20-40% of the CO_2 remains in the atmosphere subject only to far slower chemical reactions with CaCO3 and igneous rocks. Accordingly, the "climate effects of CO_2 releases to the atmosphere will persist for tens, if not hundreds, of thousands of years into the future." Archer et. al., *Atmospheric Lifetime of Fossil Fuel Carbon Dioxide*, Annu. Rev. Earth Planet. Sci. 2009. 37:117–34, https://www.annualreviews.org/doi/pdf/10.1146/annurev.earth.031208.100206.

excess methane in the atmosphere would produce the equivalent effect of removing ~39 ppm of CO_2, or an amount equal to the past 18 years of CO_2 emissions.

Halocarbons, including chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons (HFCs),[29] have 1000 to 9000 the global warming potential of CO_2. The halogenated refrigerants are a family of chemical compounds derived from hydrocarbons by substitution of chlorine and fluorine atoms for hydrogen. EPA has taken action under TSCA to control other families/classes of compounds, both before and after disposal, including poly-chlorinated biphenyls (PCBs), chlorofluorocarbons (because of their ozone depleting effects), friable asbestos in schools, and dibenzo-paradioxins/dibenzofurans,[30] in light of their similar health and environmental effects. The family of refrigerants shares common global warming effects, and should be controlled and cleaned-up to prevent their additional climate impact.

Despite the decreased production of CFCs due to the regulatory control, over a million tons of CFCs remain in existing appliances and units, increasingly in dumps, and these comprise a significant source of potential future emissions. Similarly, banks of HCFCs and HFCs are being established as some uses increase. The management of such CFC and HCFC stores are not controlled by the Montreal Protocol, and neither are they taken into account under the United Nations Framework Convention on Climate Change (UNFCCC). And yet, halocarbons are responsible for about 2-3% of the GWP of released gases.[31] It is estimated that there are over 57 GT[32] of carbon equivalents in disposed appliances that will be released as the appliances break down and emit their refrigerants.[33] These discarded units are physically an environmental problem similar to that of discarded capacitors containing PCBs and dioxin. EPA has a program to capture and destroy the latter such fluids under TSCA, and a similar program should be put in place for discarded refrigerants.

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[29] Chlorofluorocarbons, hydrochlorofluorocarbons and halons are currently regulated under TSCA, in accordance with the Montreal Protocol and under the Clean Air Act (CAA), for their ability to destroy stratospheric ozone and thus allow increased levels of harmful UV radiation to reach the Earth's surface. Halogenated refrigerants that are much less destructive to stratospheric ozone but can have as great a global warming potential are being phased out under the Kilgali accord (not yet ratified by the US). Appliances discarded before 1/1/18 are not regulated under the CAA, and there is also illegal disposal that occurs. They are included in this petition because aggressive action to find and destroy discarded refrigerants in appliances and other disposed material can be required under TSCA section 2605 in the same way TSCA regulates discarded PCB-containing materials. -

[30] https://www.brown.edu/health-safety/topics/environmental-compliance/toxic-substance-control-act-tsca Last accessed 2/8/2021.

[31] https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks Last accessed and https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data, last accessed 2/10/21.

[32] https://www.drawdown.org/solutions/refrigerant-management Last accessed 2/10/21.

[33] IPCC/TEAP Special Report: Safeguarding the Ozone Layer and the Global Climate System.

IV. Unreasonable Land-Based Risk: A Short Survey

(a) Heat, Drought, Wildfire

Fossil fuel emissions-driven heat, drought, and wildfire impose a current, imminent and unreasonable risk of serious or widespread injury to health or the environment.

In its 2018 Special Report on Global Warming of 1.5 Degrees Celsius (2.7 Degrees Fahrenheit), the IPCC noted that as the Earth warms to 1.5 °C about 14 percent of Earth's population will be exposed to severe heatwaves at least once every five years.[34] This level of heating may be unavoidable, at least for a period, even in the event of sharp emissions reductions – in light of the facts that fossil fuel GHG emissions have already driven ambient temperatures to >1.1 °C of warming and the certain persistence of the public health demand for air pollution (aerosol emissions) reduction.[35] But with additional GHG emissions, and warming, if allowed to reach the level of 2 °C of warming, extreme heatwaves will become widespread – with 37 percent of the Earth's people experiencing severe heatwaves at least once every five years.

Similarly, the IPCC notes, with its 2021 report, that with warming of 2.6 °C, heatwaves now experienced only once in a decade will likely occur as much as 6 times per decade.[36]

At this writing it is unclear if the 2021 US wildfire season will be among the most severe in the modern era of consistent record-keeping. Admittedly there are a number of relevant factors, including changes in meteorological conditions that carry their own internal variability. But long-run warming and associated drought constitute two primary conditions. Petitioners illustrate the correlation between temperature change and wildfire over a 35-year period in Figure 9 below. That correlation is strong, with an ***r*** close 64.0%.[37]

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[34] From NASA article, https://climate.nasa.gov/news/2865/a-degree-of-concern-why-global-temperatures-matter/.

[35] *See* July Temperature Update, *op cit* nte.34.

[36] AR 6, SPM-23.

[37] There were, of course, fires in western states prior to 1983, but we illustrate the point for the period during which the federal wildland agencies tracked the relevant data "using current reporting processes." https://www.nifc.gov/fire-information/statistics/wildfires (visited Aug. 18, 2021).

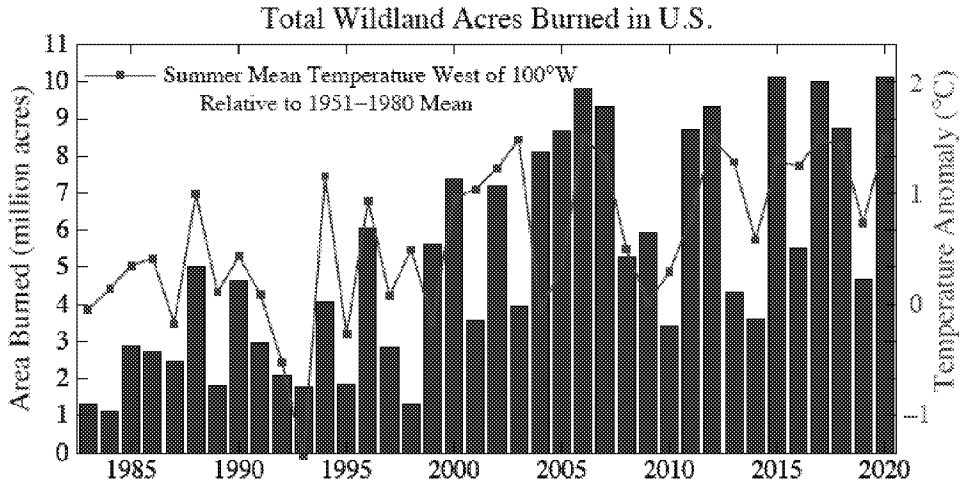

Fig. 9: Calculations and graphic by CSAS.[38]

We note that while the governmental dataset we used for the histogram covers the entire continental U.S., the picture is reflective of the western states region – where the vast majority of acres are burned in continental U.S. wildfire. We illustrate this using the federal government's Monitoring Trends in Burn Severity tool, depicting over 25,000 fires in the 1984-2019 period.

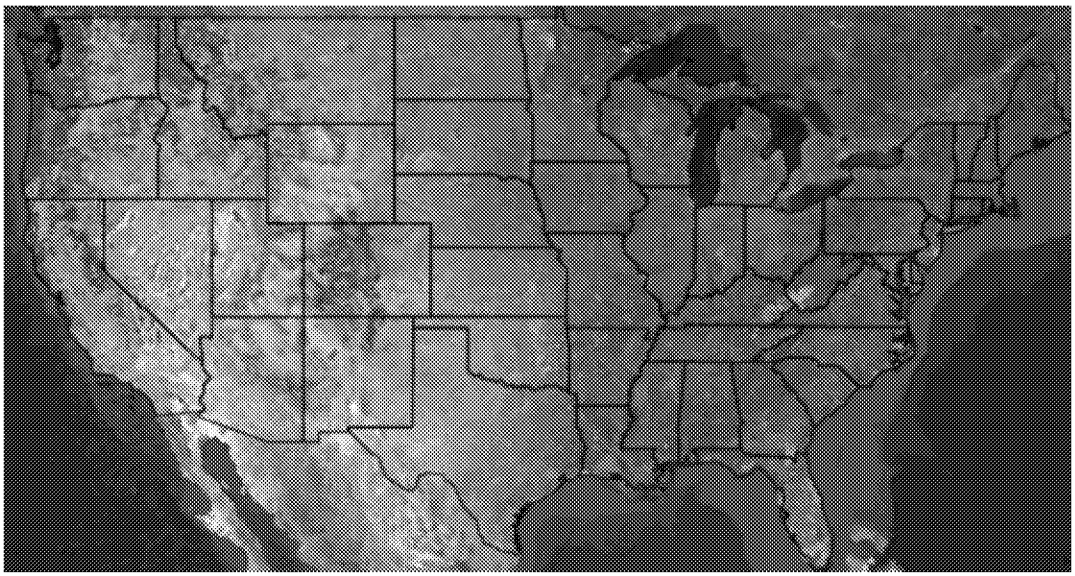

Fig. 10: USGS and Forest Service.[39]

[38] As also developed by Makiko Sato, with wildland acreage data from the National Interagency Fire Center, https://www.nifc.gov/fire-information/statistics/wildfires.

[39] Available at https://www.mtbs.gov/viewer/index.html. Visited August 18, 2021.

Temperature and drought are related variables, and record warming led to severe to extreme drought conditions in much of the western states in recent years. Figure 11, taken from the United States Drought Monitoring (USDM) program, depicts the situation this last summer. If fossil fuel GHG emissions are not rapidly phased out and their atmospheric excess removed, then drought extent and severity will increase. The IPCC observed in 2018, as an implication of this, that about 61 million more people in Earth's urban areas would be exposed to severe drought in a 2 °C warmer world. [Relatedly, up to 270 million more people are projected to be exposed to increases in water scarcity in 2050 with warming at 2 °C.[40]] Most recently, the IPCC observed that, with continued fossil fuel-driven warming, there will be an increase in the frequency and intensity of agricultural and ecological drought events. Where a drought occurred once in 10 years on average across drying regions in a climate without human influence, the IPCC anticipates that such a drought, albeit at higher severity, likely will occur 2.4 times on average in a 2 °C world and more than 4 times in a 4 °C world.

Because wildfire is driven by such drought, in combination with heat, the risk of wildfire also is anticipated to be far higher in a 2 °C warmer world than with warming of "only" 1.5 °C.

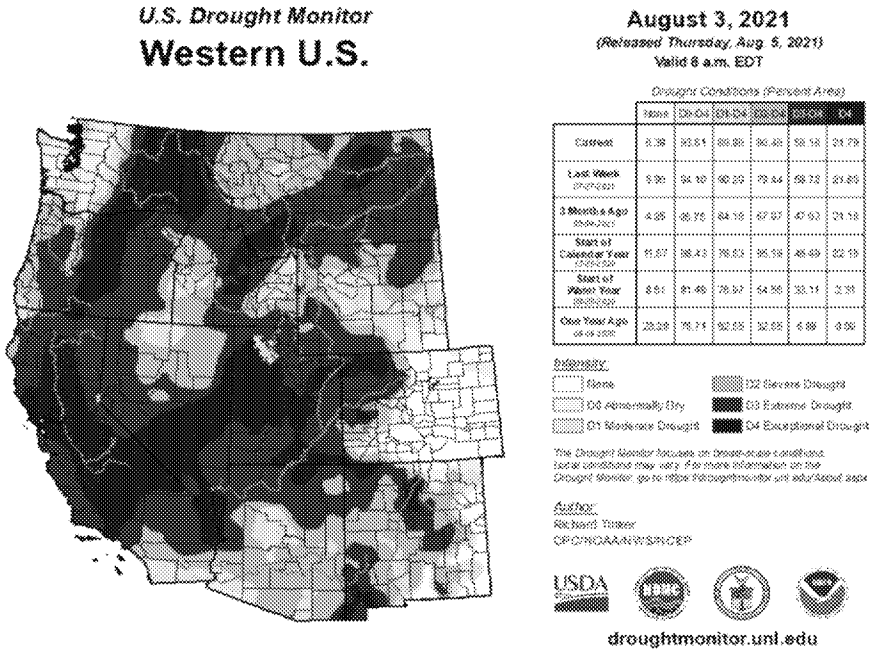

Fig. 11. Image from National Drought Mitigation Center.[41]

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[40] Again, from NASA here: https://climate.nasa.gov/news/2865/a-degree-of-concern-why-global-temperatures-matter/.

[41] Available at https://www.ncdc.noaa.gov/sotc/drought/202013#national-overview. Visited August 18, 2021.

As USDM observed,[42] "the percent area of the West in moderate to exceptional drought peaked at 90.3 percent on July 27, 2021. This value exceeded the previous peak in the 21-year USDM record that occurred in August and September of 2003. The percent area in extreme to exceptional drought (D3-D4) peaked at 59.5 percent on July 20, which is a USDM record. This is due to record low precipitation and excessively hot temperatures during the last several years."

Similar, if somewhat less intense conditions during 2020 led NOAA to note, in its annual drought report for 2020,[43] that:

> The increasing temperature trend . . . means more evapotranspiration is occurring than before and this makes the dry spells, when they happen, result in increasingly more intense droughts. . . [E]xcessive evapotranspiration and lack of rain dried soils across the West, with two-thirds or more of the topsoil moisture dry or very dry across most western states by the end of October. Several large wildfires sparked to life in parts of the West in the spring, with the wildfires spreading during June. They were burning across all of the western states during the summer and fall, and some had yet to be extinguished in California as the year ended. Nationwide, over 10 million acres burned in 2020, which is more than the 2010-2019 average of 6.79 million acres and the largest acreage consumed in the U.S. since at least 2000. The three largest wildfires in Colorado history, and five of the six largest wildfires in California history, occurred in 2020.

While 2020 did not set the drought record for the western states as a whole, it did set wildfire records for the west *coast* states.[44] The number and scale of California wildfires were unprecedented in that state's history, with its largest, the August Complex Fire, encompassing more than 1million acres – a gigafire.[45] In Oregon, fires broke out in areas that are not normally fire prone, but those had experienced exceptional drought, and were characterized by fast-moving blazes propelled by rare easterly winds of Sept. 8 to 9, 2020. A number of communities were simply wiped out. *See* Figure 12.

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[42] *Id.*

[43] National Centers for Environmental Information, Drought -Annual 2020. https://www.ncdc.noaa.gov/sotc/drought/202013#national-overview

[44] *See Record Wildfires on the West Coast Are Capping a Disastrous Decade*, New York Times, Sept 24, 2020 (usefully showing time lapse images from Sept. 6-11).

[45] *See California wildfires spawn first 'gigafire' in modern history* at https://www.theguardian.com/us-news/2020/oct/06/california-wildfires-gigafire-first

Fig. 12: Photos by wildlands ecologist Dominick DellaSala, Sept. 18, 2020, Talent, Oregon. (The trees weathered the fire storm better than many homes.) Used with permission.

Though the instant Petition was first drafted just past the middle of the anticipated western 2021 fire season, the impact was severe as the western region was subjected to one heat wave after another – in some places, even before summer officially began.[46] Perhaps the worst of these resulted in part from the parking of a high-pressure system over the Pacific Northwest, a development caused in part by an undulation of the "normally" more tightly-wound jet stream. As Petitioner Hansen and his colleague Makiko Sato wrote in their *June 2021 Global Temperature Update:*

> The jet stream is driven by the temperature gradient from middle to polar latitudes. An especially cold Arctic tends to cause a strong, tightly wound jet stream. However, an increased greenhouse effect warms the Arctic more than mid-latitudes, reducing the temperature gradient, thus slowing the jet stream and allowing it to have more extreme waggles. This was likely a contributing factor in the Pacific Northwest heat wave.[47]

In the absence of climate change, according to the credible research of one rapid attribution analysis team, the extreme heat wave that followed would have been "virtually

[46] *Climate Change Batters the West Even Before Summer Officially Begins*, NY Times, June 17, 2021 (updated June 27, 2021) at https://www.nytimes.com/2021/06/17/climate/wildfires-drought-climate-change-west-coast.html?action=click&module=RelatedLinks&pgtype=Article.

[47] http://www.columbia.edu/~mhs119/Temperature/Emails/June2021.pdf. *See also* Jacob and Reeder, "The North American heatwave shows we need to know how climate change will change our weather," The Conversation (July 2, 2021) at https://theconversation.com/the-north-american-heatwave-shows-we-need-to-know-how-climate-change-will-change-our-weather-163802.

impossible."[48] Record-eclipsing temperature followed: Lytton, British Columbia (121 °F on June 29, 2021), Portland, Oregon (116 °F on June 28), Seattle, Washington (108 °F on June 28), Lewiston, Idaho (115 °F on June 29) and Missoula, Montana (101 °F on June 29). Heat-related deaths were estimated in the hundreds for humans, in the billions for animals.[49]

A series of fires ensued, some engulfing small towns from British Columbia to Northern California. The plumes of smoke from western wildfires are, at the time of writing this petition, transported thousands of miles, creating the worst air quality ever experienced in many locations. According to the Swiss air quality measuring company IQAir, Denver, CO experienced the worst air quality in the world, on August 7, 2021, with an air quality index (AQI) of 167 due to smoke produced mostly in California. As of August 22, 2021, the Dixie fire had burned 722,000 acres of forest – rendering it, already, the second largest for that state in recorded history. But, as of that date, the fire was only 37% contained.[50] Of California's ten largest fires in recorded history, nine have occurred within the most recent decade while eight have been within the last four years.[51] Figure 13.

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[48] Philip et al, *Rapid attribution analysis of the extraordinary heatwave on the Pacific Coast of the US and Canada June 2021*, available at https://www.worldweatherattribution.org/western-north-american-extreme-heat-virtually-impossible-without-human-caused-climate-change/.

See also AR6 IPCC Physical Science Basis report, sections 11.8.3 and 12.4.3.2 noting that "the attribution of extreme weather events has emerged as a growing field of climate research with an increasing body of literature. It provides evidence that greenhouse gases and other external forces have affected individual extreme events by disentangling anthropogenic drivers from natural variability." The IPCC finds "medium confidence" that "weather conditions that promote wildfires have become more probable in southern Europe, northern Eurasia, the USA, and Australia over the last century."

[49] Stephen Leahy, *If the Hardiest Species Are Boiled Alive, What Happens to Humans?* The Atlantic. July 31, 2021.

[50] Interagency all-risk incident information management system, InciWeb, visited August 22, 2021, at https://inciweb.nwcg.gov/incident/maps/7690/.

[51] CalFire, Top 20 Largest California Wildfires, Aug. 20, 2021.

Figure 13: From https://inciweb.nwcg.gov/#. August 22, 2021.

(b) Sea-level Rise

Fossil fuel emissions-driven sea-level rise presents not only an imminent, but a current unreasonable risk of serious or widespread injury to health or the environment.

As the planet warms, sea level rises due to two factors: thermal expansion of seawater and melting of inland glaciers and the ice sheets of Greenland and Antarctica.

Thermal expansion is estimated to account for 50% of the observed sea level rise since 1971, with melting of glaciers contributing 22%, ice sheets 20% and changes in land water storage 8%.[52] Like temperature, sea level can be measured with high accuracy. We have tidal gauge measurements dating back to 1880 and more accurate satellite measurements that are not affected by changes in land elevations beginning in 1993 showing that there has been a rise in average sea level by a total of 15-25 cm (~6-10 in) during the period 1901-2018, as shown in Figure 14.

[52] IPPC AR6 WGI, Climate Change 2021, The Physical Basis, p. SPM-6.

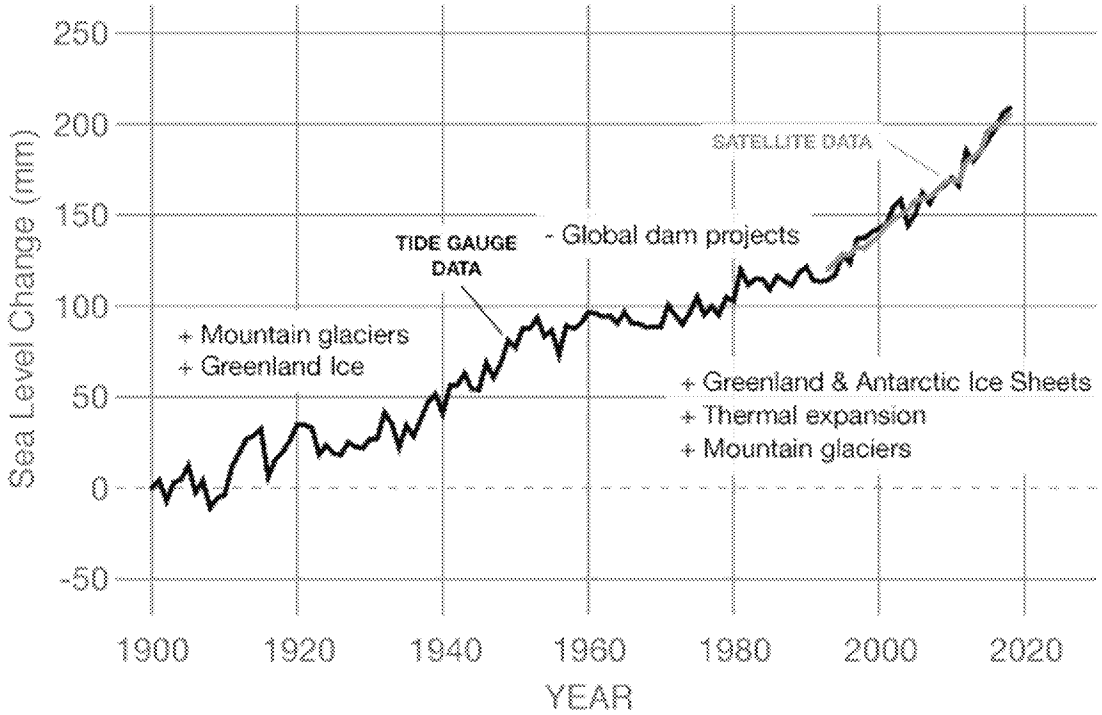

Fig. 14. Satellite observations of sea level rise from 1993 to 2021. Data Source: Frederikse et al. (2020).[53] From: https://climate.nasa.gov/vital-signs/sea-level/

The rate of sea level rise has been accelerating over at least the past century by about 0.1 mm/yr. The average rate of sea level rise increased from 1.3 mm/yr during the period 1901 to 1971 to 1.9 mm/yr during the period 1971-2006 and further increased to 3.7 mm/yr, during the period 2006-2018. In fact, the IPCC finds with high confidence that the global mean sea level has risen faster since 1900 than during any preceding century in the last 3000 years .[54] Even for IPCC's very low GHG emission scenario (SSP1-1.9), total sea level rise is predicted to reach 32 to 62 cm (12.6 to 24.4 in) by the end of this century. This 1-2 feet of sea level rise will be difficult enough for the future generations, but to keep sea level within that range requires drastic cuts in current GHG emissions. Other scenarios that include a range of likely future emissions if drastic cuts are not made predict sea level rises in the range of about 500 to 1,000 cm or 1.6 to 3.5 ft.

While the IPCC assessment of sea-level rise is quite dire, Petitioners aver, nonetheless, that it under-estimates the actual extent to which sea-level is likely to rise. A far-reaching study published in 2016 by an international group of 19 climate scientists (led by Petitioner Hansen) warned, *inter alia*, that based on an analysis of paleoclimate evidence, ongoing observations, and

[53] Frederikse *et al.*, The causes of sea-level rise since 1900, *Nature*, vol 584, pp. 393-397 (2020), at https://www.nature.com/articles/s41586-020-2591-3/.

[54] *Id.* at p. SPM-9.

modeling, continued high fossil fuel emissions may yield nonlinear ice mass loss sufficient to raise sea level several meters within 50-150 years (along with increasingly powerful storms).[55]

The major implications they drew is that (1) the (then) widely accepted target "of limiting global warming to 2 °C . . . does not provide safety," (2) that "global surface air temperature, although an important diagnostic, is a flawed metric of planetary "health," because faster ice melt has a cooling effect for a substantial period [so that] Earth's energy imbalance is a more fundamental climate diagnostic, and (3) the existence of amplifying feedbacks present a "real danger that we will hand young people and future generations a climate system that is practically out of their control."[56]

Described amplifying feedbacks including reduced Southern Ocean bottom water formation (and thus retention of subsurface heat), slow down and risk of shutdown of the Southern Ocean and Atlantic Meridional Overturning Circulations (SOMC and AMOC), increased temperature gradients and storminess in the North Atlantic region, as well as the potential for nonlinear disintegration of major ice sheets in West Antarctica and Greenland. Figure 15 depicts some of these feedbacks. In light of these additional "real dangers" the Ice Melt scientists asserted that "we have a global emergency [and that] fossil fuel CO_2 emissions should be reduced as rapidly as practical."[57]

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[55] Hansen *et al.,* Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2 °C global warming could be dangerous, Atmos. Chem. Phys., 16, 3761–3812 (2016) at www.atmos-chem-phys.net/16/3761/2016/. Hereinafter, "Ice Melt."

[56] *Id.*

[57] *Id.* at p. 3801.

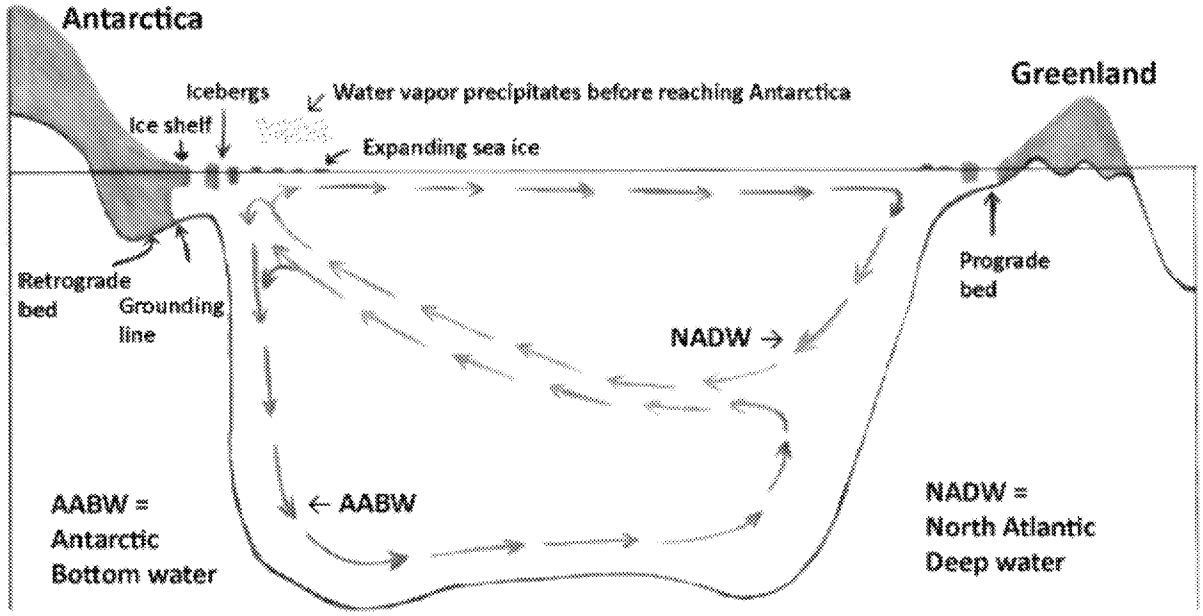

Fig. 15: Schematic of stratification and precipitation amplifying feedbacks.
Stratification: increased freshwater flux reduces surface water density, thus reducing AABW formation, trapping NADW heat, and increasing ice shelf melt.
Precipitation: increased freshwater flux cools ocean mixed layer, increases sea ice area, causing precipitation to fall before it reaches Antarctica, reducing ice sheet growth and increasing ocean surface freshening. Ice in West Antarctica and especially the Wilkes Basin, East Antarctica, is most vulnerable because of the instability of retrograde beds. Figure and description from: *Ice Melt* at p. 3776.

Among the most consequential present and imminent consequences to continued sea-level rise are the loss of habitable land and frequent flooding due to higher tides and bigger storm surges. River deltas in Africa and Asia and small island nations such as Maldives, Tuvalu, Kirabati and Fiji are immediately vulnerable to *any* additional sea level rise. The highest elevation in all of the Maldives – which consists of 26 atolls, supports a population of ~ 500,000 people, and has an average elevation of 1.8 m (6 ft) – is only 2.4 meters (7.9 ft). Thus, at current rates of sea level rise – even if rapid ice sheet disintegration is somehow staved off – the Maldives will be uninhabitable by 2100, as is true of many other island nations where tidal flooding is becoming more frequent.

Already five of the Solomon Islands, ranging in size from one to five hectares have been completely submerged due to sea level rise,[58] and king floods of the Marshall Islands capital Majuro that historically occurred every few decades are now occurring multiple times per decade. Worldwide, approximately 600 million people live directly on the coast, and 267 million people live on land less than 2 meters above sea level.[59] Further increases in sea level,

[58] Klein, Five Pacific islands vanish from sight as sea levels rise, *New Scientist*, 9 May 2016, available at https://www.newscientist.com/article/2087356-five-pacific-islands-vanish-from-sight-as-sea-levels-rise/.

especially when combined with increased storm intensity caused by global warming, will result in both loss of habitable and agricultural land, forcing tens to hundreds of millions of people to migrate further inland and reducing food production.

US citizens and residents are also at great present and imminent risk due to sea level rise. As of 2014, 127 million people or 40% of the U.S. population lived in coastal counties, and effects of sea level rise are already being felt in many of these densely populated areas. Hurricane Katrina, one of the most damaging storms in U.S. history (approximately tied with 2017's Hurricane Harvey) caused $170 billion in damages, resulted in the displacement of hundreds of thousands of people and cost the lives of more than 1,800 people. A 2013 study shows that the storm surge from Katrina would have been 15 to 60 percent lower for sea level conditions of 1900.[60] Similarly, the storm surge flooding of New York City and the New England coastline due to Superstorm Sandy of 2012 was amplified by the 12-in rise in sea level, as measured by the tidal gauge at Battery Park, during the past century.[61] Of the 12-in rise, 4 in is due to land subsidence, common for many large cities and confounding the problem of sea level, and 8 in was due to sea level rise.

A recent study estimates future flood losses without further sea level rise.[62] Even in the absence of additional sea level rise, Miami ranks only slightly behind Guangzhou, China as the most vulnerable city worldwide in terms of risk of average annual loss of property from storm-related flooding, and New Orleans ranks just behind Guangzhou in terms of estimated annual loss as a percentage of GDP of that city. The three U.S. cities of Miami, New York City and New Orleans account for 31% of the global aggregate losses of the 136 most vulnerable cities because of their high wealth and low protection level. With an assumption of 20 cm of sea level rise by 2050 and no additional adaptation, this study predicts aggregate losses due to flooding in excess of $1 trillion per year in the U.S. Although not meant to be predictive, this analysis illustrates the great and certain risk of continued sea-level rise to the United States.

The IPCC reports that if, instead of limiting global warming to 1.5 °C, fossil fuel-driven warming is allowed to reach 2.0 °C, then at least 10 million more people may be subjected to "sea-level rise greater than 0.66 feet (0.2 meters) [and ensuing] increased coastal flooding, beach erosion, salinization of water supplies and other impacts on humans and ecological systems."

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[59] Hooijer and Vernimmen, Global LIDAR land elevation data reveal greatest sea-level rise vulnerability in the tropics, *Nature Communications*, vol. 12, p. 3592 (2021) at https://www.nature.com/articles/s41467-019-12808-z/.

[60] Irish et al., Simulations of Hurricane Katrina under sea level and climate conditions for 1900, *Climatic Change*, vol. 122, pp. 635-649 (2014), at https://doi.org/10.1007/s10584-013-1011-1/.

[61] Kahn, B. Superstorm Sandy and Sea Level rise, NOAA Climate.gov (2020), at https://www.climate.gov/news-features/features/superstorm-sandy-and-sea-level-rise/.

[62] Hallegatte et al., Future flood losses in major coastal cities, *Nature Climate Change*, vol. 3, pp. 802-806 (2013) at https://www.nature.com/articles/nclimate1979/.

Petitioners here adopt the global emergency assertion of the *Ice Melt* authors in support of their request to EPA to restrict and remove GHG emissions under TSCA. In particular, the virtual certainty of accelerating sea level rise, if GHG emissions are not rapidly reduced, as described in the consensus IPCC report itself, fully establishes an actual (as well as imminent) and unreasonable risk of serious or widespread injury to health or the environment. The "real danger" of nonlinear ice sheet disintegration (with its correlated rapid sea level rise on the order of several meter, as well as superstorms) supports the view that continued unabated fossil fuel emissions may prove calamitous – and thus an "existential" threat, to appropriate President Biden's term – a threshold well beyond that required to be established under TSCA.

(c) Extreme Weather

(i) Predicted Changes in Frequencies of High Temperature, Precipitation and Drought

Increased temperature over land results in increased evaporation of water. In many regions this results in a reduction of soil moisture and eventually drought, while in other regions the increased water vapor in the atmosphere results in increased precipitation. According to the IPCC,[63] the increase in average global temperature of about 1.1 °C that we are experiencing so far is already resulting in increased frequencies of extreme temperature events, heavy precipitation events and agricultural and ecological droughts, as shown in Figure 13.

Hot temperature extremes that historically (1850-1900) occurred once every 10 years now occur 2.8 times more often. For warmings of 1.5 °C, 2 °C and 4 °C, such events are predicted to occur 4.1 times, 5.6 times and 9.4 times more frequently; i.e. a temperature event that once occurred only once every ten years would occur almost every year on average if the planet were allowed to warm by 4 °C. And those extreme temperature events would be even more severe. Also, ten-year extreme temperature events are now 1.2 °C higher than in the last half of the 18th century, accounting for the temperature records that are continually being set at locations around the world. As seen in Figure 13, global warmings of 1.5 °C, 2 °C and 4 °C are predicted to result in 10-year events that are 1.9 °C, 2.6 °C and 5.1 °C higher than historical values.

The effects of global warming on 50-year events are greatly amplified over that of 10-year events. For example, in the case of a 2 °C warming of the planet, a 50-year event is predicted to occur 13.9 times more frequently, meaning that humans and the livestock, crops and natural ecosystems we depend on will experience what was a 50-year event once every 3.6 years on average. For a catastrophic warming of 4 °C, 50-year events would occur 39.2 time more often or almost every year.

As is also summarized in Figure 13, similar increases in the frequencies of heavy-precipitation and droughts are predicted to be already occurring and to increase further with increased average global temperatures. Ten-year events for heavy precipitation have already shortened to 7.7 years and will further decrease to 6.7, 5.9 and 3.7 years for warmings of 1.5 °C,

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[63] IPPC AR6 WGI, Climate Change 2021, The Physical Basis, pp. SPM-20-24.

2 °C and 4 °C, respectively. Ten-year agricultural and ecological droughts are estimated to already be occurring once every 5.9 years and those periods are predicted to be reduced to 5, 4.2 and 2.4 years for 1.5 °C, 2 °C and 4 °C warmings. In the same way that extreme temperature events will also be hotter, the historically 10-year events will be wetter for heavy precipitation events and drier for drought events.

The 4 °C scenario would be simply catastrophic in terms of high temperature extremes, heavy precipitation events that lead to flooding and agricultural and ecological droughts.

The 2015 Paris Agreement[64] to the 1992 UNFCCC[65] committed signatory nations, including the US, to hold the increase in the global average temperature "to well below 2°C above pre-industrial levels" and to purse efforts "to limit the temperature increase to 1.5°C above pre-industrial levels."

Clearly, 1.5 °C is highly preferable to 2 °C, but even 1.5 °C is unacceptable considering that a large fraction of the population would then experience extreme temperature events once every 2.5 years. Indeed, Petitioners aver that it is necessary not only to phase out fossil fuel emissions, but also to remove a large fraction of the excess greenhouse gases from the atmosphere in order to return the planet to a temperature sustainable for human life, agriculture and the many delicate ecosystems on which we depend.

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[64] As described by the United Nations, "[t]he Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016." https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

[65] As described by the United Nations, "[t]he UNFCCC is a "Rio Convention", one of two opened for signature at the "Rio Earth Summit" in 1992. Its sister Rio Conventions are the UN Convention on Biological Diversity and the Convention to Combat Desertification. . . Preventing "dangerous" human interference with the climate system is the ultimate aim of the UNFCCC. . . The UNFCCC entered into force on 21 March 1994. Today, it has near-universal membership. The 197 countries that have ratified the Convention are called Parties to the Convention." https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change.

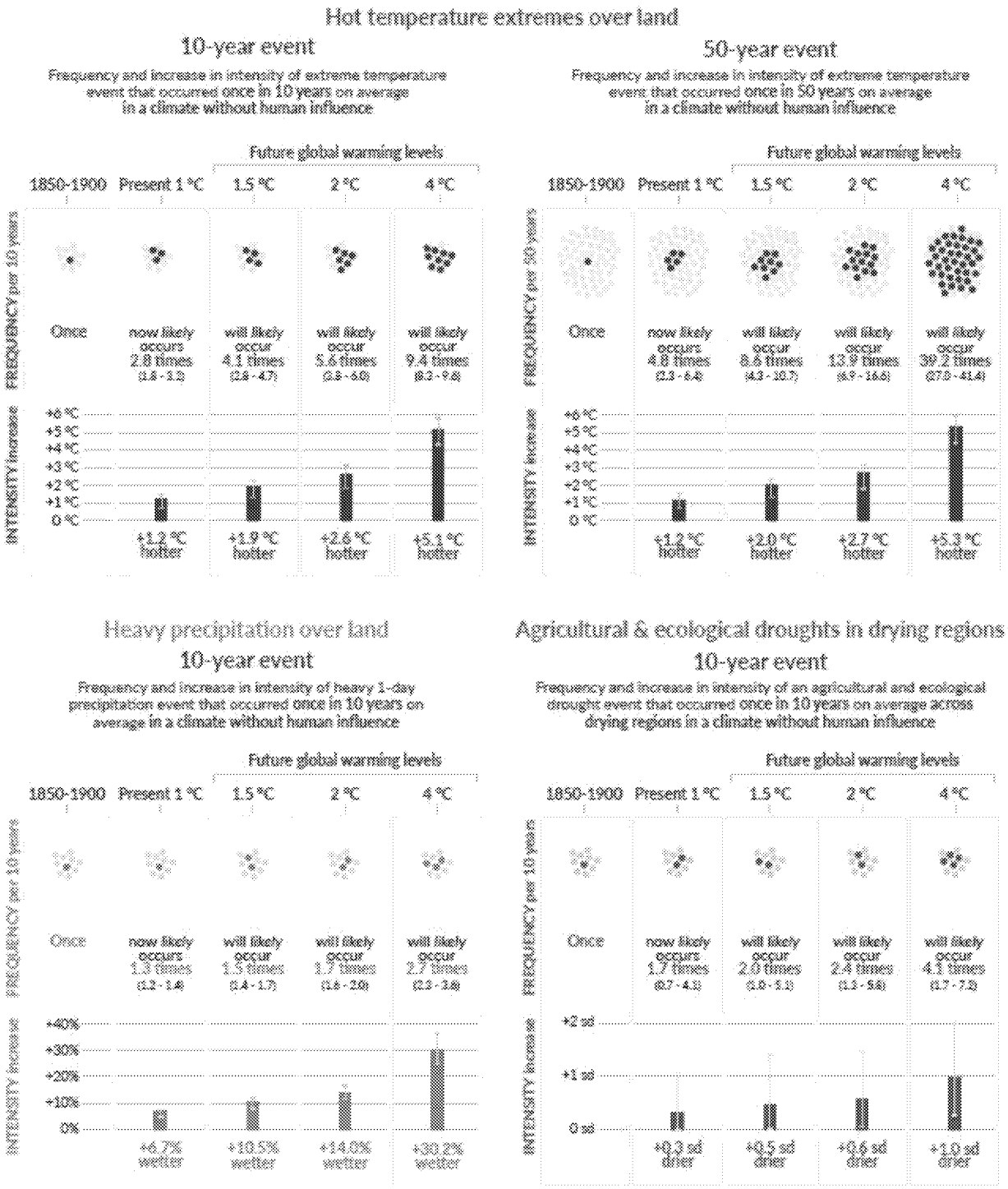

Figure 16. Projected changes in the intensity and frequency of hot temperature extremes over land, extreme precipitation over land, and agricultural and ecological droughts in drying regions. Figure SPM.6, p. SPM023 of the IPCC AR6 report, *Climate Change 2021, The Physical Science Basis*, 2021.

(ii) Changes in Frequency and Severity of Tropical Storms

The heat content of air, land and oceans and its distribution around the planet drive the weather we experience. Uneven heating results in pressure differences that produce winds. Because of the Coriolis effect, winds near the surface of our rotating planet result in cyclones that, depending on intensity and spatial scale, become tropical storms, hurricanes/typhoons, waterspouts and tornadoes. Water vapor plays a key role in the formation and intensities of storms, providing a means for heat to be transported from the surface of the ocean to the atmosphere. Evaporation of water at the surface provides water vapor to the atmosphere with potential energy (latent heat) that can be released again as kinetic energy (sensible heat) as it rises, cools and condenses back to liquid water. In fact, the fundamental physics that drives weather is well understood. It establishes that putting more energy into the land/water/air system, a process now driven by excess atmospheric greenhouse gases, results in larger pressure differentials, more water vapor in the atmosphere and thus more kinetic and potential energy in Earth's system. The result can only be an intensification of weather processes.

Global climate models find that although about half of the equilibrium response to a climate forcing, such as a radiative forcing due to added greenhouse gases, occurs within a few years, the remaining response is "recalcitrant,"[66] requiring many decades or even centuries for the complete response. This is primarily due to the slow mixing of the oceans, which act analogous to a capacitor in an electrical circuit, storing the excess energy provided by Earth's energy imbalance. Although the oceans serve to reduce the immediate climate response to some degree, they also ensure that it will take decades to centuries for the climate system to return to its balanced state – even after much of the excess radiative forcing due to greenhouse gases is removed.

Because much of the climate consequences for the excess energy we have already added to the oceans lie in the future and because of the difficulty in detecting the climate change signal above the natural noise of weather, we must rely on our predictive models – taking into account our best understanding of the geophysical processes that drive them. Current model studies predict that although tropical cyclones might be fewer in number they will have increased intensity, result in increased rainfall and produce stronger storm surges.[67] Such changes are caused primarily by rising sea temperatures, which result in higher water vapor content of the atmosphere. The condensation of lofted water vapor releases the latent heat that drives the winds of cyclones. The most recent U.S. National Climate Change Assessment concluded that "increases in greenhouse gases and decreases in air pollution have contributed to increases in

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[66] Held, et al., Probing the fast and slow components of global warming by returning abruptly to preindustrial forcing, *Journal of Climate*, vol. 23, pp. 2418-2427 (2018), at https://journals.ametsoc.org/view/journals/clim/23/9/2009jcli3466.1.xml/.

[67] Walsh et al., Tropical cyclones and climate change, *Tropical Cyclone Research and Review*, vol. 8, pp. 240-250, at https://www.sciencedirect.com/science/article/pii/S2225603220300047?via%3Dihub/.

Atlantic hurricane activity since 1970."[68] The amplification of cyclone strength from the decrease in certain air pollutants – in particular, SO_2, NO and NO_2 – reflects a partial unleashing of the full radiative forcing of greenhouse gases. The to-date suppression of their full radiative impact, by significant co-pollutants that especially degrade human health, amounted to an implicit Faustian bargain, as Petitioner Hansen has noted, one that is now coming due as the long-overdue public demand for improved air quality arises even in the face of the climate crisis.[69] Accordingly, as we reduce emissions of air pollutants such as SO_2, NO and NO_2 to improve human health and reduce acid precipitation (through, for example, rule-making by the EPA to comply with the Clean Air Act or international covenants to reduce sulfur emissions from shipping) we also eliminate the cooling effects of the aerosols they form. This in turn allows the fuller warming effect of greenhouse gases to be expressed. Indeed, aerosols currently mask as much as half of the warming potential of excess CO_2, CH_4 and other anthropogenic greenhouse gases present in the atmosphere.

Even though within statistical error the total numbers of hurricanes that occur each year may not have changed yet, there is evidence that late-season Atlantic hurricanes are occurring more often. During the 140-year period of 1851-1990, only 30 hurricanes formed in the Atlantic on or after November 1, for a total of less than one late season hurricane every five years, and only four Category 3 or stronger late-season hurricanes occurred in those 140 years, with only 3 Caribbean hurricanes. However, during only the five-times shorter, 26-year period ending in 2017, there were 17 late-season hurricanes (only five expected based on historical data), with 6 in the Caribbean, 4 of which were Category 3 or above.[70]

The science of weather event attribution is rapidly advancing, and for two main reasons: "[1] the understanding of the climate and weather mechanisms that produce extreme events is improving, and [2] rapid progress is being made in the methods that are used for event attribution"[71] This in particular may be so with respect to the detection of an anthropogenic signal for intensified tropical cyclones. The IPCC now attributes at least the increases in precipitation from such storms to human activities with "high confidence." For example, there is

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[68] Fourth National Climate Assessment, Chapter 2: Our Changing Climate (2018), at https://nca2018.globalchange.gov/chapter/2/.

[69] Hansen and Sato, July Temperature Update: Faustian Payment Comes Due (13 August 2021) at http://www.columbia.edu/~mhs119/Temperature/Emails/July2021.pdf.

[70] Masters, November Atlantic hurricane outlook: The season is not over yet, *Weather Underground*, 1 November 2017, at https://www.wunderground.com/cat6/november-atlantic-hurricane-outlook-season-not-over-yet/.

[71] National Academies of Sciences Committee on Extreme Weather Events and Climate Change Attribution, *Attribution of Extreme Weather Events in the Context of Climate Change* (2016) at https://climatemodeling.science.energy.gov/system/files/private/meetings/attachments/Sobel_Extreme_Weather_Events.pdf

high confidence that anthropogenic climate change contributed to extreme rainfall during hurricane Harvey and other intense tropical storms.[72]

Extreme weather events already cause enormous annual loss of life and property in the U.S., so that any significant potential amplification is of grave concern. During the decade 2010-2019 the U.S. sustained 258 weather and climate disasters where the overall damage costs reached or exceeded $1 billion, and the cumulative cost for these events exceeded $1.75 trillion.[73] These billion-dollar events included drought (26), flooding (32), freezes (9), severe storms (113), hurricanes (44), wildfires (17) and winter storms (17). It is especially noteworthy that the costs of inflation-adjusted billion-dollar disasters have increased steadily over the past four decades, averaging $13B, $27B, $51B and $80B per year during the decades of the 1980s, 1990s, 2000s and 2010s, respectively. Associated fatalities have increased as well, averaging 281, 217, 305 and 521 annually in each of those decades. The costs of severe weather events in terms of both property and life clearly correlate strongly with the observation of increasing average global temperature. Although cause and effect cannot yet be established between all human activities and extreme weather events – with the exception of flooding where the IPCC does assign high confidence – the observed trend over the past four decades agrees with the expectation that increasing the energy content of the land/ocean/atmosphere system will increase the frequencies and intensities of severe weather events.

We note that the conclusions of the NAS and IPCC are based on climate modeling and observations of trends in severe weather in recent decades. They do not take into account the possibility of much more far-reaching consequences that may result from nonlinearities in the climate system that have been proposed by petitioner Hansen and colleagues (*Ice Melt*) based on paleoclimate studies coupled with climate system modeling discussed above in reference to increasing sea levels. In the mechanism described above in Figure 12, the freshwater released to the ocean by melting of ice sheets in West Antarctica and Greenland results in a slowdown and possibly stopping of the thermohaline circulation in the vicinity of Antarctica due to the low density of freshwater compared to seawater. This "stratification" process induces amplifying feedbacks that increase subsurface ocean warming and ice shelf melting. Another effect is expansion of sea ice off Antarctica as a result of the colder surface water with the result that there is increased precipitation over the ocean and decreased precipitation over the ice sheet.

With this mechanism in play, the shrinking ice sheet could raise sea level by several meters. This mechanism could explain the 6-9 m sea level rise that occurred in the prior interglacial period. Near the end of that period (Eemian), 130,000-115,000 years ago, there is evidence of much larger global temperature gradients with resulting extreme storms while Earth was warmer by less than 1 °C than it is today. The geologic evidence for the superstorms near the end of the Eemian period are reviewed in Hansen's *Ice Melt* paper and include [1] megaboulders averaging 100 tons that were plucked from seaward middle Pleistocene outcrops

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[72]IPPC AR6 WGI, Climate Change 2021, The Physical Basis, p. TS-74.

[73] Smith, 2010-2019: A landmark decade of U.S. billion-dollar weather and climate disasters, NOAA National Centers for Environmental Information, at https://www.climate.gov/news-features/blogs/beyond-data/2010-2019-landmark-decade-us-billion-dollar-weather-and-climate/.

and washed onto a younger Pleistocene landscape, [2] wave run-up deposits that reach heights of over 40 m along hundreds of kilometers of older built-up dune ridges in the Bahama Islands, and [3] chevron-shaped sand ridges standing ~5-15 m across several kilometers on broad, low-lying platforms or ramps throughout the Atlantic-facing, deep-water margins of the Bahamas.

A critical conclusion of the Hansen *Ice Melt* paper is that even a "… 2 °C global warming above the preindustrial level could be dangerous." The study suggested that ice mass loss from the most vulnerable ice could rise exponentially rather than linearly in which case doubling times of 10, 20 or 40 years will yield multi-meter sea level rise in about 50, 100 or 200 years, respectively.

V. Additional Ocean-Based Risks – A Short Survey

(a) Acidification

There is clear consensus among leading national and international scientific bodies that anthropogenic CO_2 causes changes in ocean chemistry that harm the marine environment and that CH_4 also causes additional ocean warming.

For one, the IPCC, comprehensively reviewing the evidence, determined in 2014 and in 2021 that human sources of CO_2 have caused a significant decline in surface ocean pH, with further increases in atmospheric CO_2 "virtually certain to further acidify the Ocean and change its carbonate chemistry."[74] *See* Figure 17 showing a slowing of acidification only under the most stringent of decarbonization scenarios considered recently by the IPCC.

[74] Hoegh-Guldberg, O., R. Cai, E.S. Poloczanska, P.G. Brewer, S. Sundby, K. Hilmi, V.J. Fabry, and S. Jung, 2014: The Ocean. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. at 1674. See also, Rhein, M. et al., 2013. Observations: Ocean. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, at what page? And IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, SPM-6.

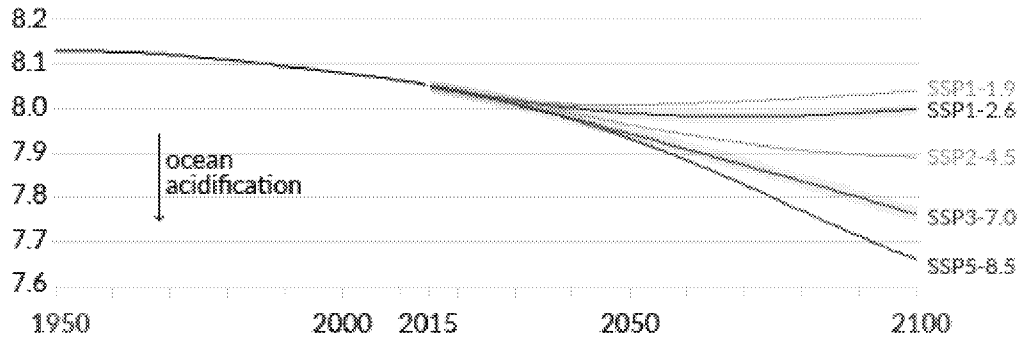

Fig. 17: Global ocean surface pH. Source: IPCC AR6 (2021) SPM-29.

The concern by the international scientific community is long-standing. More than a dozen years ago, for instance, 90 national academies of sciences, including that of the United States, warned that "[t]he average pH of oceanic surface waters [had] been lowered by 0.1 units since the pre-industrial period, represents a 30% increase in hydrogen ion activity," producing a situation in which carbonate ion concentrations – "needed by many marine organisms, such as corals and shellfish, to produce their skeletons, shells and other hard structures" – "are now lower than at any other time during the last 800,000 years."[75]

The Interacademy Panel concluded that CO_2 has increased ocean acidity with "potentially profound consequences for marine plants and animals" including severe threats to coral reefs, polar ecosystems, and a likely reduction in marine food supplies.[76] The National Research Council also acknowledges that "existing data support a growing consensus in the research community that most documented responses to acidification reflect impairment of physiological capacity or performance" for marine life with likely substantial socioeconomic impacts.[77] The U.S. National Climate Assessment concluded that ocean acidification will alter marine ecosystems in dramatic ways including threatening coral reef habitats, inhibiting the ability of marine organisms to form their shells or skeletons[78] and causing reduced growth and survival of shellfish in all regions.[79]

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[75] Interacademy Panel, 2009. IAP Statement on Ocean Acidification at https://oceanfdn.org/sites/default/files/International%20Academy%20Panel%20Statement%20on%20Ocean%20Acidification.pdf.

[76] *Id.*

[77] National Research Council, 2013. Review of the Federal Ocean Acidification Research and Monitoring Plan Committee on the Review of the National Ocean Acidification Research and Monitoring Plan ; Ocean Studies Board ; Division on Earth and Life Sciences ; National Research Council.

[78] https://nca2018.globalchange.gov/chapter/9/ Last accessed 2/12/21

[79] Doney, S. et al., 2014. Ch. 24: Oceans and Marine Resources. In Climate Change Impacts in the United States: The Third National Climate Assessment, pp.557–578.

EPA itself has already concluded that greenhouse gases, including CO_2 and CH_4, endanger public health and the environment in part because of ocean acidification,[80] and that "ocean acidification presents a suite of environmental changes that would likely negatively affect ocean ecosystems, fisheries, and other marine resources." [81]

That fossil fuel company-traced emissions make a huge contribution to ocean acidification is made clear by recent research. Heede et al[82] found that nearly two-thirds of all industrial carbon dioxide and methane emissions between 1880 and 2010 can be traced to the products of 83 large producers[83] of coal, oil, and natural gas, and 7 cement manufacturers. This is important to inform societal consideration of carbon producer responsibility for loss and damage to communities dependent upon marine ecosystems and fisheries vulnerable to ocean acidification, to include in estimates of the social cost of carbon for carbon fees, and to assign legacy carbon responsibility.

Ekwurzel et al[84] found that between 1880 and 2010, emissions traced to these 90 largest industrial carbon producers contributed ~57% of the rise in atmospheric CO2, 42%–50% of the rise in global mean surface temperature, and approximately 26%–32% of the rise in global sea level. Similarly, because the global surface pH is a function of the atmospheric concentration of carbon dioxide,[85] researchers led by R. Licker,[86] using the Heede data, quantified the contribution of fossil fuel producers to global-scale ocean acidification and found that "emissions traced to the 88 largest industrial carbon producers from 1880–2015 and 1965–2015 have contributed ~55% and ~51%, respectively, of the historical 1880–2015 decline in surface ocean pH. The latter 1965–2015 period, we note, also capture the timeframe in which the major fossil

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[80] EPA, Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act 80 (Dec. 7, 2009).

[81] 75 Fed. Reg. 13538 (Mar. 22, 2010).

[82]Heede R et al Tracing anthropogenic carbon dioxide and methane emissions to fossil fuel and cement producers, 1854–2010 Clim. Change.

[83] These producers include investor-owned, state-owned, and nationalized companies.

[84] Ekwurzel B, Boneham J, Dalton M W, Heede R, Mera R J, Allen M R and Frumhoff P C 2017 The rise in global atmospheric CO2, surface temperature, and sea level from emissions traced to major carbon producers Clim. Change 144 579–90.

[85] National Academies of Sciences, Engineering and Medicine 2017 Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide (Washington DC: The National Academies Press).

I. [86] R. Licker et al, Attributing ocean acidification to major carbon producers 2019 Environ. Res. Lett. **14** 124060. Available at https://iopscience.iop.org/article/10.1088/1748-9326/ab5abc.

fuel companies became aware that continued emissions from the intended use of their products imposed significant climate risks on public health and the environment.[87]

Ocean acidification already constitutes an unreasonable, serious and widespread injury to the marine environment. The oceans have absorbed CO_2 emitted into the atmosphere from coal and gas-fueled power plants, industrial facilities, internal combustion engine vehicles, cement production, and stemming from land use changes. From 1850 to 2019, 2,400 gigatons of CO_2 were emitted by human activity.[88] Around 950 gigatons remain in the atmosphere,[89] with approximately half of the balance taken up by the oceans and the rest by the land.[90] Indeed, each day about 22 million metric tons of CO_2 is taken up by the oceans.[91] This uptake of CO_2 is changing ocean chemistry, causing the oceans to become more acidic. As we have indicated, since the industrial revolution surface ocean pH has declined by 0.11 units on average, corresponding to a 30% increase in acidity.[92, 93, 94] If emissions continue unabated, ocean acidity will increase up to 170% from pre-industrial levels by the end of the century.[95]

Figure 18 illustrates how the pH in the ocean decreases with increasing atmospheric CO_2 concentration. The time series shows atmospheric CO_2 at Mauna Loa (ppmv) and surface ocean pH and pCO_2 (μatm) at Ocean Station Aloha in the subtropical North Pacific Ocean. Petitioners

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[87] Benjamin Franta, *Early oil industry knowledge of CO2 and global warming,* Nat. Clim. Change 8 1024 (2018) available at https://www.nature.com/articles/s41558-018-0349-9.

[88] *See* https://www.theworldcounts.com/challenges/climate-change/global-warming/global-co2-emissions/story

[89] Available at https://www.theworldcounts.com/challenges/climate-change/global-warming/global-co2-emissions/story (accessed 4/8/21).

[90] Rhein, M. et al., 2013. Observations: Ocean. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

[91] Feely, R.A. et al., 2008. Evidence for upwelling of corrosive "acidified" water onto the continental shelf. Science, 320 (5882), p.1490.

[92] Orr, J. et al., 2005. Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms. Nature, 437 (7059), pp.681–686.

[93] Caldeira, K. & Wickett, M.E., 2005. Ocean model predictions of chemistry changes from carbon dioxide emissions to the atmosphere and ocean. J. Geophys. Res., 110(C9), p.C09S04.

[94] Because the pH scale is logarithmic a small decrease is a significant change in acidity; for example, a decrease of 0.1 pH is an approximate 30 percent increase in acidity. Can you refresh my mathematics knowledge of this?

[95] IBGP et al., 2013. *Available* at http://www.igbp.net/publications/summariesforpolicymakers/summariesforpolicymakers/oceanacidificationsummaryforpolicymakers2013.5.30566fc6142425d6c9111f4.html.

observe that the increase in oceanic CO_2 over the period of observations is consistent with the atmospheric increase of CO_2 within the statistical limits of the measurements.[96]

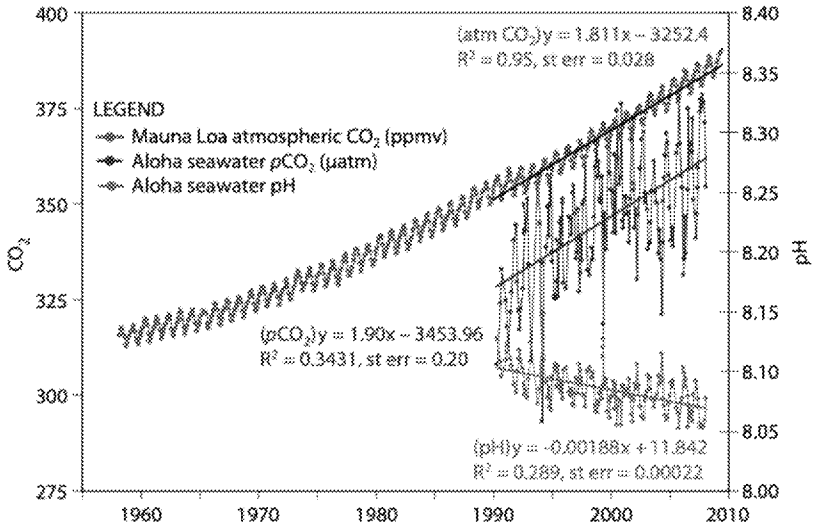

Fig. 18. Time series of atmospheric CO_2 at Mauna Loa (ppmv) and surface ocean pH and pCO_2 (µatm) at Ocean Station Aloha in the subtropical North Pacific Ocean (see inset map).[97]

Anthropogenic ocean acidification exceeds the level of natural variability up to 30 times in some regions.[98] The rate of change in ocean acidity is unprecedented in the past 300 million years, a period that includes four mass extinctions.[99, 100] The seawater chemistry change is an order of magnitude faster than what occurred 55 million years ago during Paleocene-Eocene Thermal (PET) Maximum, which is considered to be the closest analogue to the present. During the PET Maximum period, 96% of marine species went extinct.[101] The current changes in seawater chemistry are irreversible on human timescales.[102]

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[96] Feely, R.A., Doney, S. & Cooley, S., 2009. Ocean acidification: Present conditions and future changes in a high CO_2 world. Oceanography, 22(4), pp.36–47.

[97] Feely, R.A., Doney, S. & Cooley, S., 2009. Ocean acidification: Present conditions and future changes in a high CO_2 world. Oceanography, 22(4), pp.36–47. The increase in oceanic CO_2 over the period of observations is consistent with the atmospheric increase within the statistical limits of the measurements.

[98] Friedrich, T., et al. "Detecting regional anthropogenic trends in ocean acidification against natural variability." Nature Climate Change 2.3 (2012): 167-171. https://www.nature.com/articles/nclimate1372

[99] Honisch, B. et al., 2012. The Geological Record of Ocean Acidification. Science, 335(6072), pp.1058–1063.

[100] Zeebe, R., 2012. History of Seawater Carbonate Chemistry , Atmospheric CO_2 , and Ocean Acidification. Annual Review of Earth and Planetary Sciences, (December 2011), pp.141– 165.

[101] Penn, Justin L., et al. "Temperature-dependent hypoxia explains biogeography and severity of end-Permian marine mass extinction." *Science* 362.6419 (2018).

[102] Royal Society, 2005. Ocean acidification due to increasing atmospheric carbon dioxide. See also IPCC AR 6 (2021) SPM-28 ("Changes are irreversible on centennial to millennial time scales in global ocean

CO_2 pollution already is changing ocean chemistry and harming the marine environment. Unabated, there will be severe and detrimental impacts on marine ecosystems, the economy, and public health. On the other hand, fossil fuel emissions phaseout coupled with "[a]nthropogenic CO_2 removal (CDR) leading to global net negative emissions would lower the atmospheric CO_2 concentration and reverse surface ocean acidification."[103]

In light of their impact on ocean chemistry and associated impacts arising from such acidification, fossil fuel CO_2 emissions and excess atmospheric CO_2 from legacy emissions clearly constitute both an unreasonable risk of injury to the environment and health, and also an imminent and unreasonable risk of serious and widespread injury to health of the environment.

(b) Ocean Warming

As climate change warms the Earth, the oceans respond more slowly than land environments.[104] The US National Academy of Science,[105] the Royal Society,[106] 377 members of the National Academy of Sciences, including 30 Nobel laureates,[107] the InterAcademy Partnership,[108] and scientists from around the world have identified increased ocean warming as a threat to marine ecosystems.

As the EPA itself has observed:[109]

> Changes in sea surface temperature can alter marine ecosystems in several ways. For example, variations in ocean temperature can affect what species of plants,

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temperature (very high confidence), deep ocean acidification (very high confidence) and deoxygenation (medium confidence)."

[103] IPCC AR6 (2021), SPM-29. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf.

[104] Sejas et al, Environmental Research Letters, Volume 9, Number 12, 2014

[105] Climate Change Evidence & Causes, http://dels.nas.edu/resources/static-assets/exec-office-other/climate-change-full.pdf

[106] *Id.*

[107] An Open Letter Regarding Climate Change From Concerned Members of the U.S. National Academy of Sciences, September, 20, 2016

[108]Cheng, Lijing, et al. "Improved estimates of ocean heat content from 1960 to 2015." Science Advances 3.3 (2017): e1601545.

[109] USEPA "Climate Change Indicators in the United States. Accessed 12/22/2020 https://www.epa.gov/climate-indicators/climate-change-indicators-sea-surface-temperature. Internal citations omitted.

> animals, and microbes are present in a location, alter migration and breeding patterns, threaten sensitive ocean life such as corals, and change the frequency and intensity of harmful algal blooms such as "red tide" and threaten the ocean's primary producers. Over the long term, increases in sea surface temperature could also reduce the circulation patterns that bring nutrients from the deep sea to surface waters. Changes in reef habitat and nutrient supply could dramatically alter ocean ecosystems and lead to declines in fish populations, which in turn could affect people who depend on fishing for food or jobs.

Perhaps the ocean organism most vulnerable to temperature change is coral. Evidence establishes that reefs will bleach (eject their symbiotic algae) at even a slight persistent temperature rise. Bleaching slows coral growth, makes them susceptible to disease, and can lead to large-scale reef die-off. EPA has found: "Coral reefs are already disappearing due to climate change and other non-climate stressors. Temperature increases and ocean acidification are projected to further reduce coral cover in the future. Without global GHG mitigation, extensive loss of shallow corals is projected by 2050 for major U.S. reef locations."[110]

Other organisms affected by ocean temperature change include krill,[111] an extremely important link at the base of the food chain. Research has shown that krill reproduce in significantly smaller numbers when ocean temperatures rise. This can produce a cascade effect by disrupting the life cycle of krill eaters, such as penguins and seals—which in turn causes food shortages for higher predators.

When water heats up, it expands. Thus, the most readily apparent consequence of higher sea temperatures is a rapid rise in sea level, as discussed earlier. Sea level rise causes inundation of coastal habitats for humans as well as plants and animals, shoreline erosion, and more powerful storm surges that can devastate low-lying areas.

Also as discussed above, we are already seeing the effects of higher ocean temperatures in the form of stronger and more frequent tropical storms and hurricanes/cyclones. Warmer surface water dissipates more readily into vapor, making it easier for small ocean storms to escalate into larger, more powerful systems.[112] [113] These stronger storms can increase damage to human structures when they make landfall. They can also harm marine ecosystems like coral reefs and kelp forests.

Warmer sea temperatures are associated with the spread of invasive species and marine diseases. The evolution of a stable marine habitat is dependent upon myriad factors, including

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[110] https://www.epa.gov/cira/climate-action-benefits-coral-reefs last accessed 5/30/16 Available no longer: 6/18/2021.

[111] Flores et al.: Krill and climate change, Mar Ecol Prog Ser 458: 1–19, 2012

[112] de Vries, Hylke, et al. "How Gulf-Stream SST-fronts influence Atlantic winter storms." *Climate Dynamics* 52.9 (2019): 5899-5909.

[113] Zhang, Li, et al. "Decadal coupling between storm tracks and sea surface temperature in the Southern Hemisphere midlatitudes." *Climate Dynamics* 56.3 (2021): 783-798.

water temperature. If an ecosystem becomes warmer, it can create an opportunity where outside species or bacteria can thrive where they were once excluded, leading to forced migrations and even species extinctions.

Changes in ocean temperatures and currents brought about by climate change will lead to alterations in climate patterns around the world. For example, warmer waters may promote the development of stronger storms in the tropics, which can cause property damage and loss of life. The impacts associated with sea level rise and stronger storms are especially relevant to coastal communities. Figure 19, from EPA's Climate Change Indicators project, shows the change in ocean heat content. The Agency pointedly noted that, "for reference an increase of 1 unit . . . (1 × 10^{22} joules) is equal to approximately 17 times the total amount of energy used by all the people on Earth in a year."[114]

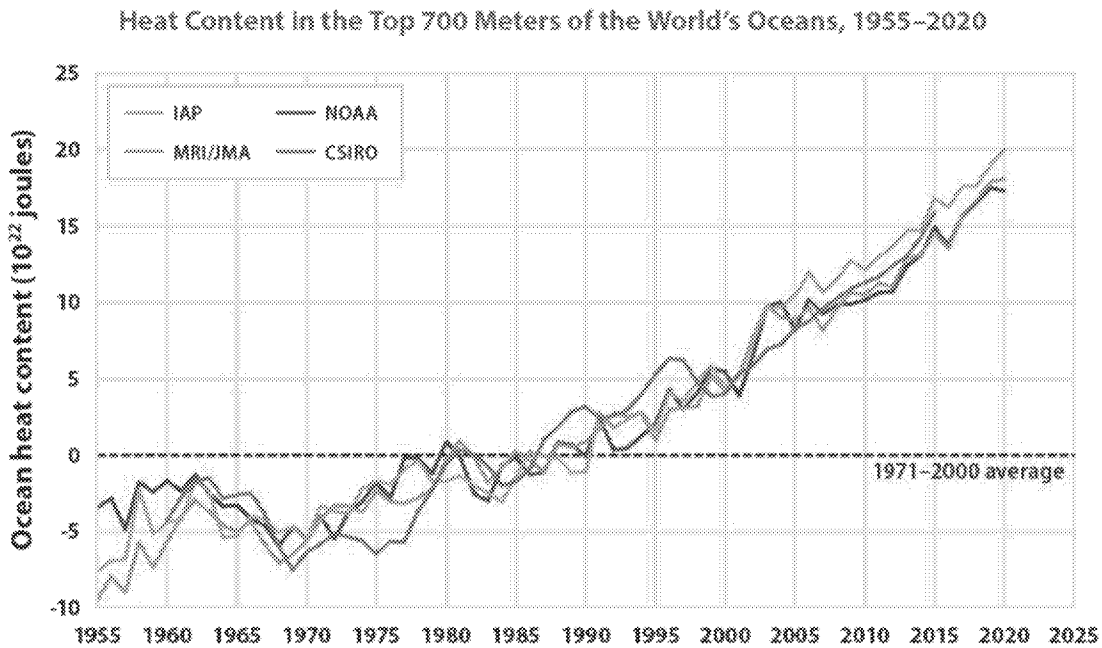

Fig. 19. Source: EPA based on data reported by the United States' National Oceanic and Atmospheric Administration et al.

In addition, recent research suggests that ocean warming is destabilizing ocean floor gas hydrates and inducing seafloor methane leakage.[115]

To reduce ocean temperatures, we must rapidly phase out fossil fuel GHG emissions and remove excess legacy GHGs. In light of their ocean warming impact and the train of impacts arising from such warming, additional fossil fuel emissions and legacy emissions impose both an

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[114] EPA, Climate Change Indicators, at https://www.epa.gov/climate-indicators/climate-change-indicators-ocean-heat.

[115] M. Ketzer et al., *Gas hydrate dissociation linked to contemporary ocean warming in the southern hemisphere*, Nature Communications (2020) at https://www.nature.com/articles/s41467-020-17289-z.

unreasonable risk of injury to the environment and health and also an imminent and unreasonable risk of serious or widespread injury to health or the environment.

(c) Ocean deoxygenation

Ocean warming also drives deoxygenation, through solubility and stratification effects. The effect is not merely to coastal waters: "Ocean warming and increased stratification of the upper ocean caused by global climate change will likely lead to declines in dissolved O_2 in the ocean interior (ocean deoxygenation) with implications for ocean productivity, nutrient cycling, carbon cycling, and marine habitat."[116]

Dissolved O_2 is essential for aerobic respiration, and low O_2 levels negatively affect the physiology of higher animals. This can lead to suboxic areas or even "dead zones" where many macrofauna are absent. Deoxygenation can also accelerate climate change. Suboxic conditions can cause denitrification in the ocean, increasing production and release of nitrous oxide – a potent, long-lived GHG. In addition, the organic matter respiration that generates hypoxia also elevates CO_2, thus leading to coupled deoxygenation and ocean acidification in a future warmer, high-CO_2 world. The synergistic effects of these multiple stressors may magnify the negative physiological and microbial responses beyond the impacts expected for each perturbation considered in isolation.

Ocean models predict declines of 1 to 7% in the global ocean O_2 inventory over the next century, with declines continuing for a thousand years or more into the future.[117] An important consequence may be an expansion in the area and volume of so-called oxygen minimum zones, where O_2 levels are too low to support many macrofauna and profound changes in biogeochemical cycling occur.

Ocean deoxygenation is primarily the consequence of two generally reinforcing, but independent, ocean warming processes: (1) oxygen is less soluble as temperature increases and (2) warming waters, as well as decreased surface salinity from ice melt, enhance stratification and thus reduced mixing and transport. The combination reduces the supply of oxygen, and that loss of oxygen from the ocean will cause myriad harmful effects– including a reduction in the habitable range for higher organisms that require a certain minimum level of oxygen. Additional major biogeochemical shifts may be triggered as well.[118]

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[116] Jewett, L., and A. Romanou, 2017: Ocean Acidification and Other Ocean Changes. *Climate Science Special Report: Fourth National Climate Assessment, Volume I.* Wuebbles, D. J., D. W. Fahey, K. A. Hibbard, D. J. Dokken, B. C. Stewart, and T. K. Maycock, Eds., U.S. Global Change Research Program, Washington, DC, USA, 364–392.

[117] Keeling, Ralph F., Arne Körtzinger, and Nicolas Gruber. "Ocean deoxygenation in a warming world." Marine Science 2 (2010).

[118] Harvey et al., *Meta-analysis reveals complex marine biological responses to the interactive effects of ocean acidification and warming*, Ecology and Evolution 2013; 3(4): 1016–1030

Significant deoxygenation has occurred over the past 50 years in the North Pacific and tropical oceans, and a convergence of evidence implies further significant changes. The strongest evidence is that O_2 changes already seem to be occurring, most notably in the North Pacific and tropical O_2 minimum zones. Changes in the North Pacific are tied to increased stratification in the subarctic region. O_2 declines are consistent with the predicted response to global warming in global ocean models, and the patterns of observed O_2 change can be reproduced with higher-resolution models driven by observed forcings. The relative rapidity of O_2 decreases in the subarctic Pacific and in coastal upwelling regions off the west coast of North America raises the specter of imminent impacts on marine habitat and fisheries.[119] There is potential for even larger O_2 declines in the future if levels of CO_2 and CH_4 in the atmosphere keep increasing.

Falkowski et al., analyzed relatively long-term databases of ocean conditions and found trends of deoxygenation in upwelling areas along continental margins and shoaling of the depths of critical oxygen concentrations. They conclude that even moderately long-term decline in source-water oxygen and increasing nutrient concentrations will cause currently intermittent but extreme deoxygenation conditions to become more frequent, intense, and persistent, with a potentially profound impact on global fisheries.[120]

Petitioners note, as well, that the number of hypoxic (deoxygenated) ocean ecosystems may be underestimated in modeling by an order of magnitude in the tropics,[121] in part because of the skewed distribution of research capacity with respect to tropical ecosystems.[122]

There is no doubt that deoxygenation is occurring and accelerating.[123] Worldwide shoaling of the upper oxygen minimum zone (OMZ) boundaries has been documented in the eastern boundaries of all major OMZs over the past several decades. In some cases the lower OMZ boundaries have also shifted to greater depths, and minimum oxygen concentrations in the OMZ cores have also decreased – intensifying the OMZ.[124] Keeling et al.[125] provides tabulations

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[119] Keeling et al., Ocean Deoxygenation in a Warming World Annu. Rev. Mar. Sci. 2010. 2:199–229

[120] Falkowski et al., *Eos*, Vol. 92, No. 46, 15 November 2011

[121] Laffoley, Dan, and John M. Baxter. Ocean Deoxygenation: Everyone's Problem-Causes, Impacts, Consequences and Solutions. Gland, Switzerland: IUCN, 2019. Available at https://portals.iucn.org/library/sites/library/files/documents/2019-048-En.pdf.

[122] Altieri, A.H., Harrison, S.B., Seemann, J., Collin, R., Diaz, R.J., & Knowlton, N. (2017). Tropical dead zones and mass mortalities on coral reefs. Proceedings of the National Academy of Sciences of the United States of America. https://www.pnas.org/content/114/14/3660.

[123] IPCC Climate Change 2013: The Physical Science Basis (eds Stocker, T. et al.) (Cambridge Univ. Press, 2013).

[124] Gilly et al., Oceanographic and Biological Effects of Shoaling of the Oxygen Minimum Zone, Annual Review of Marine Science, December 2011

[125] Keeling et al. Ocean deoxygenation in a warming world.*Annu.Rev.Mar.Sci.* 2:199–229 (2010)

of oxygen declines and volume changes in different OMZs. Whitney et al.[126] provide time-series data that reveal an extensive oxygen decline in the northeast Pacific and a significant expansion of oxygen minimum zones in the tropical and sub topical ocean over the past half century. Using historical data (1960-2015) Santos et al.[127] identify decreases in the thickness and oxygen content of OMZs in the eastern tropical South Atlantic (ETSA) and eastern tropical North Atlantic (ETNA) over a 55 year period.

Long et al.,[128] in a recent study funded by the National Academy of Sciences, using the Community Earth System Model (CESM), found that by the 2030s – under RCP8.5 (carbon emission business as usual) – widespread loss of oxygen in the thermal layer will be seen – and the new variances of all simulations were found to all be higher than the control simulation. At a global scale, anthropogenic climate change in RCP8.5 drives a sharp acceleration of oceanic deoxygenation in the first half of the 21st century. Deoxygenation on layers within the thermocline is primarily driven by increasing stratification, which curtails supply of fresh oxygen.

Low oxygen effects nitrogen cycling. Suboxia can control the loss of fixed nitrogen via denitrification, and therefore influences the availability of nitrate, a limiting nutrient for ocean productivity.[129,130.] Oxygen levels also control ocean production of N_2O: production can increase under suboxic conditions as a product of denitrification.[131] Both of these effects – release of N_2O and limiting primary production (thus slowing the carbon pump) will amplify climate change. A reduction in the nutrient supply to the euphotic layer as a result of increased thermal stratification may also lead to a decreased efficiency of the biological pump in

[126] Whitney, F. A., Freeland, H. J. & Robert, M. *Prog. Oceanogr.* 75, 179–199 (2007).

[127] Santos, Guilherme Cordova, et al. "Influence of Antarctic intermediate water on the deoxygenation of the Atlantic Ocean." *Dynamics of Atmospheres and Oceans* 76 (2016): 72-82.

[128] Long, Matthew C., Curtis Deutsch, and Taka Ito. "Finding forced trends in oceanic oxygen." Global Biogeochemical Cycles 30.2 (2016): 381-397.

[129] Codispoti LA, Brandes JA, Christensen JP, Devol AH, Naqvi SWA, et al. 2001. The oceanic fixed nitrogen and nitrous oxide budgets: Moving targets as we enter the anthropocene? Sci. Marina 65:85–105.

[130] Gruber N. 2008. The marine nitrogen cycle: Overview of distributions and processes. In Nitrogen in the marine environment, ed. DG Capone, DA Bronk, MR Mulholland, EJ Carpenter, pp. 1–50. Amsterdam: Elsevier. 2nd ed.

[131] Codispoti LA, Brandes JA, Christensen JP, Devol AH, Naqvi SWA, et al. 2001. The oceanic fixed nitrogen and nitrous oxide budgets: Moving targets as we enter the anthropocene? Sci. Marina 65:85–105.

sequestering atmospheric CO_2. The concomitant loss of ocean buffering is another amplifying feedback.[132, 133]

On the other hand, fossil fuel phaseout and removal of excess legacy emissions, as Petitioners here propose, should reduce deoxygenation by more than half of what otherwise will occur from our current trajectory.[134]

In light of their impact on ocean oxygen levels and the train of impacts arising from such ocean deoxygenation, additional fossil fuel CO_2 emissions and excess atmospheric CO_2 from legacy emissions must be deemed to impose both an unreasonable risk to of injury the environment and health, and also an imminent and unreasonable risk of serious or widespread injury to health or the environment.

(d) Widespread and Synergistic Ocean Risks

Although there is considerable uncertainty about the spatial and temporal details, climate change is clearly and fundamentally altering ocean ecosystems.[135] Further change will continue to impose enormous challenges and costs for societies worldwide, and upon future generations.[136] The effects are widespread throughout the marine food web, impacting ocean biodiversity,[137] with severe effects on top predators,[138] mesopredators,[139] herbivores,[140] as well as

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[132] Cermeno et al.The role of nutricline depth in regulating the ocean carbon cycle, PNAS V105 no. 51, 2008.

[133] Viviani, Donn A., Spatial Variability in near-surface plankton metabolic rates. Diss. UNIVERSITY OF HAWAI'I.

[134] IOC –UNESCO and UNEP (2016). Open Ocean: Status and Trends, Summary for Policy Makers. United Nations Environment Programme (UNEP), Nairobi.

[135] Du Pontavice, Hubert, et al. "Climate change undermines the global functioning of marine food webs." *Global change biology* 26.3 (2020): 1306-1318.

[136] Ove et al. The Impact of Climate Change on the World's Marine Ecosystems, Science 18 Jun 2010: Vol. 328, Issue 5985, pp. 1523-1528

[137] Hillebrand, Helmut, et al. "Climate change: Warming impacts on marine biodiversity." *Handbook on marine environment protection*. Springer, Cham, 2018. 353-373.

[138] Rosa, Rui, and Brad A. Seibel. "Synergistic effects of climate-related variables suggest future physiological impairment in a top oceanic predator." Proceedings of the National Academy of Sciences 105.52 (2008): 20776-20780.

[139] Flynn et al. Ocean acidification exerts negative effects during warming conditions in a developing Antarctic fish, Oxford Journals, Conservation Physiology Volume 3, Issue 1, 2015

[140] Poore et al. Direct and indirect effects of ocean acidification and warming on a marine plant-herbivore interaction. Oecologia. 2013 Nov;173(3):1113-24

substantial impacts to the base of the chain[141] – that is, to primary producers that supply half of our oxygen[142] and serve as engines for our planet's biological carbon pump.

Ocean impacts include warming, decreased ocean productivity, altered food web dynamics, reduced abundance of habitat-forming species, shifting species distributions, and a greater incidence of disease. Recent research demonstrates that a combination of elevated temperature and acidification, both exacerbated by fossil fuel GHG emissions, particularly CO_2 and CH_4, has a synergistic effect on marine life[143] and the ocean.

(i) Ocean Warming, Deoxygenation and Acidification's Synergistic Ecosystem Impacts

The full impact of elevated CO_2, methane, nitrous oxide, and global warming refrigerants on marine ecosystems is still being written, but there is high confidence that ecosystem impacts will be sharply negative – as has been established by recent meta-analysis into the multiplicative nature of ocean warming and acidification.[144] Demonstrated and anticipated impacts include loss of diversity,[145] loss of abundance of calcifying species, shifting prey and predator interactions, and loss of suitable habitat. As mentioned supra, the synergistic impacts of ocean acidification and warming also stand to amplify climate change. Mesocosm studies found that ocean acidification may amplify global warming through decreasing biogenic production of the marine sulfur component dimethylsulfide, which can impact cloud albedo.[146] Similarly, ocean warming through a number of mechanisms (solubility and density) increase ocean stratification and deoxygenation, resulting in increased nitrous oxide formation and emissions.[147]

In 2011, Nicholas Gruber took a broad-level look at three stressors: ocean warming, acidification and deoxygenation, He found that each of them, unless strong climate mitigation measures are implemented, are bound to have profound effects on marine biogeochemistry and ecosystems, and that situation may be aggravated further if these three stressors act

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[141] Bopp et al, Biogeosciences, 10, 6225–6245, 2013

[142] Field et al, Primary Production of the Biosphere: Integrating Terrestrial and Oceanic Components SCIENCE VOL 281 10 JULY 1998

[143] Cattano, Carlo, et al. "Living in a high CO2 world: a global meta-analysis shows multiple trait-mediated fish responses to ocean acidification." *Ecological Monographs* 88.3 (2018): 320-335.

[144] Kroeker, Karisty J., et al. "Impacts of ocean acidification on marine organisms: quantifying sensitivities and interaction with warming." *Global change biology* 19.6 (2013): 1884-1896.)

[145] Colossi Brustolin, Marco, et al. "Future ocean climate homogenizes communities across habitats through diversity loss and rise of generalist species." *Global change biology* 25.10 (2019): 3539-3548.

[146] Six KD, Kloster S, Ilyina T, Archer SD, Zhang K, et al. 2013. Global warming amplified by reduced sulphur fluxes as a result of ocean acidification. Nature Climate Change.

[147] Keeling et al. , Annu. Rev. Mar. Sci. 2010. 2:199–2 29

simultaneously.[148] Similarly, in 2010 Anlauf et al., looked at the joint effects of warming and acidification and found that although primary polyp growth was reduced only marginally by more acidic seawater, the *combined* effect of high temperature and lowered pH caused a significant reduction in growth of primary polyps – namely, by almost a third.[149]

The latest global coral reef assessment[150] estimates that 19 percent of the world's coral reefs are dead, and other result suggests that up to 70% of the world's coral reefs may be lost within the next four decades if current trends in climate change and coastal human population growth persist.[151] Major threats to corals include warming sea-surface temperatures,[152] expanding seawater acidification[153] and deoxygenation[154] from release of CO_2, nitrous oxide and methane.

In 2013, Camilo Mora[155] found that "[o]cean warming and acidification… are causing a new set of conditions that are very close to the tolerance thresholds of corals, making them vulnerable to massive bleaching and mortality when long-term trends related to climate change are added to natural variability." The decay of coral reefs could potentially impair their ability to deliver goods and services such as fisheries, tourism, coastal protection valued in 1997 at over US $375 billion annually.[156] Likewise, future changes in ocean temperature are expected to

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[148] Gruber built upon the German Advisory Council on Global Change (WBGU)'s report entitled 'The future oceans: warming up, rising high, turning sour'; which summarized what was known at that time (2006) with regard to how the ocean might respond to global warming induced primarily by increases in greenhouse gases.

[149]Anlauf, Holger, Luis D'Croz, and Aaron O'Dea. "A corrosive concoction: the combined effects of ocean warming and acidification on the early growth of a stony coral are multiplicative." Journal of Experimental Marine Biology and Ecology 397.1 (2011): 13-20.

[150] Global Coral Reef Monitoring Network (GCRMN)

[151] Wilkinson, C., 2004. Status of Coral Reefs of the World: 2004. Australian Institute of Marine Science, Townsville, Australia, p. 301.

[152] Hoegh-Guldberg, Ove, et al. "Coral reefs under rapid climate change and ocean acidification." science 318.5857 (2007): 1737-1742.

[153] *Id.*

[154] Alva-Basurto, Jorge Christian, and Jesús Ernesto Arias-González. "Modelling the effects of climate change on a Caribbean coral reef food web." Ecological Modelling 289 (2014): 1-14.

[155] Mora et al., Biotic and Human Vulnerability to Projected Changes in Ocean Biogeochemistry over the 21st Century PLOS Biology, October 2013, Volume 11, Issue 10

[156]Costanza R, d'Arge RC, de Groot R, Farber S, Grasso M, et al. (1997) The value of the world's ecosystem services and natural capital. Nature 387: 253– 261.

cause a redistribution in the global diversity of cetaceans,[157] which in turn could impact local economies that rely on tourism or the take of these species.

Anthony et al.[158] found that the combination of ocean warming and acidification from increasing levels of atmospheric CO_2 threaten coral reefs that are in many regions also subject to local-scale disturbances such as overfishing and conventional pollution.[159] Further, in 2014 Basurto et al.[160] looked at coral bleaching from warming temperatures, the potential decreases in dissolved oxygen concentration (deoxygenation) and pH (acidification) in the oceans. These employed several dynamic models constructed from an extensive database of 171 reef fish species (abundance and biomass) and benthic communities from 13 coral reefs along 400 km of the Mexican Caribbean coast. When all the three sources of stress were combined, their simulations "found a general decrease of biomass in fish, non-fish, and some commercially valuable fish and macroinvertebrate functional groups, suggesting that the combined effects can result in a potential loss of biodiversity and ecosystem services in coral reefs."

Using a probabilistic resilience model (and conservative assumptions) and building on the dynamics of a species pair of corals (Acropora) and fleshy macroalgae (Lobophora), researchers have determined that the effects of ocean acidification and warming on coral growth and mortality will impact coral reef resilience – that is, will lower the threshold at which other, normally occurring, stresses can drive the study community from predominantly coral-dominated to predominantly algal-dominated states, specifically by reducing coral growth (due to acidification) and survivorship (due to warming).[161] Figure 20 illustrates their projection of the bleaching risk over time for the Great Barrier Reef from ocean acidification and temperature. The researchers concluded that a failure to rapidly stabilize and reduce the concentration of CO_2 in Earth's atmosphere is likely to lead to significant loss of key framework builders such as Acropora, irrespective of the effectiveness of local management.[162]

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[157] Whitehead H, McGill B, Worm B (2008) Diversity of deep-water cetaceans in relation to temperature: implications for ocean warming. Ecology Letters 11: 1198–1207.

[158] Anthony et al. , Ocean acidification and warming will lower coral reef resilience, Global Change biology, Volume 17, Issue 5 May 2011 Pages 1798–1808

[159] *Id.*

[160] Alva-Basurto, Jorge Christian, and Jesús Ernesto Arias-González. "Modelling the effects of climate change on a Caribbean coral reef food web." Ecological Modelling 289 (2014): 1-14.

[161] *Id.*

[162] Similarly, Harvey et al., in a meta-analysis of 107 peer reviewed articles, containing 623 unique observations, found complex marine biological responses to the interactive effects of ocean acidification and warming. While biological responses varied across taxonomic groups, life-history stages, and trophic levels, combining stressors generally exhibited a stronger biological (either positive or negative) effect. Using a subset of orthogonal studies, they showed that four of five of the biological responses measured (calcification, photosynthesis, reproduction, and survival, but not growth) interacted synergistically, and negatively, when warming and acidification were combined. Harvey et al., *Meta-analysis reveals complex marine biological responses to the interactive effects of ocean acidification and warming*, Ecol Evol. 2013 Apr; 3(4): 1016–1030

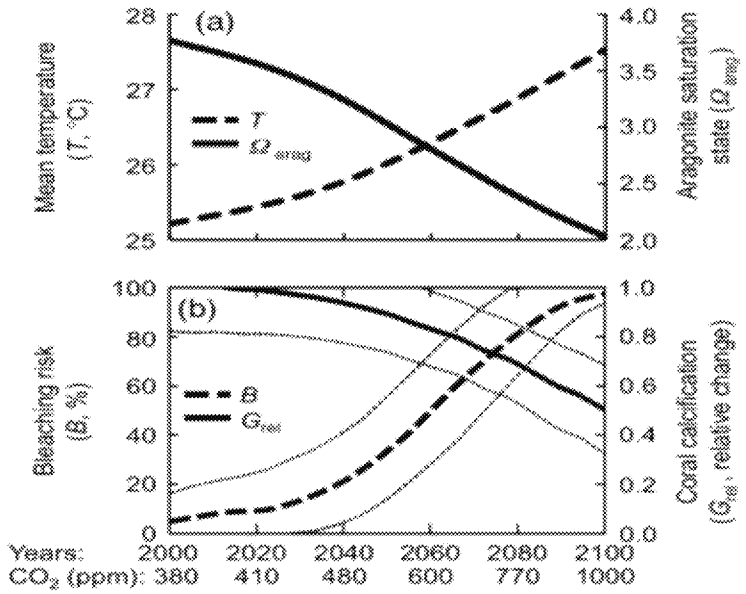

Figure 20[163] Projections of ocean warming and acidification and predicted responses by Acropora for the southern Great Barrier Reef, Australia.[164]

Nagelkerken et a.l[165], performed a meta-analysis of 632 published experiments derived from multiple ecosystems and latitudes, that quantified the direction and magnitude of ecological change resulting from ocean acidification and warming. They looked at how these stressors (warming and acidification) affected the interactions between trophic levels to conceptualize overall marine ecosystem changes. They determined that there were important and deleterious mismatches between the trophic levels. As did Harvey, they found primary production by temperate noncalcifying plankton increases with elevated temperature and CO_2, (and tropical plankton decreases productivity because of acidification). Temperature increases consumption by and metabolic rates of herbivores as well, but this response didn't translate into greater secondary production, which instead decreases with acidification in calcifying and noncalcifying species.

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[163] Kenneth RN, et al. "Ocean acidification and warming will lower coral reef resilience." *Global Change Biology* 17.5

[164] (a) Mean sea surface temperatures (T) and aragonite saturation states (Oarag) for the A1FI carbon emission scenario for the southern Coral Sea as estimated by the UVicglobal carbon cycle model. (b) Projected bleaching risk (dashed lines) and projected relative change in coral calcification of Acropora intermedia for the 6-month period (October–March) that includes the Austral summer.

[165] Nagelkerken and Connell, Global alteration of ocean ecosystem functioning due to increasing human CO_2 emissions, PNAS vol. 112 no. 43, 2015.

This effect creates a mismatch with carnivores whose metabolic and foraging costs increase with temperature. Species diversity and abundances of tropical as well as temperate species decline with acidification, with shifts favoring novel community compositions dominated by noncalcifiers and microorganisms. Both warming and acidification instigate reduced calcification in tropical and temperate reef-building species. Acidification leads to a decline in dimethylsulfide production by ocean plankton which, as a climate gas, contributes to cloud formation and maintenance of the Earth's heat budget. Analysis of responses in short- and long-term experiments and of studies at natural CO_2 levels reveal little evidence of acclimation to acidification or the temperature changes, except for microbes. This conceptualization of change across whole communities and their trophic linkages forecast a reduction in diversity and abundances of various key species that underpin current functioning of marine ecosystems.

Nagelkerken and Connel[166] observe that ocean acidification and warming are fundamentally changing the globe's largest ecosystem that sustains economic revenue and food for many countries. Their meta-analysis shows that many species communities and ocean habitats will change from their current states, warning that ocean acidification and warming "increase the potential for an overall simplification of ecosystem structure and function with reduced energy flow among trophic levels and little scope for species to acclimate. The future simplification of our oceans has profound consequences for our current way of life, particularly for coastal populations and those that rely on oceans for food and trade."

Nagelkerken et al.[167] recently simulated the effects of multiple stressors in a mesocosm study and found that the multiple stressors, acidification and warming had a catastrophic effect on the marine food web. The researchers filled 12 pools with 5700 gallons of seawater, put sand rocks and a medium for algae to grow, added invertebrates to graze on the algae and a predator fish – a complete food web. They found that CO_2 benefited growth, but warming not only wiped out the benefit but the invertebrate population collapsed. Warm water increased the metabolism of the predator fish, so they ate more, and while there was more algae growth the invertebrate did not grow enough under the new conditions. This mismatch between the availability of food and the need for food was predicted by the earlier meta-analysis.[168]

Pistevos et al.[169] also showed how warming and acidification harms the marine food web. Combining long term laboratory and mesocosm studies with sharks found detrimental effects on predators. They found that elevated CO_2 and acidification amounted to an "anagonistic effect," causing a mismatch by, e.g., higher metabolic demand and decreased ability to locate prey – all

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[166] *Id.*

[167] Nagelkerken., et al. "Boosted food web productivity through ocean acidification collapses under warming." Global Change Biology (2017). Available at https://www.researchgate.net/publication/316531707_Boosted_food_web_productivity_through_ocean_acidification_collapses_under_warming.

[168] Nagelkerken Global alteration of ocean ecosystem functioning due to increasing human CO2 emissions, PNAS vol. 112 no. 43, 2015

[169] Pistevos, Jennifer CA, et al. "Ocean acidification and global warming impair shark hunting behaviour and growth." Scientific reports 5 (2015): 16293.

of which may have cascading top-down controls over food webs through altered predator-prey relationships.[170]

In 2016 Bednaršek et al,[171] summarized the threats that ocean acidification, warming, and deoxygenation pose to pteropod populations. They suggested that pteropods were most likely to become extinct in the polar oceans, where the entire water column could become undersaturated in aragonite (a naturally occurring crystal form of calcium carbonate ($CaCO_3$)) *this century*. Pteropods play an extremely important role in many ocean ecosystems. In the Ross Sea, the pteropod Limacina helicina sometimes replaces krill as the dominant zooplankton species in the ecosystem. In many polar and subpolar regions, pteropods are an important food source for a wide range of species, including North Pacific salmon, mackerel, herring, cod, large whales, and other important species that provide food and livelihood. Overall, Pteropods are responsible for an estimated 20%– 42% of total carbonate production in the ocean,[172] so the aragonite undersaturation risk to the marine carbon pump (the ocean's biologically-driven sequestration of carbon) is enormous.

The Southern Ocean (SO), covering about 34.8 million km^2, will be one of the first and most severely affected regions from ocean acidification (OA) due to naturally low levels of $CaCO_3$. It is estimated that under the current trajectory much of the SO will be unsaturated in aragonite within two or three decades,[173] and it is expected that the seawater of the entire Southern Ocean south of 60° S and a part of the subarctic Pacific will become unsaturated with aragonite by 2100.[174] A recent meta-analysis found that many primary calcifiers are extremely vulnerable to acidification and warming (Figure 18) – including that their shells would be

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[170] Similarly, *see* Goldenberg, Silvan U., et al. "Boosted food web productivity through ocean acidification collapses under warming." Global Change Biology (2017) and Kroeker et al, Impacts of ocean acidification on marine organisms: quantifying sensitivities and interaction with warming, Glob Chang Biol. 2013 Jun; 19(6): 1884–1896.

[171] Bednaršek, Nina, et al. "Pteropods on the edge: Cumulative effects of ocean acidification, warming, and deoxygenation." Progress in Oceanography 145 (2016): 1-24.

[172] Bednaršek N., Možina J, Vogt M, O'Brien C, Tarling GA. 2012. The global distribution of pteropods and their contribution to carbonate and carbon biomass in the modern ocean. Earth Systems Science Data 4: 167–186.

[173] Hossain, M. Belal, and Mahabubur Rahman. "Ocean Acidification: an impending disaster to benthic shelled invertebrates and ecosystem." *Journal of Noakhali Science and Technology University (JNSTU)* 1.1 (2017): 19-30.

[174] Kuroyanagi, Azumi, et al. "Decrease in volume and density of foraminiferal shells with progressing ocean acidification." *Scientific reports* 11.1 (2021): 1-7.

thermodynamically predisposed to dissolve rather than form; this could eventually collapse the marine food web and induce major alterations in the biogeochemical cycle of carbon.[175]

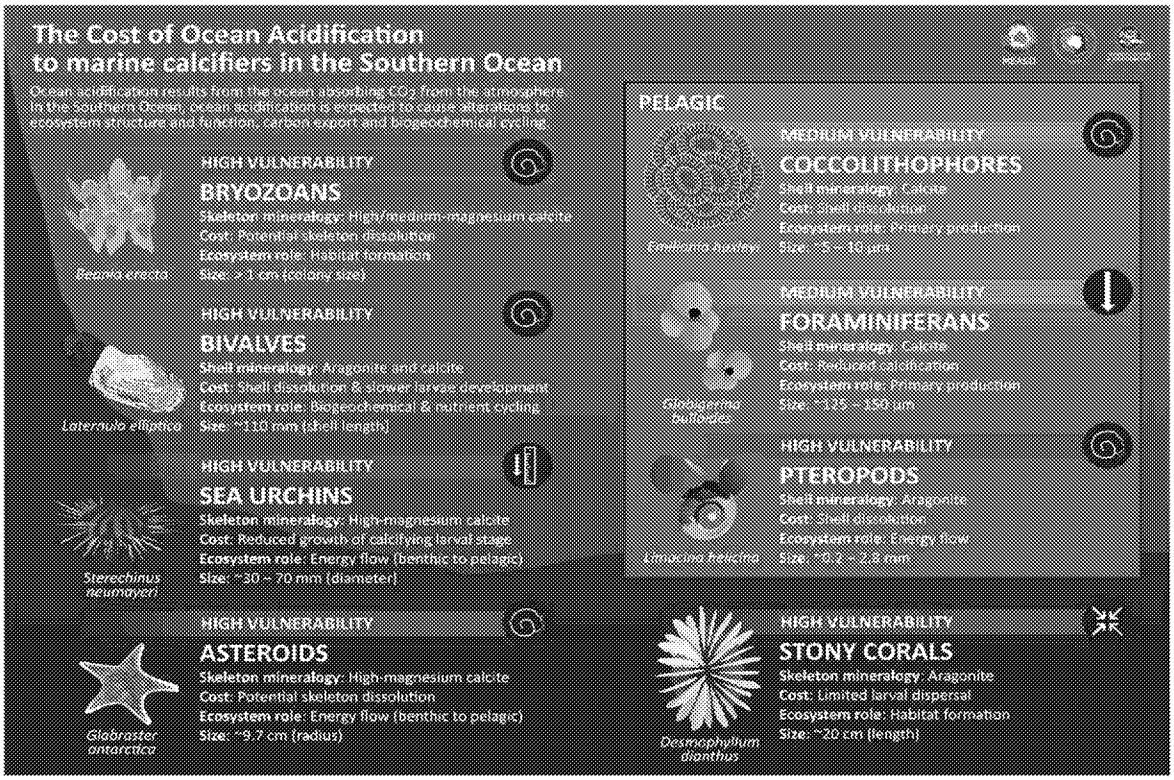

Figure 18: Vulnerability of Marine Calcifiers to Ocean Acidification[176]

(ii) Additional Ocean Impacts

Climate change is rendering certain ocean waters more conducive to waterborne pathogens. In particular, inland and coastal warming is accelerating the release of dissolved organic matter (DOM) through increases in precipitation, thawing of permafrost, and changes in vegetation. The selective absorption of ultraviolet radiation (UV) by DOM can decrease the valuable ecosystem service provided by sunlight inactivation of waterborne pathogens. Additional warming thus threatens increased exposure to infectious diseases in humans, through drinking water and other exposures, as well as to wildlife.[177]

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[175] Figuerola, Blanca, et al. "A review and meta-analysis of potential impacts of ocean acidification on marine calcifiers from the Southern Ocean." *Frontiers in Marine Science* 8 (2021): 24.

[176] *Id.*

[177] Williamson, Craig E., et al. "Climate change-induced increases in precipitation are reducing the potential for solar ultraviolet radiation to inactivate pathogens in surface waters." *Scientific Reports* 7.1 (2017): 1-12.

VI. Risk Reduction Methods

There are several ways to mitigate risk from CO_2 and CH_4. EPA should use a suite of tools to lower atmospheric concentrations of CO_2 and CH_4, including by the timely phaseout of fossil fuels, sequestering CO_2 (including compelling such sequestration, or payment to ensure sequestration, by responsible parties) – so as to mitigate and repair, to the degree possible, all relevant injury to health and the environment, and prevent any such future injury.

There is evidence that many industries could employ existing technology to achieve meaningful emissions reductions affordably. EPA's own data demonstrate that lower pollution rates are readily achievable for many industrial sources of CO_2 and CH_4. For example, the Agency has identified dozens of "control measures and energy efficiency options that are currently available for pulp and paper mill processes," ranging from technological upgrades to improved equipment maintenance.[178] Similarly, EPA has compiled more than a decade of reports on "cost-effective" control strategies and other approaches available to reduce cement plant CO_2 emissions, "includ[ing], for example, energy efficiency measures, reductions in cement clinker content, and raw materials substitution."[179] EPA also has a number of voluntary programs to reduce methane emissions. These could be made compulsory or incentivized.[180]

In 2017, the non-profit Project Drawdown[181] laid out a comprehensive plan to reverse global warming in thirty years using only solutions currently in place. The diverse group of international researchers, [182] modeled the 100 most substantive, existing solutions to address climate change. Their research shows a pathway[183], using currently available technology, from 2020 to 2050 that reduces CO_2-eq emissions by 1050 GT.[184] Benefits and savings estimated from implementation of this strategy far outweigh costs. Project Drawdown has since developed two scenarios[185] to assess what determined, global efforts to address climate change might look

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[178] *See* EPA, Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Pulp and Paper Industry at 11 (2010).

[179] EPA, National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry and Standards of Performance for Portland Cement Plants, 75 Fed. Reg. 54,970, 54,997 (Sep. 9, 2010).

[180] https://www.epa.gov/natural-gas-star-program

[181] Drawdown, Ed. Paul Hawken, Penquin Books, 2017

[182] http://www.drawdown.org/advisors,

[183] http://www.drawdown.org/solutions-summary-by-rank

[184] The change in CO2-EQ, cost and benefits is the marginal difference between a reference case that assumes 2014 levels of adoption continue in proportion to the growth in global markets.

[185] https://drawdown.org/solutions/table-of-solutions

like. Both scenarios are plausible and economically realistic. Drawdown Scenario 1 is roughly in-line with 2˚C temperature rise by 2100, while Drawdown Scenario 2 is roughly in-line with 1.5˚C temperature rise at century's end. The first removes 998 Gigatons CO_2 Equivalent while the second removes 1,576 Gigatons CO_2 Equivalent.

The potential for so-called "natural climate solutions" – reforestation, improved forest management, and improvement in agriculture and soils management – holds special attraction for their availability, in theory, not only to safely sequester a portion of excess atmospheric CO_2 but also for the co-benefits they promise – including with respect to ecosystem and hydrologic restoration. An international team of scientists in 2017 published a comprehensive review of the potential, nation by nation, for such natural atmospheric carbon removal.[186] In Figure 19 Petitioners graphically depict the potential of the top 20 of them.

The potential varies widely depending on a nation's land area, present conditions of its forests, lands and soils, latitude, and other factors. There is in principle, however, no reason that a fossil-fuel company's payments to remove its share of legacy GHG emissions generated in or connected to their US operations could not be put to the purpose in verified, effective natural climate solutions projects located outside the United States.

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[186] Griscom et al., *Natural Climate Solutions*, PSAS (2017) at www.pnas.org/content/114/44/11645.

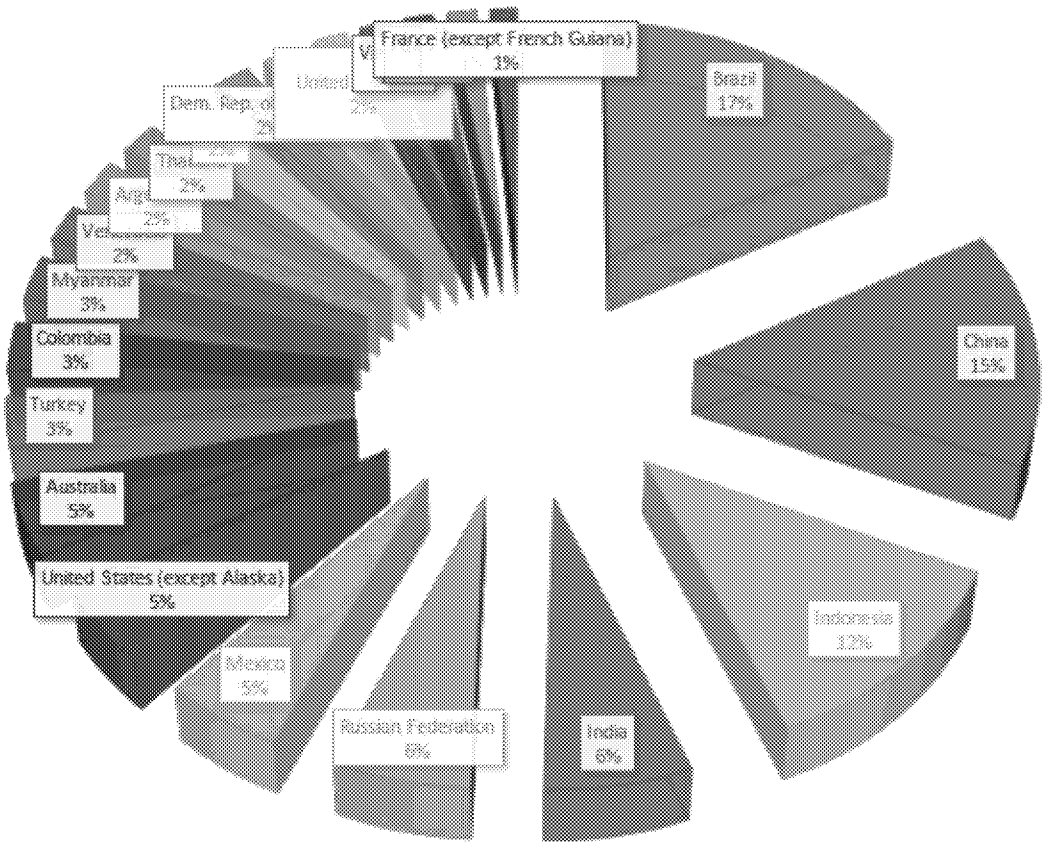

Fig. 19: Calculations and graphics by the Law Office of Daniel M Galpern.

A recent article in *Science Advances*[187] quantified the potential of natural climate solutions to increase carbon storage and avoid GHG emissions in the United States. They found a maximum potential of 1.2 (0.9 to 1.6) Pg CO_2 eq y^{-1}, the equivalent of 21% of current net annual emissions of the United States. At current carbon market prices (US $10 per Mg CO_2 eq), 299 Tg CO_2 eq y^{-1} could be achieved. NCS would also provide air and water filtration, flood control, soil health, wildlife habitat, and climate resilience benefits.

Although cost-effective strategies to reduce CO_2 and CH_4 emissions are available, existing controls have not reduced CO_2 and CH_4 emissions sufficiently to protect against environmental harm. For example, most natural gas power plants have *never* exceeded the agency's recently proposed emissions limit, thus indicating that existing and newly constructed facilities could easily satisfy a more stringent standard.[188] Because energy-related CO_2 and CH_4

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[187] Fargione, Joseph E., et al. "Natural climate solutions for the United States." *Science Advances* 4.11 (2018): eaat1869.

[188] Ctr. for Biological Diversity, Comments on Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units (Proposed Rule) Docket No. EPA-HQ-OAR-2013-0495 at 1314 (May 9, 2014).

pollution accounts for more than eighty percent of U.S. GHG production, readily achievable reductions in this sector would significantly benefit the environment.[189] Similarly, the pulp and paper industry ranks among the largest consumers of energy,[190] and emitted nearly 58 million metric tons of CO_2 equivalent gases in 2004.[191] Moreover, market incentives and regulatory controls are effective in increasing the rate of innovation for technologies that can reduce CO_2 and CH_4 emissions. Federal programs aimed at consumers also can reduce CO_2 and CH_4 emissions. For example, EPA's Energy Star program has prevented 1.8 billion tons of GHG emissions by providing information that helps customers select energy efficient devices. Sequestration of CO_2 in products, infrastructure, and waste management are among numerous methods that could be cost-effective to mitigate CO_2 and CH_4 pollution. Providing solar cooking ovens or stoves to replace coal burning ones in countries where this is a predominate cooking "appliance" would substantially reduce emissions. Reducing coal use and achieving the health, albedo and other benefits of reducing black carbon would also be useful.

If a chemical presenting an unreasonable risk to health and the environment has already been distributed, EPA may prescribe procedures by which relevant manufacturers and purchasers must replace or repurchase that chemical.[192] In addition, EPA is authorized to prohibit or otherwise restrict any continuing disposal of CO_2 and CH_4 by its manufacturer, processor or other person.[193] In the present situation, we urge the agency to exercise its authority to remediate existing harm by requiring that responsible parties either remove residual or legacy CO_2 and CH_4 emissions or pay into a carbon removal fund sufficient for that to be done.

There are numerous approaches to sequestering CO_2 and CH_4 emissions that EPA must evaluate. Effective land use and agricultural practices can significantly reduce CO_2 and CH_4 emissions and sequester CO_2, as *mentioned* supra with respect to our discussion of natural climate solutions to sequester CO_2.

As for methane, near-source destruction methods may be employed to destroy fugitive methane from the fossil fuel industry, such as aggregating and destroying fugitive emissions from coal mines as is now relied upon in the offset credits market.[194] Methods of destroying less concentrated methane are also being researched and developed. Promising methane removal methods that, at least in "[d]esk and laboratory studies," appear to mimic natural removal

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[189] U.S. Dept. of State, U.S. Climate Action Report at 16 (2010).

[190] *See* U.S. Energy Information Administration, First Use of Energy for All Purposes (Fuel and Nonfuel), 2010 (Mar. 2013), http://www.eia.gov/consumption/manufacturing/data/2010/#r1.

[191] EPA, Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Pulp and Paper Industry at 7 (2010).

[192] 15 U.S.C. § 2605(a)(7)(C).

[193] 15 U.S.C. § 2605(a)(6)(A).

[194] https://verra.org/methodology/vm0014-interception-and-destruction-of-fugitive-methane-from-coal-bed-methane-cbm-seeps-v1-0/

processes, may prove to be viable – for example, iron salt aerosols employed to enhance natural sinks and remove CH_4 as well as CO_2.[195] If trials and subsequent assessments of methane removal prove its feasibility,[196] then EPA could require oil, gas, and coal producers to pay for their utilization to remove excess atmospheric methane, as well as its CO_2 remainder.

Methods of removing ambient CO_2 also are being researched and developed, including with the Agency's support. Petitioners deem it critical that the Agency evaluate progress in this area continuously to discern the efficiency and effectiveness of methods. Particularly in light of the long atmospheric residence time of CO_2, as *discussed* supra, [197] the full potential "to remove CO_2 from the atmosphere and durably store it in reservoirs" must be pursued in order to "compensate for residual emissions [and] if implemented at a scale where anthropogenic removals exceed anthropogenic emissions, to lower surface temperature."[198]

However, while "[t]he cooling (or avoided warming) due to CDR might be proportional to the cumulative amount of CO_2 removed from the atmosphere by CDR,"[199] CO_2 emissions and removal efforts are not perfectly symmetric. This is so, according to the IPCC, because "the fraction of CO_2 remaining in the atmosphere after an emission is larger than the fraction of CO_2 remaining out of the atmosphere after a removal."[200] This implies that, all things else being equal, it is preferable to avoid an emission than to need later to remove it. For this and other reasons, Petitioners strongly endorse a recent admonition from the Department of Energy's Office of Fossil Energy and Carbon Management, namely that "it is imperative that Carbon Capture and Storage and Carbon Dioxide Removal technologies are not used as mechanisms to continue burning fossil fuels, but instead as tools in an overall strategy to achieve deep decarbonization."[201]

The IPCC recently reviewed the effects of specific CDR methods on biogeochemical cycles and climate.[202] The methods include "afforestation, soil carbon sequestration, bioenergy

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[195] Ming, Tingzhen, et al. "A nature-based negative emissions technology able to remove atmospheric methane and other greenhouse gases." *Atmospheric Pollution Research* (2021).

[196] In its recently-released AR6 Working Group I report, the IPCC stated, "Methane removal is, however, still in its infancy and the available literature is insufficient for an assessment."

[197] *Op-cit* nte 68.

[198] IPCC AR6, SPM-39.

[199] *Id.*

[200] *Id.* at §5.6.2.1.4.

[201] Office of Fossil Energy and Carbon Management, *DOE's Office of Fossil Energy and Carbon Management Makes Historic Shift to Center Work on Climate Change* (Dec. 6, 2021) available at https://www.energy.gov/fecm/articles/does-office-fossil-energy-and-carbon-management-makes-historic-shift-center-work

with carbon capture and storage, wetland restoration, ocean fertilization, ocean alkalinization, enhanced terrestrial weathering and direct air capture and storage."[203] In a report slated for release in March 2022, and building on the IPCC's work released in 2018, the IPCC Working Group III (Mitigation of Climate Change) is expected to evaluate and discuss the potential of different CDR options "in terms of the amount of removed CO_2 removed per year from the atmosphere, costs, co-benefits and side effects. . . ." [204] This is precisely the type of information required by the Agency for its own relevant assessment. Upon information and belief, however, the Agency likely is already in possession of the WGIII report, second draft, since that was released to and reviewed by governments on January 14, 2021.[205]

Petitioners suggest that in addition to any missing and necessary information concerning the science of ocean warming, deoxygenation and acidification, the Agency must work together with the Department of Energy and others to focus on testing emission reduction and sequestration processes and technologies.

If information on the efficacy of sequestration technologies is inadequate to determine if the risk is unreasonable, Petitioners recommend that the Agency use TSCA Section 2603. The Agency has in the past required TSCA test rules for many chemicals already released and in the environment in high volumes (such as dyes, plasticizers, flame retardants) to determine if treatment/mitigation methods (for example aerobic digestion) are sufficient to reduce the risk to human health and the environment to a reasonable level. [206] Treatment/ mitigation methods to control CO_2 and CH_4 after release are analogous to those test rules. Any such Agency assessment should evaluate the efficiency and cost of sequestration technology and methods to treat/mitigate released CO_2 and CH_4. Costs for any such testing (and for remedies under sections 2605 or 2608) should be apportioned among CO_2 and CH_4 emission contributors according to the cumulative CO_2 emission inventory information the Agency has collected. This could be structured in a manner similar to the sponsorship format used in TSCA's High Production Volume (HPV) Program (a more complex format than for two chemicals, i.e., CO_2 and CH_4, the HPV Program covered thousands of chemicals and thousands of tests from both foreign and domestic sources).

Since any carbon emissions that result from sequestration actions must be subtracted to calculate net carbon sequestration, the Agency should in particular examine options that rely (completely or substantially) on non-fossil fuel energy, such as biosequestration relying on solar, wind, geothermal and nuclear power.

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[202] *Id.* at §5.6.2.2.

[203] IPCC AR6, §4.6.3.2 and §5.6.2.2.

[204] IPCC AR6, §4.6.3.2.

[205] *See* https://www.ipcc.ch/2021/01/04/pr-working-group-iii-ar6-sod/

[206] See, for example: Certain Polybrominated Diphenylethers; Federal Register / Vol. 77, No. 63 / Monday, April 2, 2012 / Proposed Rules

In the view of Petitioners, CDR methods that offer substantial ecological or agricultural co-benefits merit the Agency's special attention. By increasing their process area, volume, or efficiency, natural occurring processes may sequester gigatons of carbon. For example, grass pastures can build soil carbon slowly through microbial processes. Legume-based pastures that fix nitrogen and drive higher biomass production of associated grasses, drive a more rapid carbon accretion.[207] Marginal lands may be managed to trap a ton of carbon per hectare a year with proper management.[208] Enhanced soil carbon is beneficial not only for its increased productivity, but also because it enables greater infiltration and retention of rainfall, and this compensates for expected increases in temperature and more uncertain rainfall. In the oceans microalgae can be fertilized to sequester carbon, and then removed/ harvested for products. For example, the nutritional value of micro algae,[209] and its potential as a biodiesel source,[210] have been extensively researched. Petitioners suggest that ancillary benefits like these should be accounted for in assessing net sequestration benefits, as is required to provide a complete analysis by OMB and Agency economic and regulatory guidelines.

Recently, the World Bank investigated the capacity of different agricultural land use management practices to sequester carbon. Biomass, especially in soils, sequesters atmospheric carbon, and this role as a carbon sink and carbon store can be strategically optimized through proven farming techniques and methods that simultaneously reduce emissions. These technical elements of climate-smart agriculture are well understood, and in addition to their technical feasibility, they can be highly productive and profitable. In the Report the World Bank authors estimate there to be an enormous capacity of agriculture to sequester carbon and in turn provide markets to repurchase legacy carbon and provide carbon offsets (until the point of emissions phaseout) and negative emissions options. Looking at different scenarios that are based on different levels of international integration and ecological concern, the employment of land use and management techniques in Asia, Africa and Latin America could sequester between 12 and 18 Gt of carbon, with net positive welfare benefits of between 1.4 and 1.6 trillion dollars by 2030.[211] Lal et al.,[212] in particular, have estimated that soil carbon has the potential to offset fossil-fuel emissions by 0.4 to 1.2 Gt C/ year, or 5 to 15% of the global emissions. Soil organic carbon is an extremely valuable natural resource and has many ancillary benefits including, e.g., food security and watershed protection. These benefits should be considered in any carbon

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[207] Dalal, RC, Strong, WM, Weston, EJ, Cooper, JE, Lehane, KJ, King, AJ, Chicken, CJ (1995). Australian Journal of Experimental Agriculture, **35**

[208] Project Drawdown estimates Carbon sequestration rates of 1.3 tons per hectare per year, based on meta-analysis of 31 data points from four sources.

[209] FAO Fisheries Technical Paper 361

[210] NREL/TP-580-24190

[211] Carbon Sequestration in Agricultural Soils, The World Bank, REPORT NO. 67395-GLB, 2012

[212] Lal, Rattan. "Soil carbon sequestration impacts on global climate change and food security." science 304.5677 (2004): 1623-1627.

management regulatory option that includes trading soil C. This is another option for legacy carbon emission buy-back.

More aggressively, it has been proposed that lignin rich crops, which sequester carbon refractorially, might be used directly as a soil amendment to enrich and provide carbon to desertified or otherwise depleted lands, enabling the growth of more lignin crops to produce additional fertile soils, geometrically amplifying the sequestration.[213] Climate change may worsen desertification because of temporal changes in radiation, wind, temperature, rainfall and other parameters driven by the increased energy in the atmosphere,[214] making soil management all that more important.

Globally, human land use has resulted in an estimated 74 Mha of salinized agricultural land[215] – 43 Mha is irrigated land and 31 Mha is secondary salinization of nonirrigated land. There are ecosystem and economic benefits, in addition to carbon sequestration, to reclaiming desertified or salinized land, and studies have identified suitable tree species for reclamation of saline farmland (Marcar et al., 1995; Benyon et al., 1999; Niknam & McComb, 2000) and the use of salinized lands for fuel-wood production (e.g. El-Lakany, 1986). Of potential halophytic shrubs, saltbush (Atriplex spp.) has been the most extensively examined due to its salt tolerance and its nutritional potential as an alternative fodder for livestock (Norman et al., 2004). [Same.] Biomass estimates reported from many of these studies relate mostly to edible dry matter (EDM) and not total biomass.

Studies have shown that another economically beneficial use for tree, litter and other forestry and agricultural high lignin sources (>15%) would be for erosion control necessitated by the expected increase in rainfall in many areas from the rising temperatures.[216]

Sustainable biocharing has both an energy and a sequestration component, so that biochar may be used to produce fuels and the char itself can be used to increase soil fertility, thus enabling greater sequestration of carbon. Researchers estimate that up to 12% of anthropogenic emissions can be offset by biochar application to soils.[217]

Reforestation and reducing deforestation can also play enormous roles. Reforestation to combat desertification is underway, e.g., in Mongolia by the Mongolian and South Korean

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[213] pp 150-168, Viviani, Bioenergy and Biobased Products, DOE National Bioenergy Center Strategic Partnerships Workshop April 11-12, 2001 Colorado

[214] World Meterological Organization, Climate_Change Desertification, 2007.

[215] Dregne, Harold E., and Nan-Ting Chou. "Global desertification dimensions and costs." Degradation and restoration of arid lands (1992): 73-92.

[216] Trees, Crops, and Soil Fertility: Concepts and Research Methods edited by G. Schroth, Fergus L. Sinclair

[217] Nature Communications 1: 56 doi:10.1038/ncomms1053

governments.[218] Goodman et al.[219] estimated that by halting deforestation, allowing forests to regrow, and leaving mature forests undisturbed, tropical forests alone could capture 25–35% of anthropogenic carbon emissions. Of course, the sequestration potential of forestration "varies depending on the scenario-assumptions of available land and of background climate. . . Afforestation of native grasslands, savannas, and open-canopy woodlands leads to the undesireable loss of unique natural ecosysems with risk biodiversity, carbon storage and other ecosystem services." Further, account needs to be taken of feedbacks which are "highly region dependent. For instance, afforestation at high latitudes would decrease albedo and increase local warming. . . ."[220]

Petitioners emphasize that selection of appropriate regulatory emission and sequestration remedies is a policy judgement for the Agency. It may be that promising options require further testing. Such testing could be required under TSCA section 2603.

VII. Emission Reduction and Sequestration

Given the enormous magnitude of the climate change problem, the mitigation prescription must also be adequate to the purpose. In the absence of human activities, nature maintains carbon dioxide atmospheric concentrations within a narrow band by balancing emissions with sequestration. Nature efficiently removes atmospheric carbon by transforming it into biomass and minerals, or "storing" it in the oceans (the source of the ocean acidification problem). Unlike the natural cycle, which is in dynamic equilibrium, the anthropogenic carbon cycle is not in equilibrium and is unbalanced.

The economics of the anthropogenic carbon cycle still do not take into account the externalities of climate change or ocean warming and acidification; accordingly, the economic carbon cycle is skewed towards emissions and away from sequestration. While the amount of the imbalance is relatively small when compared to the annual amount of carbon nature moves into and out of the atmosphere, it is consistently biased in one direction and over the years has almost doubled the baseline atmospheric carbon.

We thus confront a two-fold market failure[221] as the environmental cost of emissions are not included in the price of fossil fuel energy and the environmental benefits of sequestration of CO_2 (or oxidation of methane) similarly are not valued by the market. OMBs "best practices" [222] for preparing the economic analysis of a significant regulatory action, called for by Executive

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[218] Min-Kyung Kang et al, Jour. Korean For. Soc. Vol. 99 No. 5, pp 655-663 (2010)

[219] Rosa C. Goodman and Martin Herold. 2014. "Why Maintaining Tropical Forests Is Essential and Urgent for a Stable Climate." CGD Working Paper 385. Washington, DC: Center for Global Development.

[220] IPCC AR6, WGI, §5.6.2.2.1.

[221] The Cost of Delaying Action to Stem Climate Change, US Council of Economic Advisors, EOP, 2014

[222] OMB: https://www.whitehouse.gov/omb/inforeg_riaguide last accessed 8/17/16

Order 12866,[223] include determining whether there exists a market failure that is likely to be significant. Fossil fuel GHG emissions-imposed global warming and associated ocean effects (acidification, warming and deoxygenation) clearly meet OMBs definition of an externality.[224] "Once a significant market failure has been identified, the analysis should show how adequately the regulatory alternatives to be considered address the specified market failure."[225] Of course, these are best practices for regulatory agencies, not petitioners. Petitioner recommends that the Agency include all reasonable options in the cost analysis to comply with the OMB best practices.

The Council of Economic Advisers have pointed out that "the emission of greenhouse gases such as carbon dioxide (CO_2) harms others in a way that is not reflected in the price of carbon-based, energy, i.e., CO_2 emissions create a negative externality. Because the price of carbon-based, energy does not reflect the full cost or economic damages, market forces result in a level of CO_2 emissions that is too high. Public policies are thus needed to reduce CO_2 emissions and thereby limit the damage to economies and the natural world from further climate change."[226] Some of these "harms" include severe heat, wildfire, extreme weather, and ocean warming, deoxygenation, and acidification. TSCA provides a vehicle for implementing the public policy called for by the Council necessary to rectify the market failure.

The largest benefits and perhaps the most powerful argument for action may be the possibility of catastrophic effects from continued emissions. These include the possibility of runaway climate change from either amplification and/or feedback from physical and chemical processes triggered by continued emissions. Most of these positive feedbacks are anticipated from the simple physics of the situation, and are not debatable, e.g., the ice-albedo effect[227] [228] in the arctic, e.g.., more summer ice melt means warmer water, warmer water means less winter ice formation, gradually decreasing each year's arctic ice coverage; or the release of soil carbon as frozen soil warms.[229] These effects are occurring now. There are many others,[230] including the likely collapse of the marine food web; impacts to cloud albedo[231]; alterations in ocean

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[223] Executive Order 12866, "Regulatory Planning and Review"

[224] OMB: https://www.whitehouse.gov/omb/inforeg_riaguide last accessed 8/17/16

[225] *Id.*

[226] The Cost of Delaying Action to Stem Climate Change, CEA, July 2014.

[227] Pistone et al http://www.pnas.org/content/111/9/3322.short

[228] Vihma, T. Surv Geophys (2014) 35: 1175. https://doi.org/10.1007/s10712-014-9284-0

[229] Shuur et al, The effect of permafrost thaw on old carbon release and net carbon exchange from tundra, Nature 459, 556-559 (28 May 2009).

[230] Price, James. "Climate Tipping Points." (2012).

[231]Six K.D., Kloster S., Ilyina T., Archer S.D., Zhang.K, Maier-Reimer,E., Global warming amplified by reduced sulphur fluxes as a result of ocean acidification. Nature Climate Change

circulation[232]; rapid sea-level rise driven by West Antarctic Ice Sheet collapse or other sources; shifts in weather patterns like the Indian Summer Monsoon or the West African Monsoon[233]; ecological regime shifts in the Amazon or the Sahel; a massive release of carbon from seafloor methane hydrates.[234] Modeling studies have revealed the potential for an atmospheric super rotation threshold that rapidly increases climate sensitivity by changing planetary cloudiness[235] or an abrupt drop in the volume of snow on the Tibetan Plateau.[236] Some of these potential tipping elements may be realized by 2100 or earlier under current trajectories, others are likely not to materialize this century. In any case both near and long-term tipping points need to be included in a risk assessment so that *all* relevant costs and benefits are considered by decision makers.

As Petitioners discussed *supra*, Executive Order 12866[237] clearly requires accounting of low probability, high impact events in EPA's risk and benefit analysis. There is research[238] that indicates that probabilities, at least for extreme weather events, are consistently undervalued. Such mistakes must be avoided by the Agency in its evaluation of a rule that aims to ensure that fossil fuel GHG emissions, both new and legacy, are phased out and removed so as to eliminate their present and anticipate injury to public health and the environment.

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[232]Rahmstorf, S., Box, J., Feulner, G., Mann, M., Robinson, A., Rutherford, S., Schaffernicht, E. (2015): Evidence for an exceptional 20th-Century slowdown in Atlantic Ocean overturning. Nature Climate Change (online)

[233] Nordhaus, William D., and Joseph Boyer. "Warming the world." (2000).

[234] Schellnhuber, Hans Joachim. "Tipping elements in the Earth System." Proceedings of the National Academy of Sciences 106.49 (2009): 20561-20563.

[235] Caballero, Rodrigo, and Matthew Huber. "Spontaneous transition to superrotation in warm climates simulated by CAM3." Geophysical Research Letters 37.11 (2010).

[236] Drijfhout, Sybren, et al. "Catalogue of abrupt shifts in Intergovernmental Panel on Climate Change climate models." Proceedings of the National Academy of Sciences 112.43 (2015): E5777-E5786.

[237] https://www.whitehouse.gov/sites/default/files/omb/inforeg/eo12866/eo12866_10041993.pdf

[238] Mann, Michael E., Elisabeth A. Lloyd, and Naomi Oreskes. "Assessing climate change impacts on extreme weather events: the case for an alternative (Bayesian) approach." Climatic Change (2017): 1-12.

VIII. Risk Reduction Costs and Benefits

In denying[239] an earlier petition that also sought restrictions, under TSCA, of CO_2 emissions,[240] the Agency had asserted[241] that then-Petitioner Viviani had "provided neither adequate specifics on the relief sought under TSCA nor sufficient information on the costs and benefits associated with a requested regulatory option to allow EPA to make the unreasonable risk finding specified in TSCA section 6(a)." As discussed earlier, the section 21 guidance[242] states that petitioners are *encouraged* to provide cost and benefit information, while the plain language of TSCA section 2605 (b) (4) (A), as amended in 2016 *after* the denial of petitioner's prior petition, now makes it clear that it is the Administrator's responsibility to conduct the risk evaluation to determine if a risk is unreasonable no longer permits consideration of such factors. That is:

> "The Administrator shall conduct risk evaluations pursuant to this paragraph to determine whether a chemical substance presents an unreasonable risk of injury to health or the environment, *without consideration of costs or other nonrisk factors*, including an unreasonable risk to a potentially exposed or susceptible subpopulation identified as relevant to the risk evaluation by the Administrator, under the conditions of use."

As noted, *supra*, resolving the myriad widespread and severe threats to health and the environment arising from fossil fuel GHG emissions, in particular but not limited to CO_2 and CH_4 – including Earth's energy imbalance, global warming, increasing drought, wildfire, and extreme weather, ecosystem degradation, species loss, ice melt and sea level rise, ocean acidification, ocean warming, ocean detoxification, and the threat to the food web – **all** require a phaseout of those emissions and removal of a significant share of their atmospheric excess.[243] The information provided herein suffices for the Agency to determine that the present surfeit of these chemicals presents an imminent, widespread, severe and unreasonable risk of injury to health or the environment, so that EPA should initiate a civil action against fossil fuel companies to phase out production, release and the continuing disposal of these substances.

Further, Petitioners assert that the present concentrations of atmospheric CO_2 and CH_4 and ocean CO_2, combined with the certainty of worse to come absent emissions phaseout and removal, amply meets the TSCA unreasonable risk standard. Moreover, there is strong evidence

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[239] https://www.regulations.gov/document?D=EPA-HQ-OPPT-2015-0487-0001

[240] https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/tsca-section-21-petition-requesting-epa-regulate

[241] https://www.regulations.gov/document?D=EPA-HQ-OPPT-2015-0487-0001

[242] FR Doc. 85-26938.

[243] IBGP, IOC & SCOR, 2013. Ocean Acidification Summary for Policymakers – Third Symposium on the Ocean in a High- CO_2 World.

that the benefits of strong action to reduce CO_2 and CH_4 concentrations outweigh the costs,[244, 245] i.e., the benefits based on the risk avoided and economic payback derived from increased reliance on clean energy and removal of excess atmospheric concentrations of CO_2 and CH_4 are calculated in the trillions of dollars. Global, country, and industry-wide analyses estimate a positive balance of benefit over cost for various mitigation options the Agency could select, and numerous analyses show that even with uneven initial participation by some countries, the goal of keeping or returning warming to below 1.5 degrees C still may be attained. These facts alone, given the enormity of the existential risk from global warming and ocean impacts, and the dire consequences of not acting quickly, require the Agency to initiate rule making under TSCA.

Petitioners herein present data on (a) the socio-economic costs of CO_2 and CH_4 pollution, (b) the feasibility of controls on CO_2 and CH_4, and (c) the social cost of carbon including the costs of delaying action to reduce and mitigate CO_2 and CH_4 pollution. Ultimately it is the responsibility of the Agency to gather all the necessary information, develop robust options and decide how to proceed, in order to comply with the intent of Congress, i.e., that the Administrator shall carry out this chapter in a reasonable and prudent manner, considering the environmental, economic, and social impact of any action the Administrator takes or proposes.[246]

(a) Socioeconomic Costs, and Benefits

The release of CO_2 and CH_4 into the environment is already imposing substantial social and economic impacts, and these will become ever more damaging upon additional loading of the atmosphere with these dangerous gases. Primary economic concerns include the lost functionality of coastal cities and regions, agricultural degradation and collapse, lost worker productivity, loss of life from migration-related civil unrest and war, and loss of fisheries and increased food insecurity.

(i) US economic risks from unabated climate change

Volume II of the Fourth National Climate Assessment (NCA4) (2018) "focuses on the human welfare, societal, and environmental elements of climate change and variability for 10 regions and 18 national topics, with particular attention paid to observed and projected risks, impacts, consideration of risk reduction, and implications under different mitigation pathways."[247] The Environmental Protection Agency is one of 13 federal agencies comprising "the Subcommittee on Global Change Research of the Committee on Environment within the National Science and Technology Council,"[248] that helped to provide "several rounds of technical and policy review" of that volume.[249] In the light of its high-quality, we directly

[244] https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30029-9/fulltext

[245] https://www.tandfonline.com/doi/full/10.1080/14693062.2020.1724070

[246] TSCA §2601. Findings, policy, and intent.

[247] *See* https://nca2018.globalchange.gov/chapter/front-matter-about/

[248] https://www.globalchange.gov/agencies

[249] https://nca2018.globalchange.gov/chapter/front-matter-about/

incorporate and cite relevant portions of that volume's summary chapter (Chapter 1) in the duration of this sub-section, while omitting internal references for ease of reading.[250]

> Without more significant global greenhouse gas mitigation and regional adaptation efforts, climate change is expected to cause substantial losses to infrastructure and property and impede the rate of economic growth over this century. Regional economies and industries that depend on natural resources and favorable climate conditions, such as agriculture, tourism, and fisheries, are increasingly vulnerable to impacts driven by climate change. Reliable and affordable energy supplies, which underpin virtually every sector of the economy, are increasingly at risk from climate change and weather extremes. The impacts of climate change beyond our borders are expected to increasingly affect our trade and economy, including import and export prices and U.S. businesses with overseas operation and supply chains). Some aspects of our economy may see slight improvements in a modestly warmer world. However, the continued warming that is projected to occur without significant reductions in global greenhouse gas emissions is expected to cause substantial net damage to the U.S. economy, especially in the absence of increased adaptation efforts. The potential for losses in some sectors could reach hundreds of billions of dollars per year by the end of this century.
>
> Existing water, transportation, and energy infrastructure already face challenges from heavy rainfall, inland and coastal flooding, landslides, drought, wildfire, heat waves, and other weather and climate. Many extreme weather and climate-related events are expected to become more frequent and more intense in a warmer world, creating greater risks of infrastructure disruption and failure that can cascade across economic sectors. For example, more frequent and severe heat waves and other extreme events in many parts of the United States are expected to increase stresses on the energy system, amplifying the risk of more frequent and longer-lasting power outages and fuel shortages that could affect other critical sectors and systems, such as access to medical. Current infrastructure is typically designed for historical climate conditions and development patterns—for instance, coastal land use—generally do not account for a changing climate, resulting in increasing vulnerability to future risks from weather extremes and climate. Infrastructure age and deterioration make failure or interrupted service from extreme weather even more likely. Climate change is expected to increase the costs of maintaining, repairing, and replacing infrastructure, with differences across regions.
>
> Recent extreme events demonstrate the vulnerabilities of interconnected economic sectors to increasing risks from climate change. In 2017, Hurricane Harvey dumped an unprecedented amount of rainfall over the greater Houston area, some of which has been attributed to human-induced climate change. Resulting power outages had cascading effects on critical infrastructure facilities such as hospitals and water and wastewater treatment plants. Reduced oil production and refining capacity in the Gulf of Mexico caused price spikes regionally and nationally from actual and

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[250] Petitioners direct the reader to https://nca2018.globalchange.gov/chapter/1/ for such further detail.

anticipated gasoline shortages. In the U.S. Caribbean, Hurricanes Irma and Maria caused catastrophic damage to infrastructure, including the complete failure of Puerto Rico's power grid and the loss of power throughout the U.S. Virgin Islands, as well as extensive damage to the region's agricultural industry. The death toll in Puerto Rico grew in the three months following Maria's landfall on the island due in part to the lack of electricity and potable water as well as access to medical facilities and medical care.

Climate-related risks to infrastructure, property, and the economy vary across regions. Along the U.S. coastline, public infrastructure and $1 trillion in national wealth held in coastal real estate are threatened by rising sea levels, higher storm surges, and the ongoing increase in high tide flooding. Coastal infrastructure provides critical lifelines to the rest of the country, including energy supplies and access to goods and services from overseas trade; increased damage to coastal facilities is expected to result in cascading costs and national impacts. High tide flooding is projected to become more disruptive and costlier as its frequency, depth, and inland extent grow in the coming decades. Without significant adaptation measures, many coastal cities in the Southeast are expected to experience daily high tide flooding by the end of the century. Higher sea levels will also cause storm surge from tropical storms to travel farther inland than in the past, impacting more coastal properties and infrastructure. Oil, natural gas, and electrical infrastructure located along the coasts of the Atlantic Ocean and Gulf of Mexico are at increased risk of damage from rising sea levels and stronger hurricanes; regional disruptions are expected to have national implications. Hawai'i and the U.S.-Affiliated Pacific Islands and the U.S. Caribbean also face high risks to critical infrastructure from coastal flooding, erosion, and storm surge.

In the western United States, increasing wildfire is damaging ranches and rangelands as well as property in cities near the wildland–urban interface. Drier conditions are projected to increase the risk of wildfires and damage to property and infrastructure, including energy production and generation assets and the power grid. In Alaska, thawing of permafrost is responsible for severe damage to roads, buildings, and pipelines that will be costly to replace, especially in remote parts of Alaska. Alaska oil and gas operations are vulnerable to thawing permafrost, sea level rise, and increased coastal exposure due to declining sea ice; however, a longer ice-free season may enhance offshore energy operations and transport. These impacts are expected to grow with continued warming.

U.S. agriculture and the communities it supports are threatened by increases in temperatures, drought, heavy precipitation events, and wildfire on rangelands. Yields of major U.S. crops (such as corn, soybeans, wheat, rice, sorghum, and cotton) are expected to decline over this century as a consequence of increases in temperatures and possibly changes in water availability and disease and pest outbreaks. Increases in growing season temperatures in the Midwest are projected to be the largest contributing factor to declines in U.S. agricultural. Climate change is also expected to lead to large-scale shifts in the availability and prices of many

agricultural products across the world, with corresponding impacts on U.S. agricultural producers and the U.S. economy.

Extreme heat poses a significant risk to human health and labor productivity in the agricultural, construction, and other outdoor sectors. Under a higher scenario (RCP8.5), almost two billion labor hours are projected to be lost annually by 2090 from the impacts of temperature extremes, costing an estimated $160 billion in lost wages. States within the Southeast and Southern Great Plains regions are projected to experience some of the greatest impacts.

(ii) A closer look at ocean-based economic risks from unabated climate change

a. Sea-level rise economic risks

According to a recent Center on Public Integrity study – one that employed highly conservative assumptions – the United States faces more than $400 billion in costs over the next 20 years to defend coastal communities from unavoidable sea-level rise – requiring the construction of more than 50,000 miles of coastal barriers in 22 states.[251] More than 130 counties face at least $1 billion in costs, and 14 states will see expenses of $10 billion or greater between now and 2040. These costs reflect the bare minimum coastal defenses that communities need to build to hold back rising seas and prevent chronic flooding and inundation over the next 20 years. Unless action begins now to hold temperature rise to 1.5 °C, costs for adaptation and public health impacts,[252] including increases in water-borne diseases[253] and other morbidities,[254] will greatly increase.

A 2018 analysis[255] using a multi-model approach estimated the difference in level and in cost from sea level rise for a temperature rise of 1.5 °C and 2.0 °C by 2100. Authors found a difference of 11 cm global sea level rise in 2100 between the two temperatures and estimated

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[251] Center for Climate Integrity, High Tide Tax: The Price to Protect Coastal Communities from Rising Seas (2019) at https://www.climatecosts2040.org/files/ClimateCosts2040_Report.pdf.

[252] Allen, Thomas R., et al. "Linking water infrastructure, public health, and sea level rise: integrated assessment of flood resilience in coastal cities." *Public Works Management & Policy* 24.1 (2019): 110-139.

[253] Dvorak, Ana C., et al. "Possible impacts of sea level rise on disease transmission and potential adaptation strategies, a review." *Journal of environmental management* 217 (2018): 951-968.

[254] Vineis, Paolo, Queenie Chan, and Aneire Khan. "Climate change impacts on water salinity and health." *Journal of Epidemiology and Global Health* 1.1 (2011): 5-10.

[255] Jevrejeva, Svetlana, et al. "Flood damage costs under the sea level rise with warming of 1.5 C and 2 C." *Environmental Research Letters* 13.7 (2018): 074014.

potential additional losses of $1.4 trillion per year (0.25% of global GDP) if no additional adaptation is assumed from the modelled adaptation in the base year. The study used the NOAA-funded, Coupled Model Intercomparison Project (CMIP5).[256] This coupled model combines data from three types of models – Atmosphere–Ocean, General Circulation, and Earth System – and simulated both long and short-term data sets.

If the current emissions trajectory isn't changed, the human impact and the costs will become far more extreme. The UK National Oceanographic Centre found flooding from rising sea levels could cost more than $14 trillion worldwide *annually* by 2100, if global warming reaches 2 °C above pre-industrial levels.[257]

A higher end projection of 184 cm and a 95% quantile of 292 cm by 2100[258] was estimated by Le Bars et al, using a probabilistic process-based method. Uncertainties in the projections increase when including the temperature dependence of Antarctic mass loss and the uncertainty in the Coupled Model Intercomparison Project Phase 5 (CMIP5) model ensemble.

The costs required to respond to sea level rise are high and rising sharply. Sugiyama et al.,[259] using the DIVA[260] database with its high spatial resolution, coastal segment (a polygon) element and non-linear sea-level rise scenarios, looked at four kinds of cost: protection cost; dryland/capital loss; wetland loss; and wetland gain. They found that, under an assumption of linear sea level rise, net wetland loss (wetland loss offset by gain) dominated costs, estimating that the cost of sea level rise was, using market exchange rate (MER) present values[261] $1,182B for global cost and loss.[262] As well, using purchasing power parity (PPP), they estimate $1,991B for global cost and loss (and $317B for the US).

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[256] Taylor, Karl E., Ronald J. Stouffer, and Gerald A. Meehl. "An overview of CMIP5 and the experiment design." *Bulletin of the American meteorological Society* 93.4 (2012): 485-498

[257] Zhongming, Zhu, et al. "Rising sea levels could cost the world $14 trillion a year by 2100." UK NOC (2018).

[258] Le Bars, Dewi, Sybren Drijfhout, and Hylke de Vries. "A high-end sea level rise probabilistic projection including rapid Antarctic ice sheet mass loss." *Environmental Research Letters* 12.4 (2017): 044013.

[259] Sugiyama, Masahiro, Robert J. Nicholls, and Athanasios Vafeidis. Estimating the economic cost of sea-level rise. MIT Joint Program on the Science and Policy of Global Change, 2008.

[260] The Dynamic Interactive Vulnerability Assessment (DIVA) tool

[261] All in 1995 dollars.

[262] "Cost and loss" refers to protection cost, capital loss and wetland loss (net wetlands loss being the largest contributor).

A 2018 study[263] estimated global and coastal sea level projections with warming of 1.5 °C and 2 °C by 2100 and compared the costs associated with RCP8.5 business as usual temperature rise. They projected global sea-flood costs of $10.2 trillion per year (1.8% of GDP) without additional adaptation for sea level projections with warming of 1.5 °C by 2100. With adaptation they estimated costs could decrease to $1.1 trillion per year (0.2% GDP) for the same 1.5 °C scenario in 2100. If warming is not mitigated and follows the RCP8.5 scenario, global mean sea level could rise to 86 cm (median) or even 180 cm (95th percentile) by 2100. This could result in annual sea-flood costs of US$ 14 trillion per year and US$ 27 trillion per year respectively if no further adaptation were undertaken – the latter would equate to 2.7% of global GDP.

Meeting the Paris Accord limits[264] could restrict sea level rise to about half of what it would be under the IPCC business as usual projections (RCP8.5). This would provide for a significant difference in risk and: "The median global mean sea-level rise by 2100 is projected as 35 cm for RCP2.6 and 74 cm for RCP8.5"; and "under constant protection 0.2–2.9% of the global population is expected to be flooded annually in the year 2100 under RCP2.6 and 0.5–4.6% under RCP8.5."[265] Starting in about 20 years the damage patterns from sea level rise-induced flooding under different emissions scenarios begins to diverge sharply, so that the higher fossil fuel GHG emissions will impose trillions of additional costs on impacted communities.

The IPCC also found a doubling of sea level rise from RCP2.6 to RCP8.5.[266] In its Special Report on the impacts of global warming of 1.5 °C, the IPCC projected that risks to global aggregated economic growth due to climate change impacts "would be lower at 1.5 °C than at 2 °C," particularly "in the tropics and Southern Hemisphere subtropics."[267] The IPCC

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[263] Jevrejeva, Svetlana, et al. "Flood damage costs under the sea level rise with warming of 1.5 C and 2 C." *Environmental Research Letters* 13.7 (2018): 074014

[264] This is ~ RCP2.6, which is includes atmospheric CO_2 eq peaking at 490ppm and then declining.

[265] Hinkel, Jochen, et al. "Coastal flood damage and adaptation costs under 21st century sea-level rise." *Proceedings of the National Academy of Sciences* 111.9 (2014): 3292-3297. In the constant protection strategy, dikes are maintained at their height, but not raised, so flood risk increases with time as relative sea level rises. In the enhanced protection strategy, dikes are raised following both relative sea-level rise and socioeconomic development (i.e., dikes are raised as the demand for safety increases with growing affluence and increasing population density) Dike costs comprise annual investment cost (for building and upgrading dikes) and the cost of maintaining the additional dike stock built since the base year of 1995. In 2100, these costs range from US$ 12–31 billion under RCP2.6 to US$ 27–71 billion under RCP8.5.

[266] 2013: Sea Level Change. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

estimated that future rise in global mean sea level rise (GMSL) caused by thermal expansion, melting of glaciers and ice sheets and land water storage changes, will rise between 0.43 m (0.29–0.59 m, *likely* range; RCP2.6) and 0.84 m (0.61–1.10 m, *likely* range; RCP8.5) by 2100 relative to 1986–2005. Beyond 2100, sea level will continue to rise for centuries due to continuing deep ocean heat uptake and mass loss of the GIS and AIS and will remain elevated for thousands of years (*high confidence*). Under RCP8.5, estimates for 2100 are higher and the uncertainty range larger than in AR5. Antarctica could contribute up to 28 cm of SLR (RCP8.5, upper end of *likely* range) by the end of the century.[268] Keeping temperature rise to 1.5°C versus 2°C will reduce GMSL by about 100 cm.[269]
Following the current business as usual, Zillow data indicates almost 1.9 million homes (or roughly 2 percent of all U.S. homes) – worth a combined $882 billion – are at risk of being underwater by 2100.[270]

b. Acidification-based economic risks

According to the Secretariat of the U.N. Convention on Biological Diversity, ocean acidification and warming will induce a loss of more than $1 trillion *annually* in marine food resources by disrupting marine communities, promoting harmful algal blooms and the spread of some diseases, and increasing contaminants in fish and shellfish[271]

The United Nations Environment Programme has also reported that ocean acidification's impact on marine organisms is a threat to food security,[272] posing a threat to fisheries resources and the billions of people that rely on a marine-based diet.[273] Seafood has been shown to prevent hundreds of thousands of premature deaths, as well as significantly reduce infant morbidity, so that a decline of seafood availability will increase deaths and entire populations, including

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[267] IPCC Special Report on 1.5 °C, SPM-B.5.5. Similarly, *see* Kopp, Robert E., et al. "Probabilistic 21st and 22nd century sea-level projections at a global network of tide-gauge sites." Earth's Future 2.8 (2014): 383-406.

[268] *See also*, Church, J.A., Clark, P.U., Cazenave, A., Gregory, J.M., Jevrejeva, S., Levermann, A., Merrifield, M.A., Milne, G.A., Nerem, R.S., Nunn, P.D. and Payne, A.J., 2013. Sea level change. PM Cambridge University Press.

[269] IPCC special report on the impacts of global warming of 1.5 °C

[270] Rao, K., 2017. Climate Change and Housing: Will a Rising Tide Sink All Homes? https://www.zillow.com/research/climate-change-underwater-homes-12890/.

[271] Tirado, M.C. et al., 2010. Climate change and food safety: A review. Food Research International, 43(7), pp.1745–1765.

[272] UNEP, 2010. The Emissions Gap Report: Are the Copenhagen Accord pledges sufficient to limit global warming to 2 °C or 1.5 °C?

[273] United Nations Environment Programme, 2010. Environmental consequences of ocean acidification: A threat to food security.

subsistence fishing populations and poor communities that depend on seafood.[274] For example, 95% of Alaskan households do some sort of subsistence fishing, and 17% of the state's population, 120,000 people, depend on subsistence fishing.[275] Many subsistence fishers also have cultural ties tjat are threatened by ocean acidification. Accordingly, CO_2 and CH_4 implicate severe social and environmental justice concerns.[276]

Not only will ocean acidification affect global food webs and ecosystems, it also will have a direct effect on the global economy. For its part, the U.S. economy is highly dependent on the health of the ocean. In 2009, the ocean economy contributed over US$ 223 billion annually to the U.S. gross domestic product and provided more than 2.6 million jobs.[277] In Washington State alone, the seafood industry generates $1.7 billion for gross state product and employs 42,000 people.[278] Already, shellfish hatchery failures in Washington have caused an economic stir and caused some hatcheries to relocate. Alaska's commercial fishing industry is valued at over $4 billion a year and supports 90,000 jobs; recreational fishing and fishing tourism add even more value.[279]

Tropical coral reefs provide ecosystem services, such as habitat and nursery functions for commercial and recreational fisheries and coastal protection. As reefs decline in warming and increasingly acidified waters, there will be an ecological shift to a new ecosystem state dominated by less commercially valuable species. Brander et al.[280] estimated the annual economic damage of ocean acidification-induced coral reef loss to escalate rapidly over time, reaching US$ 870 billion by 2100. In an updated (2014) review, Brander et al.[281] estimated the

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[274] Mozaffarian D, Rimm EB. Fish Intake, Contaminants, and Human Health: Evaluating the Risks and the Benefits. *JAMA*. 2006;296(15):1885-1899.

[275] Mathis, J.T. et al., 2014. Ocean acidification risk assessment for Alaska's fishery sector. Progress in Oceanography.

[276] Convention on Biological Diversity, 2014. An Updated Synthesis of the Impacts of Ocean Acidification on Marine Biodiversity.

[277] NOAA, http://oceanservice.noaa.gov/facts/oceaneconomy.html. *See also*, Cooley, Sarah R., and Scott C. Doney. "Anticipating ocean acidification's economic consequences for commercial fisheries." Environmental Research Letters 4.2 (2009): 024007.

[278] Washington State Blue Ribbon Panel, 2012. Ocean Acidification : From Knowledge to Action, Washington State's Strategic Response.

[279] Mathis, J. T., et al. "Ocean acidification risk assessment for Alaska's fishery sector." Progress in Oceanography 136 (2015): 71-91. Alaska is ranked among the most vulnerable areas to acidification.

[280] Brander, Luke M., et al. "The economic impact of ocean acidification on coral reefs." Climate Change Economics 3.01 (2012): 1250002.

[281] Brander, Luke M., et al. "The economic impacts of ocean acidification." Handbook on the Economics of Ecosystem Services and Biodiversity (2014): 78-92. *See also*, Lane, Diana, et al. "Climate change

annual anticipated loss of ecosystem services from corals to be $US 1 trillion. Shoreline protection afforded by coral reefs and the services they provide by preventing loss of life, property damage and erosion are also reduced by legacy and continuing CO_2 and CH_4 emissions.

Acidification impacts are so fundamental to the overall structure and function of marine ecosystems that any significant changes could have far-reaching consequences for the oceans of the future and the hundreds of millions of people that depend on its food and other resources for their livelihoods.[282] There is also a significant cost to delaying action. According to a recent report by the Council of Economic Advisers, delaying the implementation of policies to mitigate climate change could significantly increase economic damages, in addition to worsening environmental harm.[283]

While there are still large unknowns on the biological consequences of ocean acidification, the science we have is clear: from shellfish to corals, and from pteropods to fish, our marine resources are threatened by the acidification of our ocean waters, and these risks are amplified by synergistic effects from warming and deoxygenating oceans.[284]

A recent study estimated that the damage our oceans will face from emissions-related problems will amount to $428 billion a year by 2050 and nearly $2 trillion per year by the century's end.[285]

As was also mentioned *supra*, a recent study[286] of emissions traced to just 88 investor- and state-owned fossil fuel producers establishes their responsibility for half of the historical

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impacts on freshwater fish, coral reefs, and related ecosystem services in the United States." Climatic Change 131.1 (2015): 143-157 (modeling three major U.S. locations for shallow water reefs – South Florida, Puerto Rico, and Hawai'i – to project future reef cover and associated economic values to inform a GHG emissions mitigation scenario compared to a business as usual to estimate, for example, that reducing emissions would result in an "avoided loss" in Hawai'i of approximately $10.6 billion in recreational use).

[282] Doney, S.C. et al., 2009. Ocean acidification: the other CO2 problem. Annual Review of Marine Science, 1, pp.169–192.

[283] Executive Office of the President of the United States, The Cost of Delaying Action to Stem Climate Change at 1 (July 2014).

[284] *See also*, Hoagland P, Scatasta S. 2006. The economic effects of harmful algal blooms. In E Graneli and J Turner, eds., Ecology of Harmful Algae. Ecology Studies Series. Chap. 29 (discussing toxicity of harmful algal bloom increases under conditions of ocean acidification, which not only poison marine mammals but also cause paralytic shellfish poisoning in people. Scientists hypothesize that some of the increases in red tides off the coast of Southern California may be related to ocean acidification, though this has yet to be confirmed).

[285] Noone, K., Sumaila, R. & Diaz, R., 2012. *Valuing the Ocean*: Draft Executive Summary, Stockholm Environment Institute.

(1880–2015) decline in surface ocean pH. The research is critical to an assignment of associated damages and the cost of removing excess atmospheric CO_2 and CH_4.

(iii) A closer look at economic risks of climate extremes

As referenced earlier, some model estimates do not take full account of low probability or difficult to quantify effects that amplify and accelerate warming, such as unstable methane deposit releases from permafrost and the sea floor,[287] impacts to cloud albedo,[288] the observed effects on the ocean carbon pump, or the very likely and perhaps inevitable (absent swift action) collapse of major ice sheets.[289] These may be relatively low probability events, but they have enormous consequences and must be accounted for by EPA either as a deterministic estimate or, as suggested by Weitzman,[290] as a probability density function. Otherwise, the Agency's "unreasonable" decision will not be based on a true representation of all critical potential costs and benefits.

Pycroft *et al.*[291] looked at the importance for the social cost of carbon to incorporate the possibility of extreme sea-level rise. They incorporated three types of "fat tails" associated with the effect of elevated temperature on sea level rise allowing for, and representing in the damage function, the possibility that the physical consequences of greenhouse gases and/or the consequent economic damages might be very high. They found that incorporating the possible collapse of ice sheets "by adding thin, medium or fat tails to the climate sensitivity and damage exponents raises the mean value for the social cost of carbon dioxide. When tails for the two parameters are normally distributed, the mean value of the social cost of carbon dioxide rises to \$135/t CO_2 (33% above the standard model), when using lognormal distributions the mean value is \$147/t CO_2 (44% above), and when using Pareto distributions the mean is \$218/tCO_2 109% above).

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[286] Licker, Rachel, et al. "Attributing ocean acidification to major carbon producers." *Environmental Research Letters* 14.12 (2019).

[287] Schaefer, K., T. Zhang, L. Bruhwiler, and A. P. Barrett (2011), Amount and timing of permafrost carbon release in response to climate warming, Tellus Series B: Chem. Phys. Met., DOI: 10.1111/j.1600-0889.2011.00527.x.; oven teal, Analysis of Permafrost Thermal Dynamics and Response to Climate Change in the CMIP5 Earth System Models, JOURNAL OF CLIMATE 2013

[288]Six K.D., Kloster S., Ilyina T., Archer S.D., Zhang.K, Maier-Reimer,E., Global warming amplified by reduced sulphur fluxes as a result of ocean acidification. Nature Climate Change

[289] Pycroft, Jonathan, Lucia Vergano, and Chris Hope. "The economic impact of extreme sea-level rise: Ice sheet vulnerability and the social cost of carbon dioxide." Global environmental change 24 (2014): 99-107. *See also* discussion, *op c*it, of *Ice Melt* study by Petitioner Hansen et al.

[290] Weitzman, Martin L. "On modeling and interpreting the economics of catastrophic climate change." The Review of Economics and Statistics 91.1 (2009): 1-19.

[291] *Id.*

The effects on the social cost of carbon dioxide range show a consistent asymmetry. As expected, the 5th and 50th percentile values do not change significantly, while a more substantial increase is registered for the 95th and 99th percentiles. The 95th percentile for the social cost of carbon dioxide is \$489/ tCO_2 with the tails normally distributed and \$839/t CO_2 with the Pareto distribution (112% and 263% above the standard values). It should be noted here that EPA often has credited 95th[292] or higher percentile[293] impacts in one or more aspects of each risk assessment, e.g., for exposure or effect. But none of such previous uses of the 95th or higher percentile presented an equivalently devastating magnitude or potential risk that is presented by the over-concentration of CO_2 and CH_4 – including, e.g., from the potential of ice sheet collapse.

Executive Order 12866[294] clearly requires accounting of low probability high impact events in EPA's risk and benefit analysis. As was observed by a group convened by OMB to describe "best practices" for preparing the economic analysis of any significant regulatory action pursuant to E.O 12866, "risk assessments should be conducted in a way that permits their use in a more general benefit-cost framework," so that they characterize, in part "the probabilities of occurrence of outcomes of interest" and provide "a valuation of the levels and changes in risk experienced by affected populations as a result of the regulation."[295]

Petitioners note that, according to the U.S. Global Change Research Program, in the period January 1980 through December 2020, the U.S. experienced 290 weather and climate disasters with damage costs reaching or exceeding \$1 billion[296] for each individual event. The cumulative costs for these 290 events exceed \$1.9 trillion. Figure 20 depicts these events; the

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[292] e.g., the U.S. Ambient Water Quality Criteria for Protection of Aquatic Life are based on Species Sensitivity Distributions (SSDs), with the criteria set at the fifth percentile, they can be interpreted as protecting at least 95% of the species in a community.

[293] We note, for instance, that EPA uses the 99.9 percentile for exposure in regulating pesticide food tolerance, when determining the threshold of concern for pesticide consumption. A lower percentile may be used if the risk assessment contains a number of "conservative" assumptions that might result in overestimates of risk at the 99.9th percentile. However, as noted in this petition, because many potential climate amplifying effects are ignored, the warming, acidification and other deleterious effect estimates cannot be characterized as at all conservative.

[294] *See* https://www.reginfo.gov/public/jsp/Utilities/EO_12866.pdf.

[295] Economic Analysis of Federal Regulations Under Executive Order 12866, OMB, 1996, available at https://georgewbush-whitehouse.archives.gov/omb/inforeg/riaguide.html#iii.

[296] https://www.globalchange.gov/browse/indicators/billion-dollar-disasters

trend is clear enough.

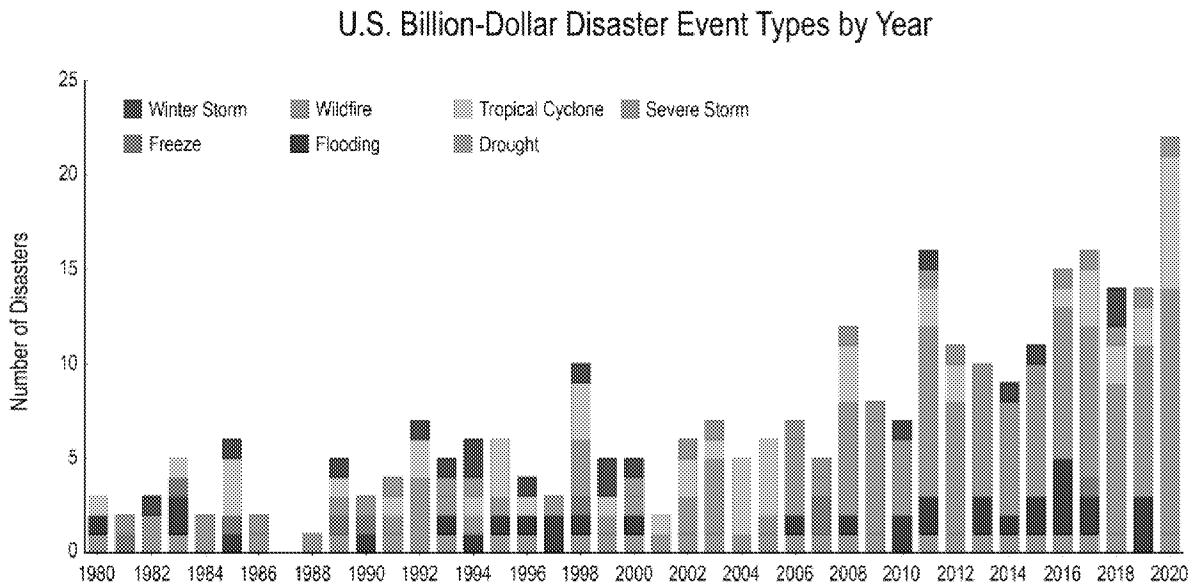

Fig. 20: Billion-dollar disaster events. Research and graphic from the U.S. Global Change Research Program

(iv) Accounting for climate action co-benefits

Local air quality co-benefits[297] amplify the beneficial impact of climate action, including by reducing premature deaths from air pollution. VanDyke et al,[298] showed that the transformation of the energy system implied by the emission reduction pledges of the Paris Agreement on climate change substantially reduces local air pollution across the globe. The Nationally Determined Contributions (NDCs), if achieved, could avoid between 71 and 99 thousand premature deaths annually in 2030 compared to a reference case, depending on the stringency of direct air pollution controls. The same study determined that if NDCs were strengthened so that they were actually consistent with Paris Agreement requirements (itself a wholly-inadequate target in light of the impacts of that level of warming on human and natural systems) then substantially more premature deaths from air pollution would be avoided –between 178–346 thousand annually in 2030, and up to 0.7–1.5 million in the year 2050. Air quality co-benefits on morbidity, mortality, and agriculture could globally offset the costs of climate policy.

McCollum et al.,[299] using a single integrated assessment model, assessed just the benefits from energy security improvement, climate change mitigation, and the reduction of air pollution

[297] Aldy, Joseph E., et al. Co-Benefits and Regulatory Impact Analysis: Theory and Evidence from Federal Air Quality Regulations. No. w27603. National Bureau of Economic Research, 2020.

[298] Vandyck, Toon, et al. "Air quality co-benefits for human health and agriculture counterbalance costs to meet Paris Agreement pledges." *Nature communications* 9.1 (2018): 1-11.

and its human health impacts accrued by keeping warming under 2 °C. They found that total cost savings were between 0.1 % and 0.7 % of globally-aggregated GDP in 2030. While the steps taken in their analysis add to energy system expenditures, the analysis showed that these costs will be substantially compensated for by the corresponding reductions for air pollution control and energy security expenditures.

Petitioners are aware that while the impact of non-fossil fuel energy is complicated for pollutants such as NO_x and SO_2 that are already subject to emissions cap and trade programs, there are many pollutants other than CO_2 that pose serious adverse health and environmental impacts, including fine particulate matter, volatile organic compounds, and trace heavy metals *not* currently subject to emissions trading requirements. Emissions of these pollutants will be reduced when fossil fuel generation is reduced, and the health and environmental benefit from reduction of these pollutants need to be accounted for as benefits, to the extent each regulatory option considered includes them.

In particular, exposure to ambient fine particulate matter (PM) air pollution from fossil fuels is a major risk for premature death. Warmer temperatures speed up these reactions. When we breathe, particulate matter is pulled into our nose and lungs. Its presence in our bodies triggers inflammation. Many diseases and conditions are linked to inflammation – and by extension therefore are linked to polluted air. Particulate matter comes in many sizes – with the largest particles not making it much past our noses – because of a primary filtration process that takes place. With smaller particles it's a different story. The smaller the particle the better it is at escaping our body's defenses. Ultrafine particulate matter is especially dangerous because it can cross directly from lung tissue into the bloodstream where it is then carried throughout the body. (see diagram) Research, already confirmed in nonhuman primates, suggests that in humans ultra-fine particulate matter also crosses the nasal mucosa to pass directly into the brain – transported via nerve endings.[300] These smaller particles, e.g., PM1 and PM0.1, present a greater risk because they penetrate further into the body. Figure 21. PM 0.1 indeed presents the most grievous risk as it readily crosses the alveoli into the blood stream, and then cross the blood brain barrier -- inducing inflammation in the brain as well as other organs.

[299] McCollum et al, Climatic Change (2013) 119:479–494.

[300] Obederdöster, G., Elder, A., & Rinderknecht, A. (2009). Nanoparticles and the brain: Cause for concern? *Journal of Nanoscience and Nanotechnology, 9*, 4996–5007. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3804071/pdf/nihms-507989.pdf

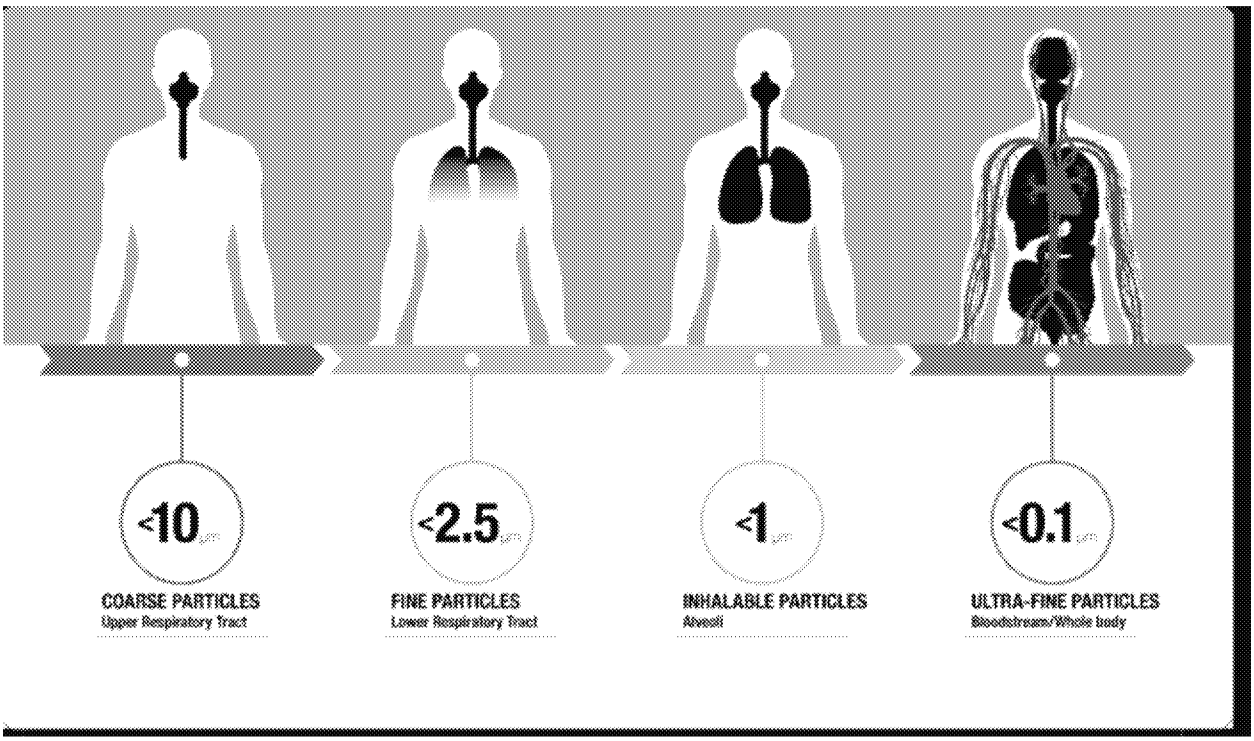

Figure 21: Transport of particulate matter in the body by size

Evidence is mounting that inflammation of brain tissue from air pollution is linked to dementia, including Alzheimer's type; to being a comorbidity factor in the development and exacerbation of symptoms of Parkinson's disease, and to amyotrophic lateral sclerosis (ALS) Calderón-Garcidueñas & Villareal-Ríos, 2017 [301]; Chen et al., 2017[302]; Lee et al., 2017; Seelen et al., 2017.[303] Even intermittent exposure to exhaust PM air pollution cause both a decline in neurogenesis in some areas of the brain and an increase in other parts, and is accompanied by inflammation.[304] Reducing fossil fuel combustion will decrease this risk.[305]

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[301] Calderón-Garcidueñas, L., & Villareal-Ríos, R. (2017). Living close to heavy traffic roads, air pollution, and dementia. *The Lancet, 389*, 675–677.

[302] Chen, C.-Y., Hung, H.-J., Chang, K.-H., Chung, Y. H., Muo, C.-H., Tsai, C.-H., et al. (2017). Long-term exposure to air pollution and the incidence of Parkinson's disease: A nested case-control study. *PLoS One, 12*(8), e0182834.

[303] Seelen, M., Toro Campos, R. A., Veldink, J. H., Visser, A. E., Hoek, G., Brunekreef, B., van der Kooi, A. J., de Visser, M., Raaphorst, J., van den Berg, L. H., & Vermeulen, R. C. (2017). Long-term air pollution exposure and amyotrophic lateral sclerosis in Netherlands: A population-based case-control study. *Environmental Health Perspectives, 125*, 097023.

[304] Rivas-Arancibia, Selva, et al. "Oxidative stress caused by ozone exposure induces loss of brain repair in the hippocampus of adult rats." *Toxicological Sciences* 113.1 (2010): 187-197.

[305] *See* World Health Organization, COP26 Special Report on Climate Change and Health The Health Argument for Climate Action, October 2021 at https://www.who.int/publications/i/item/cop26-special-report.

Evidence supports a link between the role of neuro-inflammation in classic psychiatric illness and major depressive disorders, bipolar disorder, schizophrenia, and obsessive-compulsive disorders (Souhel, Pearlman, Alper, Najjar, & Devinsky, 2013[306]). Air pollution is also associated with increased psychosis in adolescents.[307] Even *low levels of pollution*—primarily from traffic—are associated with an increased risk of mental illness in children.[308] The American Psychological Association reported children exposed to particulate matter were more likely to have "brain and damaged tissue in the prefrontal cortex," as well as lower test scores with respect to "memory, cognition and intelligence."[309] Researchers have also established a statistically-significant association between emergency room visits for anxiety—including panic attacks and threats to commit suicide—and air pollution.[310]

Petitioners anticipate that the incidence of these diseases and impacts will rise; they already bring an economic burden in the hundreds of billions of dollars. The cost in human suffering alone amplifies the case that continued use of fossil fuels threatens public health.[311, 312, 313]

While particulate matter is formed by a range of anthropogenic activities, fossil fuel combustion is the primary source. Figure 21.[314] Wildfire smoke and dust, the major natural

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[306]Souhel, N., Pearlman, D., Alper, K., Najjar, A., & Devinsky, O. (2013). Neuroinflammation and psychiatric illness. *Journal of Neuroinflammation, 10*, 43.

[307] Newbury, J. B., Arseneault, L., Beevers, S., et al. (2019). Association of air pollution exposure with psychotic experiences during adolescence. *JAMA Psychiatry, 76*, 614–623.

[308] Oudin, A., Bråbäck, L., Åström, D. O., Strömgren, M., & Forsberg, B. (2016). Association between neighbourhood air pollution concentrations and dispensed medication for psychiatric disorders in a large longitudinal cohort of Swedish children and adolescents. *BMJ Open 6*:e010004.

[309] Weir, K. (2012). Smog in our brains: Researchers are identifying startling connections between air pollution and decreased cognition and well-being. *American Psychological Association, 43*, 32. https://www.apa.org/monitor/2012/07-08/smog

[310] Szyszkowicz, M., Willey, J. B., Grafstein, E., Rowe, B., & Colman, I. (2010). Air pollution and emergency department visits for suicide attempts in Vancouver, Canada. *Environmental Health Insights, 4*, 79–86.

[311] Gladman, M., & Zinman, L. (2015). *The economic impact of amyotrophic lateral sclerosis: A systematic review*. National Center for Biotechnology Information, U.S. National Library of Medicine.

[312] Kirson, N., Desai, U., Ristovska, L., Cummings, A. K., Birnbaum, H., Ye, W., et al. (2016). Assessing the economic burden of Alzheimer's disease patients first diagnosed by specialists. *BMC Geriatrics, 16*, 138.

[313] Kowal, S.L., Dall, T. M., Chakrabarti, R., Storm, M.V., & Jain, A. (2013). *The current and projected economic burden of Parkinson's disease in the United States*. Movement Disorders Society. US National Library of Medicine National Institutes of Health.

[314] Karagulian, Federico, et al. "Contributions to cities' ambient particulate matter (PM): A systematic review of local source contributions at global level." *Atmospheric environment* 120 (2015): 475-483.

sources, are also increased by global warming. Accordingly, addressing warming by phasing out fossil fuels, reducing other GHG sources, and removing excess atmospheric CO2 and methane -- with the attendant resulting temperature moderation – accordingly will reduce the sources of fine and superfine PM in the troposphere.

Using data from the Global Burden of Disease project and actuarial standard life table methods, Apte et al[315] estimated global and national decrements in life expectancy that can be attributed to ambient PM 2.5 for 185 countries. In 2016, PM 2.5 exposure reduced average global life expectancy at birth by ~1 year with reductions of ~1.2−1.9 years in polluted countries of Asia and Africa. While more polluted countries would have greater increases in life expectancy from reduced air pollution and reduced particulate matter, countries at all levels of economic development could experience gains in life expectancy on a par with reducing other well recognized threats to public health.

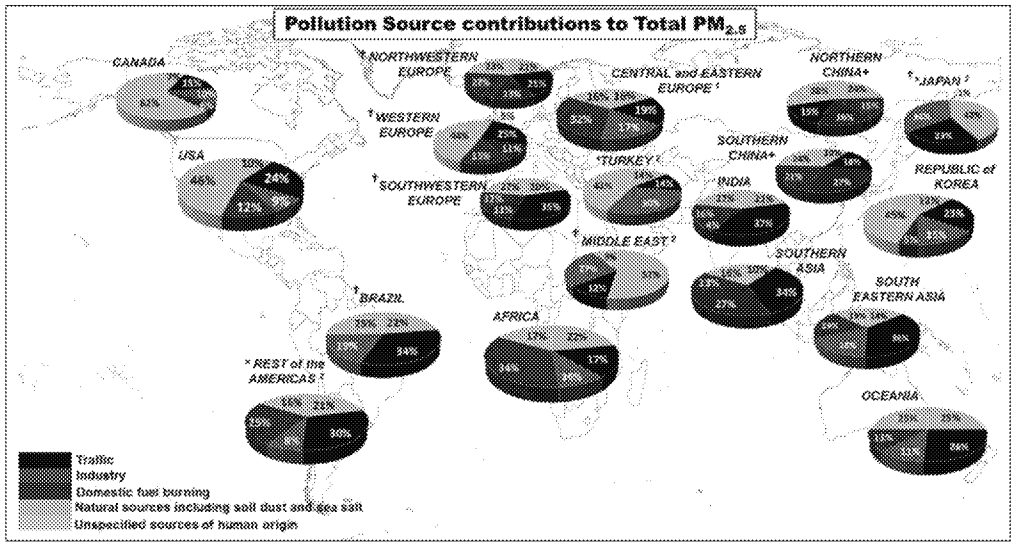

Figure 22: PM 2.5 Sources by area[316]

Yang et al.[317] used the Environmental Benefits Mapping and Analysis Program to estimate the health and economic impacts of projected changes in O_3 and PM 2.5 in the U.S. in a future (2046–2055) decade relative to current (2001–2010) decade under the Representative Concentration Pathway (RCP) 4.5 and 8.5 climate scenarios. This petition asks that carbon emissions be held significantly under what these pathways estimate. The instant petition asks for

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[315] Joshua S. Apte, Michael Brauer, Aaron J. Cohen, Majid Ezzati, and C. Arden Pope *Environmental Science & Technology Letters* **2018** *5* (9), 546-551

[316] Karagulian, Federico, et al. "Contributions to cities' ambient particulate matter (PM): A systematic review of local source contributions at global level." *Atmospheric environment* 120 (2015): 475-483.

[317] Yang, Peilin, et al. "Health impacts and cost-benefit analyses of surface O3 and PM2. 5 over the US under future climate and emission scenarios." *Environmental research* 178 (2019): 108687.

CO_2 to be stabilized by 2100 at a little more than half of the RCP 4.5 and a quarter or the RCP 8.5. So the estimate by the aforementioned authors greatly underestimates the actual benefits in mortality and morbidity.

Even so, the benefits calculated for the US are extremely significant. Comparing the decades 2001-10 with 2045-55 for the US due to differences in projected future O_3 and PM2.5 between RCP8.5 and RCP4.5 scenarios, they estimated over 38,000 deaths avoided in the decades 2046-55 and $55,354 million in additional costs due to projected higher O_3 under RCP8.5 relative to RCP4.5. (Again, the benefits anticipated under the instant petition will be much larger.)

A recent *Lancet* study[318] used an additive model to examine the relationship between long-term exposure to the combustion products fine particulate matter <$PM_{2.}$, and tropospheric ozone, and hospital admissions among Medicare patients (2000-2016). The study looked at cardiovascular and respiratory outcomes (myocardial infarction, ischemic stroke, atrial fibrillation and flutter, and pneumonia). They found that "[l]ong-term exposure to air pollutants poses a significant risk to cardiovascular and respiratory health among the elderly population in the United States, with the greatest increase in the association per unit of exposure occurring at lower concentrations." In particular, they found that each 1 $\mu g/m^3$ increase in annual $PM_{2.5}$ increased absolute annual risk of death by 0.073% (95% CI 0.071–0.076) and each 1 ppb increase in summer O_3 concentrations increased the annual risk of death by 0.081% (0.080–0.083). These translated to approximately 11,540 attributable deaths (95% CI 11,087–11,992) for $PM_{2.5}$, and 15,115 attributable deaths (14,896–15,333) for O_3 per year for each unit increase in pollution concentrations. The effects were higher in certain subgroups, including individuals living in areas of low socioeconomic status. These considerations are relevant here, since TSCA directs EPA to identify and protect "potentially exposed or susceptible sub-populations,"[319] which would include individuals living in areas of low socioeconomic status.

Lelieveld et al[320] estimated that globally, fossil-fuel-related emissions account for about 65% of the excess mortality imposed by air pollution. They used the ECHAM/MESSy

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[318] Danesh Yazdi, Mahdieh, et al. "Long-Term Association of Air Pollution and Hospital Admissions Among Medicare Participants Using a Doubly Robust Additive Model." *Circulation* 143.16 (2021): 1584-1596.

[319] The term "potentially exposed or susceptible subpopulation" means a group of individuals within the general population identified by the Administrator who, due to either greater susceptibility or greater exposure, may be at greater risk than the general population of adverse health effects from exposure to a chemical substance or mixture, such as infants, children, pregnant women, low-wage workers, the elderly, or persons with pre-existing respiratory disease.

[320] Lelieveld, J., et al. "Effects of fossil fuel and total anthropogenic emission removal on public health and climate." *Proceedings of the National Academy of Sciences* 116.15 (2019): 7192-7197. The authors attempted to take into account the global temperature and potential hydrologic impacts from removing fossil fuel aerosol pollution. They suggest that such aerosol pollution, if removed, could help restore rainfall patterns (ameliorating long-term drought) in Asia, the Sahel, and elsewhere, but at the cost of "liberating," that is, unlocking considerable additional warming. The study authors recommend, therefore, that "to reverse the major impacts on public health, regional climate, water supply, and food production,"

Atmospheric chemistry – Climate (EMAC)[321] model to estimate the climate and health outcomes attributable to fossil fuel use, indicating the potential benefits of a phaseout and estimated 3.61 (2.96–4.21) million deaths per year could be avoided worldwide by reducing and for some uses, eliminating combustion of fossil fuels. This could be up to 5.55 (4.52–6.52) million per year by additionally controlling non fossil anthropogenic sources.

Peters et al.[322] found, in a systematic review of literature,[323] that greater exposure to airborne pollutants, particularly PM, is associated with increased risk of dementia. Because many of the studies used quantiles and/or different statistical methods, no meta-analysis was done.

TSCA provides regulatory and incentivized pathways to reduce particulate matter and ozone. Making combustion less competitive through, e.g. fees targeting market failures, or emission limits, assuring a market for non- and less polluting alternatives and encouraging their development as well allowing for the economic benefits of volume production. Germany, e.g., has increased its green energy profile from less than 3%[324] growing to about 46% in 2020,[325] using a combination of subsidies, incentives and encouraging consumer demand.[326]

TSCA sections 2605 and 2606 can be used to reduce the emission of CO_2, through limits and fees, and thereby also limit the formation of much particulate matter. There is considerable literature on the ability of both Market Pull policies or Technology Push policies to increase the rate of innovation.[327] While not all of these sequestration technologies/methods are available at the current time to provide significant mitigation, they could be in the near future given the

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a phaseout of other anthropogenic emissions sources of CH4 and black carbon should be pursued in conjunction with a phaseout of fossil fuels.

[321] EMAC comprehensively simulates atmospheric chemical and meteorological processes and interactions with the oceans and the biosphere.

[322] Peters, Ruth, et al. "Air pollution and dementia: a systematic review." *Journal of Alzheimer's Disease* 70.s1 (2019): S145-S163.

[323] Medline, Embase, and PsychINFO® were searched from their inception to September 2018, for publications reporting on longitudinal studies of exposure to air pollution and incident dementia or cognitive decline in adults

[324]Wüstenhagen, Rolf, and Michael Bilharz. "Green energy market development in Germany: effective public policy and emerging customer demand." *Energy policy* 34.13 (2006): 1681-1696.

[325] BMW1, 8th Monitoring Report on the Energy Transition (2021)

[326] Sunstein, Cass R., and Lucia A. Reisch. "Automatically green: Behavioral economics and environmental protection." *Harv. Envtl. L. Rev.* 38 (2014): 127. *See also*, Fischedick, Manfred. "German energy transition: targets, current status, chances and challenges of an ambitious pathway." (2019).

[327] "Impact of Renewable Energy Policy and Use on Innovation,A Literature Review," Felix Groba and Barbara Breitschopf 2013, Deutsches Institut für Wirtschaftsforschung

proper market. In any case, the Agency has a successful history of setting regulatory "reach" targets (e.g., CAFE standards).

Under section 2608, the Administrator can also use CAA authority to lower CAFE standards. Under section TSCA sections 2611, 2612 and 2614, EPA can seize and/or impose fees on imports and exports that in their manufacture fail to meet the requirements of section 2605.

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/4/2022 9:54:58 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Wednesday, January 5
Attachments: Updated: Aircraft Lead comms; E15 Briefing for OAR final.pptx; TPs for OIRA Call

Goffman, Joseph Calendar
Goffman.Joseph@epa.gov
On Wednesday, January 5, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Busy — Tentative — Free
Out of Office — Working Elsewhere — Outside of Working Hours

January 2022

Wed, Jan 5

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 9:55 AM	Air Issues Meeting
	9:55 AM – 10:00 AM	**Free**
	10:00 AM – 10:50 AM	SCOTUS ACE Case -- comments on OSG draft of EPA brief
	10:50 AM – 11:00 AM	**Free**
	11:00 AM – 11:30 AM	Weekly EPA/OIRA check-in (1 email)
	11:30 AM – 11:55 AM	One-on-One with Ann Ferrio
	11:55 AM – 12:00 PM	**Free**
	12:00 PM – 1:00 PM	Lunch/Management Time

☐	**1:00 PM – 1:30 PM**	**Free**
■	1:30 PM – 2:00 PM	RA: OAR Welcome with Regional Administrator Region 9
■	2:00 PM – 2:25 PM	One-on-One with Jon Edwards
☐	**2:25 PM – 2:30 PM**	**Free**
■	2:30 PM – 2:55 PM	One-on-One with Chris Grundler
☐	**2:55 PM – 3:00 PM**	**Free**
■	3:00 PM – 3:50 PM	E15 Background and Next Steps (1 ppt)
☐	**3:50 PM – 4:00 PM**	**Free**
■	4:00 PM – 4:25 PM	Rollout: AvGas Lead Endangerment Petition Response (1 email)
☐	**4:25 PM – 4:30 PM**	**Free**
■	4:30 PM – 5:00 PM	MEETING: CPO/EPA Biweekly
■	5:00 PM – 5:45 PM	MEETING: Weekly CPO/EPA/DOT Vehicle Call
☐	**After 5:45 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/5/2022 3:38:16 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
Subject: RE: TPs for OIRA Call

Joe, was able to connect with Kevin on the timing for the GHG White Paper. He said it could be ready to share with OIRA this week – possibly tomorrow, but definitely Friday.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 4, 2022 4:50 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Subject: TPs for OIRA Call

Joe, below are the proposed TPs for tomorrow's OIRA call. Please let me know if you have any questions or comments. If none, I will send to OP for Vicki's awareness.

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

Message

From: Shoaff, John [Shoaff.John@epa.gov]
Sent: 1/5/2022 5:38:51 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Hockstad, Leif [Hockstad.Leif@epa.gov]; Ferland, Henry [Ferland.Henry@epa.gov]
Subject: RE: Background for OITA Minamata mtg - Thurs at 1:00
Attachments: OAR Minamata and APMMN Background Rev.docx

Joe et al,

Sorry to come back on this, just some minor late additions and a tweak to this version for the OITA mtg tomorrow.

John

JOHN SHOAFF (HE/HIM/HIS) | DIRECTOR
OFFICE OF AIR POLICY & PROGRAM SUPPORT (OAPPS)
OFFICE OF AIR & RADIATION | U.S. EPA | WJC NORTH 5442-C
1200 PENNSYLVANIA AVE. NW | MC 6103A | WASHINGTON, D.C. | 20460 | USA
Shoaff.john@epa.gov | **1-202-564-0531 DIRECT | 1-202-257-1755 MOBILE**

From: Shoaff, John
Sent: Wednesday, January 5, 2022 9:51 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Ann Campbell (Campbell.Ann@epa.gov) <Campbell.Ann@epa.gov>; Leif Hockstad (Hockstad.Leif@epa.gov) <Hockstad.Leif@epa.gov>; Ferland, Henry <Ferland.Henry@epa.gov>
Subject: Background for OITA Minamata mtg - Thurs at 1:00

Joe et al,

With thanks to Henry for coordinating with programs, here's some background on OAR involvement for awareness with the OITA update tomorrow on the Minamata Convention. Thanks.

John

JOHN SHOAFF (HE/HIM/HIS) | DIRECTOR
OFFICE OF AIR POLICY & PROGRAM SUPPORT (OAPPS)
OFFICE OF AIR & RADIATION | U.S. EPA | WJC NORTH 5442-C
1200 PENNSYLVANIA AVE. NW | MC 6103A | WASHINGTON, D.C. | 20460 | USA
Shoaff.john@epa.gov | **1-202-564-0531 DIRECT | 1-202-257-1755 MOBILE**

Message

From: Gibson, Neshawne [Gibson.Neshawne@epa.gov]
Sent: 1/5/2022 10:42:32 PM
To: Gibson, Neshawne [Gibson.Neshawne@epa.gov]
Subject: Administrator's Weekly Report for 1/5/22
Attachments: Administrator Weekly Report 1.5.2022 FINAL.pdf; Administrator Weekly Report 1.5.2022 FINAL.docx

Hello Administrator Regan and colleagues,

Attached, please find the Administrator's Weekly Report (in both PDF and Word), which includes programs and regional office updates for the week ending January 5, 2022.

Sincerely,

Neshawne Gibson
Office of the Administrator
US Environmental Protection Agency
Phone: (202) 566-1957
Mobile: (202) 603-7617

Administrator's Actions

- **Needed by January 10: Administrator's signature requested (OMS):** Delegation of Authority 2-93A, Vessel Sewage. (OMS POC: Deborah Ward-Beard, beard.deborah-ward@epa.gov, 513-569-7766)
- **Needed by January 10: Administrator's signature requested (OMS):** 30/40/50 Federal Service Awards. (OMS POC: Kimberly Wheeler, wheeler.kimberly@epa.gov, 202-564-1877)
- **Needed by January 10: Administrator's signature requested (OMS):** Response to Secretary Cardona on Executive Order 14041 on White House Initiative on Advancing Educational Equity, Excellence and Economic Opportunity Through Historically Black Colleges and Universities. (OMS POC: Tania Allen, allen.tania@epa.gov, 301-232-4973)
- **Needed by January 10: Administrator's signature requested (OECA/OCSPP):** Following the public comment period and as part of the public docket to withdraw two FAQs from EPA's website that state that EPA will not enforce the TSCA Lead-based Paint Renovation, Repair and Painting (RRP) Rule against property management companies (PMCs) for RRP violations by outside contractors hired by PMCs, OECA and OCSPP are requesting the Administrator's approval of the recommendation that the withdrawal take effect as planned on **March 21, 2022**. (OECA POC: James Miles, miles.james@epa.gov, 202-564-5161)
- **Needed by January 11: Administrator's signature requested (OAR):** Response to Petition for EPA to Develop an Endangerment Finding for Lead Emissions from Aircraft: EPA has received a petition to develop a proposal regarding endangerment related to lead emissions from piston-engine aircraft. EPA plans to respond to the petition noting our plans to publish a proposal regarding endangerment. The proposed endangerment finding would undergo public notice and comment and after evaluating comments on the proposal, EPA could issue a final endangerment finding in 2023. (OAR POC: Benjamin Hengst, Hengst.benjamin@epa.gov, 202-564-1495)
- **Needed by January 12: Administrator's signature requested (OP):** National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills Residual Risk and Technology Review; Correction (Final rule). In this action, EPA is finalizing technical revisions and clarifications for the national emission standards for hazardous air pollutants (NESHAP) for MSW Landfills established in the **March 26, 2020,** final rule. (OP POC: Bill Nickerson, Nickerson.William@epa.gov, 202-566-0326)
- **Needed by January 12: Administrator's signature requested (OP):** Control of Air Pollution from Aircraft Engines: Emission Standards and Test Procedures (Proposed Rule). Re-signature requested December 27. EPA is proposing particulate matter (PM) emission standards and test procedures applicable to certain classes of engines used by civil subsonic jet airplanes (those engines with rated output of greater than 26.7 kilonewtons (kN)) to replace the existing smoke standard for aircraft. (OP POC: Bill Nickerson, Nickerson.William@epa.gov, 202-566-0326)
- **Needed by January 12: Administrator's approval requested (OP):** Approval and Promulgation of Air Quality Implementation Plans; North Dakota; Regional Haze State and Federal Implementation Plans (Final rule). EPA is finalizing approval of a State Implementation Plan (SIP) revision submitted by the State of North Dakota on **August 3, 2020**, addressing regional haze. (OP POC: Bill Nickerson, Nickerson.William@epa.gov, 202-566-0326)
- **Needed by January 12: Administrator's approval requested (OP):** Civil Monetary Penalty Inflation Adjustment (Final rule). EPA is promulgating this final rule to adjust the level of the maximum (and minimum) statutory civil monetary penalty amounts under the statutes the EPA administers. (OP POC: Bill Nickerson, Nickerson.William@epa.gov, 202-566-0326)
- **Needed by January 12: Administrator's approval requested (OP): Petition to Revise the Non-Hazardous Secondary Material Standard: Proposed Response** (Notification of tentative

response to petition for rulemaking). EPA is responding to a rulemaking petition from American Forest and Paper Association et al. ("the petition") requesting amendments to the Non-Hazardous Secondary Materials (NHSM) regulations, initially promulgated on **March 21, 2011, and amended on February 7, 2013, February 8, 2016, and February 7, 2018,** under the Resource Conservation and Recovery Act (RCRA). The EPA is proposing to deny the requested amendments. (OP POC: Bill Nickerson, Nickerson.William@epa.gov, 202-566-0326)

- **Needed by January 17: Administrator's signature requested (OMS):** Request to Lift the Biweekly Maximum Earning Limitation (Biweekly Pay Cap) Due to Work Critical to the Agency's Mission for the Benton Harbor Drinking Water Response and Filter Performance Study. (OMS POC: Loretta Hunt, hunt.loretta@epa.gov, 202-564-6963)

Region 1

Acting Regional Administrator Signature Items

- On **December 13**, R1 signed a final notice that approves Connecticut's Transport SIP for the 2015 ozone NAAQS. This notice approves the "Good Neighbor" (or interstate transport) CAA provisions for this air-quality standard. (R1 POC: Lynne Hamjian, hamjian.lynne@epa.gov, 617-918-1601)
- On **December 28**, R1 signed a letter to the Chief of Micmac Nation addressing concerns about use of the herbicide glyphosate in Maine, the common active ingredient in most Roundup® products. (R1 POC: Nancy Barmakian, Barmakian.Nancy@epa.gov, 617-918-1202)

Hot Topics

- On **December 13**, US DOJ lodged a proposed consent decree in US District Court resolving alleged Clean Air Act violations by Synagro Northeast, LLC and the City of Woonsocket, RI related to operation of a sewage sludge incinerator. Pursuant to the consent decree, defendants are required to meet all federal requirements, including complying with emission limits for nine air pollutants, and to pay a $373,660 penalty. The proposed settlement affects an area with potential EJ concerns.
- On **December 14**, R1 approved TMDLs for six metals for Buckeye Brook and Tributaries to Warwick Pond in Rhode Island, to restore the aquatic life uses of the waterbodies. Buckeye Brook was first listed as impaired on the state's 303(d) list in 1998, and RI DEM began work on the TMDL study in 2008.
- On **December 15**, R1 notified the Environmental Appeals Board (EAB) of its decision to withdraw the load-based permit limits for the Marlboro Westerly WWTF, MA which were contested by Organization of the Assabet River (OARs). Until a new permit is issued, the concentration-based limits in the previous permit will remain in effect. This agreement resolved the appeal filed by the OARs.
- On **December 17**, R1 finalized a consent order with the City of Fall River, MA to address CWA violations. The order requires the City to reduce combined sewer overflow (CSO) discharges, rehabilitate its wastewater treatment plant, optimize existing CSO chlorination facilities, evaluate new CSO screening disinfection options, and update its integrated plan. The City is expected to spend $126 million to implement these projects. Fall River is a community with low income and minority populations and EJ concerns.

- On **December 21**, R1 submitted two Massachusetts RCRA Authorization FR notices. The notices, scheduled to be published **January 4**, authorize revisions to the hazardous waste program. The final authorization will be effective 60 days after the date of publication unless EPA receives adverse written comments within 30 days. The revisions include additional hazardous waste listings as well as Universal Waste Rule Provisions for Mercury Containing Equipment, Cathode Ray Tube Exclusion, Academic Laboratories Generator Standards, and Conditional Exclusions for Solvent Contaminated Wipes.
- On **December 16**, R1 met with South Fork Wind, LLC to discuss comments received on the draft permit for the South Fork Windfarm. South Fork Wind, LLC provided clarifying information on the operating scenarios for the generator engines that will be used at the windfarm. R1 anticipates issuing a final permit decision in January 2022.

Region 2

Hot Topics

- **Limetree Bay Refining:** ***Consent Decree Modification:*** On **December 30, 2021,** the U.S. District Court for the U.S. Virgin Islands approved and entered the First Modification of the 2011 consent decree (CD Mod) between the United States, the USVI and Hovensa, concerning the oil refinery on St. Croix. DOJ had filed a motion in **April 2021** for the court's entry of the CD Mod. The entry of the CD Mod. accomplishes a number of things, including substituting Limetree Bay Refining and Limetree Bay Terminals for Hovensa on the consent decree; adding the Environmental Response Trust (ERT) (which is conducting the long-term groundwater remediation at the facility under RCRA) as a party; changing some of the work requirements that were contained in the original CD; and enabling Hovensa to transfer several million dollars to the ERT for use in the groundwater cleanup, and for Hovensa then to dissolve. We expect that there will be another CD modification in the future, adding to the CD the winning bidders for the refinery, currently identified as West Indies Petroleum Ltd. and Port Hamilton Refining and Transportation, LLLP (WIP/PHRT). (The lawsuit in which the CD and the CD Mod. were filed is a separate case from the one we filed against Limetree in **July 2021** to seek relief under Section 303 of the Clean Air Act to address an imminent and substantial endangerment caused by the refinery operations.) ***Bankruptcy:*** WIP and PHRT have until **January 21** to close the purchase transaction with Limetree Refining. (Two of the unsuccessful bidders have filed appeals of the bankruptcy court's **December 21, 2021** order approving the sale to WIP/PHRT; the appeals have no effect on the schedule for the sale unless the sale order is stayed pending appeal.)
- **Settlement in Lead-Based Paint Case against SYG Realties, LLC:** On or about **January 3rd**, the U.S. Attorney's Office for the Eastern District of New York will file on behalf of EPA a Complaint and a Stipulation and Settlement Agreement to resolve our TSCA enforcement action against SYG Realties, LLC. and related companies. The Complaint alleges that the Defendants violated 7 different requirements of EPA's Renovation, Repair and Painting Rule ("RRP Rule") from 2011 to 2013 during renovation work conducted at five buildings located in Brooklyn, New York. The settlement prohibits the Defendants, for 5 years after its effective date, from performing any renovation or demolition regulated by the RRP Rule unless: (1) they notify the United States six months in advance; and (2) they get a compliance plan agreed to by the United States and approved by the Court. There is a stipulated penalty of $10,000 per occurrence for any violation of these

requirements. The Stipulation also includes a certification by the Defendants as to the accuracy of the information they previously submitted to the government as to their financial status.

- **Favorable Decision on Mt. Kisco, NY Superfund Site:** On **December 27, 2021**, the SDNY District Court ruled in *Cannistra Realty, LLC, v. EPA, et al.*, upholding an EPA administrative order for access under CERCLA against the plaintiff, the owner of contaminated property in Mt. Kisco, Westchester County, New York. For ten months, EPA attempted to obtain consent to access the property to investigate possible radioactive contamination. Plaintiff set unreasonable conditions, tantamount to denying access. EPA finally issued a CERCLA administrative access order, which plaintiff challenged in this lawsuit. EPA counterclaimed to compel compliance and sought civil penalties. At a court-mandated settlement conference, plaintiff agreed to grant EPA access to the property, but continued to challenge the order. The court ruled for EPA and imposed and imposed a penalty of $62,250 for 83 days of non-compliance.

Miscellaneous

- **Ezra Prentice Homes Meeting:** R2 will hold a meeting and listening session with the community, likely in early **February**, as a follow up to Administrator Regan's August 2021 visit to the Ezra Prentice Homes in Albany, NY. On **December 13, 2021**, R2 had an initial planning meeting with representatives from Congressman Paul Tonko's Office, Legislator Carolyn Mclaughlin, NYSDEC, NYSDOH, HUD, Capital District Transportation Committee, the Albany Housing Authority, and the Port of Albany.

Region 3

Regional Administrator Signature Items

- **January 3:** RA submitted a Summary of the Clarksburg Drinking Water Issues for the EPA Administrator (R3 POC: Michael Dunn, Dunn.Michael@epa.gov, 215-814-2712)
- **January 3:** RA signed the West Penn Power Consent Decree Package (R3 POC: Douglas Frankenthaler, Frankenthaler.Douglas@epa.gov, 215-814-2472)
- **January 3**: DRA signed four State Implementation Plans (0531, 0554, 0834 & 0854), (R3 POC: Cristina Fernandez, Fernandez.Cristina@epa.gov, 215-814-2178)
- **January 3:** DRA signed the Notice of Proposed Rulemaking for an Outer Continental Shelf - Consistency Update for Commonwealth of Virginia (EPA-R03-OAR-2021-0767), (R3 POC: Cristina Fernandez, Fernandez.Cristina@epa.gov, 215-814-2178)
- **December 28:** RA signed the ECAD & LSASD Re-Organization Decision Memorandums (R3 POC: Kevin Schuman, Schuman.Kevin@epa.gov, 215-814-5338)

Items awaiting Regional Administrator Signature -

- Due **January 6:** For RA signature, WVDEP Messer DOJ Referral & Joint Prosecution Agreement (R3 POC: Douglas Frankenthaler, Frankenthaler.Douglas@epa.gov, 215-814-2472)
- Due **January 10:** For DRA or RA signature, EPA Response to Department of Energy & Environment (DOEE) 2020 DC Exceptional Events (EE) Rule (R3 POC: Cristina Fernández, Fernandez.Cristina@epa.gov, 215-814-2178)

Hot Topics

- **R3 Settles Alleged SPCC Violations at Pennsylvania Petroleum Storage and Distribution Facility in Greensburg, PA [Docket No. CWA-03-2022-0014.]** On **November 30, 2021,** R3's ECAD Division Director signed a proposed Consent Agreement between EPA and Buckeye Terminals, LLC, settling alleged violations of the CWA's Spill Prevention, Control, and Countermeasure (SPCC) requirements with a penalty of $67,856. This case helps ensure compliance by Buckeye with spill prevention regulations and to mitigate potential discharge threats into nearby waterways and adjacent PA communities.
- **EPA R3 Regional Tribal Operations Committee Holds First Annual Meeting** – The first annual meeting of the EPA R3 Regional Tribal Operations Committee (RTOC) was held on **December 14, 2021**. All seven Federally recognized tribes in R3 were represented and gave individual tribal updates during the meeting. The primary purpose of the meeting was to help inform R3 on issues important to tribes and on EPA operations that affect tribes.
- **Bay Congressional Staff Briefed on Chesapeake Bay Allocation in the Bipartisan Infrastructure Law (BIL) -** On **December 14**, EPA HQ and R3 provided a briefing to staffers representing congressional offices across the Chesapeake Bay watershed. EPA explained the development of a "spend plan" per the BIL and that the $238,000,000 for the Chesapeake Bay over the next five years appropriated in the BIL will be allocated based on the language in the BIL and the FY'21 explanatory statement language for geographic programs referenced in the BIL.

Region 4

Regional Administrator Signature Items

- On **December 29,** the following Notices were signed: Sullivan County, Tennessee Sulfur Dioxide Finding of Failure to Attain Determination proposed rulemaking (TN-FFA-PR); Jefferson County Emissions Statements Requirements for the 2015 8-Hour Ozone Standard Nonattainment Area (KY-282); Approval of Mecklenburg County General Provisions (NC-228); and North Carolina Minor Revisions to Cotton Ginning Rule (NC-257). (R4 POC: Caroline Freeman, freeman.caroline@epa.gov, 404-562-8976)

Hot Topics

- **Reginal Administrator External Engagement in Washington DC:** On **January 11-12**, Regional Administrator Blackman will be in Washington DC for individual meetings with Congressional members to include Congressman Bennie Thompson (MS-2) and Congressman James Clyburn (SC-6).
- **New Indy Catawba, LLC:** On **December 29**, EPA lodged a proposed Consent Decree with New Indy to resolve EPA's Clean Air Act Section 303 imminent and substantial endangerment civil action against New Indy. New Indy has agreed to a civil penalty of $1.1 million to resolve alleged violations of EPA's **May 13, 2021** CAA Section 303 Order and to enforceable measures designed

to prevent New Indy from emitting hydrogen sulfide above health-based concentration levels at its fence line. The Consent Decree is subject to a 30-day public comment period.

- **Notice of Intent; Manatee Mortality** – On **December 20**, EPA received a Notice of Intent (NOI) from Earth Justice alleging that the EPA has unlawfully failed to reinitiate Endangered Species Act consultation with the U.S. Fish and Wildlife Service (FWS) relative to EPA's **November 30, 2012** approval of Florida's estuary-specific numeric nutrient water quality criteria (NNC for nitrogen, phosphorus, and chlorophyll-a). Since **December 1, 2020**, more than 719 manatees have died and there have been 67 rescues in the estuaries along the Florida Atlantic coast largely in the Indian River Lagoon. Region 4 is working with the OW and OGC in response to this NOI.
- **Old Davis Hospital Superfund Site (Statesville, NC) and Pineville Textile Mill Superfund Site (Pineville, NC):** On **January 3, 2022**, the case for recovery of EPA's costs at these two sites is scheduled for trial before a judge and a jury in the U.S. District Court for the Western District of North Carolina. The U.S. is seeking to recover $2.5 million in response costs.

Region 5

Regional Administrator Signature Items

- On **December 30**, the RA signed a second modification to the GLLA project agreement between EPA and U.S. Steel for remedial action work at the U.S. Steel Duluth Works/Spirit Lake Sediment project site in Duluth, Minnesota, within the St. Louis River AOC. (R5 POC: Chris Korleski, korleski.christopher@epa.gov, 312-353-8320)
- The RA is scheduled to sign a *Federal Register* notice approving the redesignation request for the Rhinelander area in Wisconsin. (R5 POC: John Mooney, mooney.john@epa.gov, 312-886-6043)
- The RA is scheduled to sign an amendment to the GLLA project agreement between EPA and the Minnesota Pollution Control Agency for remediation and habitat restoration at the Ponds Behind Erie Pier site in the St. Louis River AOC in Duluth, Minnesota. (R5 POC: Chris Korleski, korleski.christopher@epa.gov, 312-353-8320)

Hot Topics

- EPA continues to respond to concerns about lead in drinking water in Benton Harbor, Michigan. In mid-December, EPA concluded the fieldwork portion of its filter studies, where sampling occurred at 240 homes. The Region is continuing to process the nearly 2,000 samples in the laboratory and is continuing to communicate preliminary results to residents through phone calls and letters. EPA has drafted a response to the **September 9** petition, which is undergoing additional review at headquarters.
- R5 will host a meeting of state environmental agency directors on **January 12**. These monthly meetings are part of an ongoing effort to enhance our partnership with state agency directors. The round-robin communication style allows each state to report on hot issues and provide updates to their ongoing efforts.

Region 6

Regional Administrator Signature Items

- By **January 10**, R6 will respond to Multicultural Alliance for a Safe Environment correspondence regarding the ongoing CERCLA remediation at the Homestake Gold Superfund site.

Hot Topics

- **Northwest Arkansas Conservation Authority, Arkansas:** On **December 30**, R6 sent General Objection letters to the Arkansas Department of Environmental Quality and the permittees for the Northwest Arkansas Conservation Authority (NACA) and the Springdale NPDES permits. By **January 7**, R6 will issue the Specific Objection Letter for the NACA permit. By **January 14**, R6 will issue the Specific Objection Letter for the Springdale permit.
- **St Bernard Parish, Louisiana:** On **December 28**, a Federal Register notice was published extending the comment period to **January 13** for EPA's proposed finding that the St. Bernard sulfur dioxide (SO2) nonattainment area failed to attain the SO2 ambient air quality standard by the attainment deadline of **October 4, 2013**.
- **January 11:** Regional Tribal Operations Committee Meeting
- **January 13:** SAFETEA Consultation

Region 7

Hot Topics

- On **January 10, 11, and 13,** R7 is holding our annual meeting with R7 states and tribes on the Clean Water Act 303(d) and Total Maximum Daily Load programs. Major topics for discussion include environmental justice training, on-going regional and national litigation, updates on major Tribal rules and treaties, climate change, and national program initiatives.
- On **January 11**, R7 is holding our first meeting with Iowa, Kansas, Missouri, and Nebraska to discuss the Bipartisan Infrastructure Law (BIL) ramp-up, timeline, and spend plan. The states are asked to share any information or news that they may have about areas of focus or resource commitments regarding these Administration priorities. R7 currently plans to hold these calls monthly to ensure that lines of communication remain open and that our strong state partnership achieves the greatest benefit possible for our communities in need. If a Build Back Better (BBB) plan is passed into law, discussions about the implementation of that law will also be included in future calls.
- On **January 25**, R7 will host the first virtual National Listening Session for EPA's Draft Lead Strategy. The R7 Lead and Sustainability Advisory, R7 Information Technology staff, and R7 Public Affairs staff are working with HQ staff. RA Meg McCollister will provide introductory remarks.

Region 8

Hot Topics

Marshall Fire, Boulder County, Colorado

- On **January 1, 2022**, EPA R8 Superfund and Emergency Management Division received a FEMA Activation Mission Assignment (MA) for the Marshall Fire response. The Activation MA directs EPA to provide personnel to participate in coordination calls/meetings as requested to support disaster operations.
- R8's Water Division has also been working with Colorado Department of Public Health and Environment (CDPHE) as they address water issues in the burn area.

White Mesa Mill CERCLA Off-Site Rule Determination

- R8 and the Office of Radiation and Indoor Air will hold an informal conference with Mill owner/operator Energy Fuels on **January 6** to discuss EPA's initial determination that the Mill is unacceptable for receiving CERCLA wastes.
- If information presented in the informal conference does not support a determination of acceptability, Energy Fuels will have 10 calendar days after EPA issues a final notice of unacceptability, to request a reconsideration from the Regional Administrator.
- R8 is planning a site visit of White Mesa Mill on **January 13 and 14**. The State of Utah will be invited.

Region 9

Regional Administrator Signature Items

Anderson Air Force Base, Guam

- The RA intends to sign letters to Guam Senator Sabina Flores Perez and to Earth Justice responding to concerns regarding Guam EPA's proposed draft RCRA permit and health issues surrounding open burn/open detonation. EPA is initiating a rulemaking process to revise regulations pertaining to this type of disposal reflecting the latest information regarding alternative treatment technologies for energetic waste. (R8 POC: Barbara Gross, 415-972-3972)

Hot Topics

Drinking Water Emergency at Joint Base Pearl Harbor-Hickam (HI)

- This week, EPA and Navy will finalize an Interagency Agreement to support EPA's continued participation in the multiagency response. As of **January 4**, flushing of the water distribution system has been completed in seven of 19 zones, pending confirmation sampling results. Residential flushing and sampling will follow successful system flushing in each zone. Outreach to residents, social media audiences and stakeholders continues. EPA has three OSCs and three expert members of our Water Emergency Team onsite and has deployed two mobile labs to California to assist with analytical capacity. Last week, we responded to a Senate Appropriations Committee's request for a cost estimate for the Navy to set up and sustain an environmental lab at the University of Hawaii.

Border 2025 California-Baja California Regional Coordinators Meeting

- This week, we will host the first Border 2025 binational meeting for California/Baja California Regional Coordinators. Program partners include federal and state agencies in the U.S. and Mexico and all federally recognized tribes in the area. Discussion will focus on our partners' regional environmental priorities, recently funded projects focused on water quality and emergency preparedness, and development of an Action Plan. EPA will also advocate for expanding and strengthening environmental justice integration in the Border 2025 Program.

Primacy Program Revision for the Commonwealth of the Northern Mariana Islands

- Last week, we approved the Commonwealth of the Northern Mariana's primacy program revision request for adoption of the federal Ground Water Rule. The public has 30 days to request a public hearing, elsewise the approval will become effective on **February 2.**

Region 10

Acting Regional Administrator Signature Items

- 12/28/2021: Letter directing payment from the Tulalip Landfill Superfund Trust account to the Tulalip Tribes of Washington.
- 12/29/2021: Hilcorp Alaska Amendment: Underground Injunction Control Financial Responsibility Requirement

Miscellaneous

- **State Revolving Fund Helps Rebuild Water System After Wildfires (OR):** The City of Detroit, Oregon suffered catastrophic damage during the 2020 Lionshead Complex wildfire including to its water treatment facility. $200,000 from EPA's Drinking Water State Revolving Fund is helping co-fund reconstruction of this facility. Detroit is deemed a disadvantaged community by the State of Oregon.
- **R10 Healthy Schools News January Issue:** The January issue of R10's Healthy Schools News will offer readers practical tools to help keep classrooms healthier for students and staff. This e-newsletter reaches about 6,000 school officials across R10.
- **Major Milestone Achieved at Idaho National Laboratory:** The U.S. Department of Energy completed the final exhumation and out of state shipment of transuranic waste as required under an agreement between the State of Idaho and DOE. More than 10,300 cubic meters of waste were removed and shipped one year ahead of schedule.
- **Portland Water Bureau Continues to Detect Cryptosporidium (OR):** The Portland Water Bureau detected low levels of Cryptosporidium from routine monitoring of the Bull Run Watershed on **December 27**. Cryptosporidium was last detected on **November 29.**
- **R10 Issues Underground Injection Control Permits to Oil and Gas Facilities in Alaska and Idaho:** In the first week of January, R10 will issue Class 1 Underground Injection Control permits

to two oil and gas facilities in Alaska. In addition, in mid-January, the region will issue a draft permit for public comment for the Snake River Oil & Gas facility in Idaho following an invitation for Government-to-Government consultation to the Shoshone-Bannock Tribes.

Office and Air and Radiation

Acting Assistant Administrator Signature Items

- On **January 3**, Principal Deputy Assistant Administrator Joseph Goffman provided EPA's approval of the National Radon Action Plan (NRAP) 2021-2025. The NRAP 2021-2025 was reviewed for concurrence by all member organizations of the NRAP Leadership Council. The NRAP 2021–2025 is the third installment of a strategy anchored by EPA to ramp up action on radon. The NRAP Leadership Council has set a goal for the nation to find, fix and prevent high indoor radon levels in 8 million buildings by 2025; to prevent an average of at least 3,500 lung cancer deaths per year; and to save one-quarter of a million lives in those buildings over the next 74 years.

Hot Topics

- On **January 4**, EPA held a virtual public hearing on its proposal for the "Renewable Fuel Standard (RFS) Program: RFS Annual Rules" which was signed on **December 7, 2021**. In this action, EPA is proposing the 2020, 2021, and 2022 renewable fuel standards, several regulatory changes to the RFS program, and to address the remand of the 2016 standard-setting rulemaking. There were 218 registered participants for the public hearing, of which 81 were registered to speak.
- Beginning on **January 4**, EPA will launch its outreach campaign announcing that January is National Radon Action Month. Throughout the month of January, the Office of Radiation and Indoor Air (ORIA), Regional Offices, and their state grantees are encouraging Americans to test and fix their homes as part of National Radon Action Month (NRAM). The annual outreach campaign features a national press release, social media posts, stakeholder engagement messages in English and in Spanish, new infographics and targeted outreach by EPA Regional programs. Regional public affairs offices will be encouraged to amplify the headquarters announcements. Additional social media messages will be sent throughout the month to emphasize the importance of radon testing and mitigation, and to highlight EPA's radon resources.
- On **January 11**, EPA's Office of Air Quality Planning & Standards (OAQPS) will host a webinar, titled "EPA's Enhanced Air Quality Monitoring for Communities Grant Competition: Informational Webinar." The webinar will provide an opportunity for participants to have their questions answered regarding EPA's recent announcement of $20 million in available funds under the American Rescue Plan Act of 2021 (ARP) for eligible entities to conduct ambient air monitoring of pollutants of greatest concern in communities with environmental and health outcome disparities stemming from pollution and the COVID-19 pandemic.

Office of the Chief Financial Officer

Chief Financial Officer Signature Items

- **On December 30**, OCFO transmitted the Administrator's required Antideficiency Act violation notifications to Congress, the President, and GAO regarding FY 2017 and FY 2018 expenses. (OCFO POC: Maria Williams, williams.maria@epa.gov, 202-564-3021)

Hot Topics

- OMB confirmed the FY 2023 Passback will not occur before **January 10** but has not provided a specific revised date. The FY 2023 President's Budget submission to Congress as well as other related deliverables, including the *Final Draft FY 2022-2026 EPA Strategic Plan*, FY 2022-2023 APG Action Plans, and Evidence Act *Final Draft Learning Agenda* and *Final Draft Capacity Assessment*, will be delayed by about the same amount of time as the Passback to allow time to account for budget levels and policy guidance included in Passback.
- OCFO shared the Deputy Administrator's input on the *Final Draft FY 2022-2026 EPA Strategic Plan* and extended the deadline for Core Team responses from **January 7 to January 12**.
- OCFO continues to work with key senior officials and program offices to implement the Bipartisan Infrastructure Law (BIL). OCFO submitted the Spend Plan to OMB on December 17 for review and clearance and received OMB's initial comments on **December 23**. OCFO is preparing a response to transmit to OMB this week. The CFO also issued budget guidance to the agency on **December 28** followed by technical guidance issued by the Office of Budget. In addition, OCFO is fine-tuning the Program Integrity Guidance for the infrastructure programs based on results of the OAR pilot. This guidance will focus on performing risk assessments and evaluating the effectiveness of internal controls for specific programs related to the BIL. On **January 10,** OCFO will provide the EPA Steering Committee an update on initial analysis results and next steps to apply continuous improvement support to BIL implementation.

Miscellaneous

- The E-Enterprise for the Environment Leadership Council co-chairs' New Year greeting is scheduled to be distributed to the E-Enterprise community, comprised of internal EPA and external stakeholders, on January 5. The message was developed with input from the Leadership Council's co-chairs: Janet McCabe, EPA EELC chair; Myra Reece, state EELC chair; and Kari Hedin, tribal EELC chair.
- On **January 5**, OCFO will meet with the U.S. Patent and Trademark Office's Director of Process Improvement to share information and best practices from each agency's continuous improvement program.
- On Tuesday **January 11**, OCFO will meet with the Director of the Arizona Department of Environmental Quality as a follow-up to the state and tribe pre-summit session the AZ DEQ provided in December 2021.

Office of Congressional and Intergovernmental Relations

Hot Topics

- **January 4 – 6 -** State Environmental Secretaries from priority states will meet with leadership from EPA's Office of Intergovernmental Relations and Office of Land and Emergency Management to discuss forthcoming action from the agency on coal combustion residuals or "coal ash." Among the meetings taking place this week are with the environmental secretaries of Michigan, New York, North Carolina, and Illinois.
- **January 6** -Mayor LaToya Cantrell of New Orleans, Louisiana will meet with EPA Administrator Regan to discuss his visit to the City in November and the environmental justice issues raised during his tour of the Gordon Plaza affordable housing development, which the Mayor is seeking to develop into a solar farm.
- **January 7**- Dialogue with Intergovernmental Associations on the Bipartisan Infrastructure Law. EPA's Office of Intergovernmental Relations will lead the next regularly scheduled dialogue with Intergovernmental Associations to continue regular engagement on BIL implementation. Participants from the agency include EPA's Office of Water, Office of Air and Radiation, Office of Chemical Safety and Pollution Prevention, and Office of Land and Emergency Management.
- **January 7 (T) -** Administrator may do a virtual BIL water infrastructure event with Representative Steny Hoyer (D-MD 5th District).

Office of Chemical Safety and Pollution Prevention

Assistant Administrator Signature Items

- **AA Signature projected by January 10 (OCSPP):** On an FR document announcing that there will be a 3-day public peer review virtual meeting of the Science Advisory Committee on Chemicals (SACC) to consider and review the draft EPA TSCA Screening Level Approach for Assessing Ambient Air and Water Exposures to Fenceline Communities. In addition, EPA is announcing the availability of and soliciting public comments on the draft approach, which will be presented as a screening level methodology for assessing potential air and water chemical exposures to fenceline communities. (OCSPP POC: Angela Hofmann, hofmann.angela@epa.gov, 202-564-0258)

Hot Topics

- As part of the comprehensive Strategic Roadmap to confront the human health and ecological risks of PFAS, EPA will announce the addition of five PFAS to the Toxics Release Inventory (TRI). The Fiscal Year 2020 National Defense Authorization Act (NDAA) provides the framework for adding additional PFAS to the TRI each year. The NDAA also identifies certain regulatory activities, including finalization of toxicity value and Significant New Use Rules under TSCA, that automatically add PFAS or classes of PFAS to the TRI beginning January 1 the following year. Per the NDAA requirements, these PFAS additions became effective as of **January 1, 2022.** Reporting forms for these PFAS will be due to EPA by **July 1, 2023,** for calendar year 2022 data. Finalization of a toxicity value is a triggering regulatory action under the NDAA for automatic addition to the

NDAA, and in April 2021, EPA finalized a toxicity value for perfluorobutane sulfonic acid (PFBS), potassium perfluorobutane sulfonate, and perfluorobutanesulfonate. One PFAS was added because it is subject to EPA's 2020 long-chain PFAS Significant New Use Rule under TSCA. Another PFAS had been identified for addition to the TRI list based on the NDAA's provision to include certain PFAS upon the NDAA's enactment; however, due to a confidential business information (CBI) claim related to its identity, as provided by the NDAA, this PFAS was not included on the TRI list until EPA completed its review of the CBI claim. This PFAS was included in updates to the confidential status of chemicals on the TSCA Inventory published by EPA in October 2021, and thus was added to the TRI list due to the CBI declassification.

- EPA will announce that before the agency registers any new conventional pesticide active ingredient (AI), EPA will evaluate the potential effects of the AI on federally threatened or endangered (listed) species and their designated critical habitats, and initiate ESA consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (the Services), as appropriate. If EPA finds through its analyses that a new pesticide is likely to adversely affect listed species or their critical habitats, EPA will initiate formal consultation with the Services before registration and consider whether the registration may jeopardize the continued existence of listed species or adversely modify their designated critical habitat. In addition, EPA intends to release an overall ESA workplan in the coming months.
- EPA will renew time-limited registrations for Enlist One and Enlist Duo prior to their expiration in January 2022 Enlist One and Enlist Duo are herbicides used for post emergence control of broadleaf weeds. These herbicides offer a potential alternative to over-the-top dicamba. The new product labels incorporate robust ESA mitigation measures. EPA's ecological risk assessment found direct risks to non-listed and listed plants from runoff and indirect risks to animals that rely on these affected plants for diet or habitat, including non-listed and listed animals and some designated critical habitats. Based on these findings, the Agency is implementing a variety of control measures to protect honey bees, on-field listed animals, and their designated critical habitats, as well as off-field listed animals and their designated critical habitats. Additionally, as required under ESA, EPA has made effects determinations for Enlist One and Enlist Duo and has initiated formal consultation with the U.S. Fish and Wildlife Service.

Office of Enforcement and Compliance Assurance

Acting Assistant Administrator Signature Items

- **New Tribal Underground Storage Tank Compliance Pilot:** On **December 18**, OECA Acting AA Larry Starfield issued a new pilot aimed at improving compliance at tribal underground storage tank facilities through two key mechanisms: (1) ensuring tribal governments are provided with information on, and notice of, consultation opportunities related to announced inspections, compliance assistance, noncompliance, and enforcement responses; and (2) making it easier for regions to use expedited enforcement tools through advance concurrence from the OECA AA. The Pilot began the second quarter of FY 2022 (**January 1, 2022**) and will last three years.
- **Extension of COVID-19 Inspection Commitment Flexibilities for Regulatory Partners:** On **December 30**, OECA Acting AA Larry Starfield issued a 3-month extension to states, tribes, territories, and local agencies allowing them the flexibility to count off-site compliance monitoring

activities towards their on-site inspection commitments under OECA's Compliance Monitoring Strategies and grant workplans. The letter continues to emphasize the importance of inspectors going out in the field as appropriate and when it is safe during the COVID-19 public health emergency.

Hot Topics

- **Three Companies Face Criminal Charges of Negligent Conduct During Offshore Oil Leak that Damaged Southern California Coastline:** A 17-mile-long pipeline, which was used to transfer crude oil from several offshore facilities to a processing plant in Long Beach, California, began leaking on the afternoon of **October 1, 2021**. Amplify Energy, Beta Operating, and San Pedro Bay Pipeline allegedly continued to operate the damaged pipeline, on and off, until the next morning. As a result of the negligent conduct, an estimated 25,000 gallons of crude oil was discharged from a point approximately 4.7 miles west of Huntington Beach into the Pacific Ocean from a crack in the 16-inch pipeline. On **December 15**, the defendants were indicted in the Central District of California for illegally discharging oil during the pipeline break.
- **Monsanto Agrees to Plead Guilty to Illegally Using Pesticide at Corn Growing Fields:** After using the Forfeit 280, a glufosinate ammonium-based product, in 2020 on corn fields on Oahu, Hawaii, Monsanto allowed workers to enter the fields during a six-day "restricted-entry interval" after the product was applied. As a result of this new conduct, the company violated a 2019 Deferred Prosecution Agreement (DPA) related to the storage of Penncap-M, a banned pesticide. Monsanto will plead guilty to two felony RCRA charges filed in 2019 that the government would have dismissed if the company had complied with federal law. On **December 9**, Monsanto admitted in a filed plea agreement that it committed 30 misdemeanor FIFRA crimes. Monsanto will serve three years of probation, pay a total of $12 million, and continue for another three years a comprehensive environmental compliance program that includes third-party auditor.

Office of General Counsel

Hot Topics

- New Decision: *Northwest Environmental Advocates v. EPA,* No. 2:20-cv-01362-MJP (W.D. Was.) -On **December 29**, the U.S. District Court for the Western District of Washington issued a decision vacating EPA's denial of Northwest Environmental Advocates' (NWEA) Clean Water Act (CWA) rulemaking petition. NWEA's petition requested that EPA exercise its CWA 303(c)(4)(B) authority to determine whether new or revised aquatic life water quality criteria were necessary for Washington waters. The court found that EPA's denial of NWEA's petition was unreasonable and not grounded in the CWA, rejecting the three bases for EPA's decision, namely: (1) cooperative federalism, (2) resource constraints, and (3) assertions about the stringency of Washington's existing human health criteria as well as certain existing aquatic life criteria.
- New Decision: *Iowa League of Cities v. EPA,* No. 11-3412 (8th Cir.) – On **December 22**, the Eighth Circuit Court of Appeals partially granted and partially denied Petitioner's request for mandamus relief to enforce a March 2013 decision. The Court held that its prior decision finding that EPA exceeded its statutory authority in regulating the practice of "blending" applied to both sanitary sewer systems (SSS) and combined sewer systems (CSS).

- New Decision: *Food and Water Watch v. EPA,* 20-71554 (9th Cir.) - On **December 16**, the Ninth Circuit Court of Appeals issued a new order, superseding the prior decision described below and remanded the relevant permit to EPA rather than vacating it. On September 16, the Ninth Circuit had issued a decision finding that the monitoring provisions in EPA's general permit for concentrated animal feeding operations in Idaho were inadequate and vacated the permit. EPA requested panel rehearing of the court's vacatur on the grounds that vacatur would be unduly disruptive; it would shift permitting authority to Idaho and the State would be required to initiate the permit issuance process anew if it had chosen to issue a CAFO general permit.

Miscellaneous

- New Litigation: *Center for Investigative Reporting v. EPA,* 4:21-cv-9680 (N.D.Cal.)- On **December 15**, the Center for Investigative Reporting filed a Freedom of Information Act (FOIA) complaint in the Northern District of California. The complaint alleges that the Office of Air and Radiation (OAR), Office of Atmospheric Programs (OAP) failed to timely respond to two FOIA requests (EPA-2022-000018 & EPA-2022-000019) which sought Natural Gas STAR Program annual reports and implementation plans from 2010 to 2021, for all segments of the oil and natural gas industry.
- New Litigation: *Board of County Commissioners of Weld County, CO v. EPA,* (D.C. Cir.)– On **December 15**, Board of County Commissioners of Weld County, CO filed a Petition for Review of "Additional Revised Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards: El Paso County, TX and Weld County, CO," challenging the portion of the rule that applies to Weld County, CO.

Office of International and Tribal Affairs

Hot Topics

- On **January 11**, EPA Administrator Regan and WHO Director-General Tedros Adhanom, will virtually sign the EPA-WHO Memorandum of Understanding that covers a range of environment and health issues. WHO has been a longstanding and valued international EPA partner, collaborating on health-related topics including climate change, air quality, children's environmental health, chemicals and toxics, water sanitation, and environmental burden of disease. In 1992, former EPA Administrator Reilly and former WHO DG Dr. Hiroshi Nakajima signed the first EPA-WHO MOU.
- On **January 12**, EPA Administrator Regan and United Nations Food and Agriculture Organization Director-General Dr. Qu Dongyu, will meet to identify areas of potential collaboration. The meeting is expected to focus on mobilizing ambitious action to mitigate climate change, such as reducing food loss and waste, reducing methane emissions associated with food production, and promoting a more sustainable and resilient global food system.
- **On January 13,** EPA (OITA and R6) will host a consultation with Oklahoma Tribal nations on the **December 22, 2022**, withdrawal and reconsideration of the Agency's decision from **October 1, 2020**, granting the State of Oklahoma's request to extend its EPA-approved environmental

regulatory programs into certain areas of Indian country within Oklahoma. The comment period on the proposed withdrawal and reconsideration ends on **January 31, 2022.**

- On **January 13**, EPA (OITA and R10) will participate in a consultation with the Chiefs in the Interior of Alaska in the Tanana Chiefs Conference Region on the proposed Ambler Road project. The previous Administration approved permits and authorization by DOI and USCOE for a proposed access road that runs across much of interior Alaska to the Ambler mining district without meaningful tribal consultation.

Office of Land and Emergency Management

Hot Topics

- **Non-Hazardous Secondary Materials (NHSM).** The NHSM Standards Petition Response package is with OP for OMB review.
- **Risk Management Program Retrospection Notice of Proposed Rulemaking (NPRM).** On **December 16**, option selection was held.
- **Clean Water Act Hazardous Substances Worst Case Discharge NPRM.** On **November 19**, OLEM briefed OMB on the rule and background. OMB has agreed to an expedited 45-day review.
- **Designation of PFOA and PFOS as CERCLA Hazardous Substances NPRM.** The final agency review (FAR) meeting was held **December 13**, and the package will go to OP for OMB review shortly thereafter.
- **Coal Combustion Residuals (CCR)**.
    - The notice re-opening the comment period for 60 days for the CCR Beneficial Use and Waste Piles NODA was published in the Federal Register (FR) on **March 12, 2021**. The public comment period ended on **May 11, 2021**.
    - We are developing the first batch of responses to applications for extensions past the deadline to cease receipt of waste. The regulations toll the deadline until the Agency acts on the applications. We are working closely with OGC, OECA, affected regions, and others.
- **Ongoing major Federal Facilities and Superfund National Priorities List (NPL) sites.** We are working with R4 on Oak Ridge Reservation; R6 on Chevron/Questa; R7 on Big River Watershed; and R9 on Hunters Point Naval Shipyard.
- **National Brownfields Training Conference.** This conference is now scheduled for **August 16 – 19, 2022.**

Office of Mission Support

Hot Topics

- After months of hard work, on **January 3**, the new EPA Career Page was launched. The new webpage features new graphics, user-friendly navigation, and many new resources for individuals interested in working for the EPA, including a page for hiring outreach events, application materials, and equal employment opportunities.
- There are multiple upcoming outreach events scheduled in January, targeting students and recent grads at Minority Serving Institutions.

  - HBCUs and Predominantly Black Institutions (Students and Alumni) on **January 18 and 19**
  - Native-Serving Institutions and Tribal Colleges (Students and Alumni) on **January 25**
  - Latin American and Hispanic-Serving Institutions (Students and Alumni) on **January 27**
  - Asian American and Pacific Islander-Serving Institutions (Students and Alumni) on **February 1**
- Microsoft 365/Teams Federation with the Small Business Association: The Office of Digital Services and Technical Architecture and Office of Information Technology Operations successfully established federation with the SBA as part of a pilot initiative. EPA employees, especially in the Office of Small and Disadvantaged Business Utilization, can now chat with SBA employees and include them in Microsoft Teams meetings.

Office of Policy

Hot Topics

- **January 5 – National Environmental Justice Advisory Council Public Meeting:** The National Environmental Justice Advisory Council (NEJAC) will convene a public meeting on Wednesday **January 5**. Administrator Regan will join the NEJAC to provide a welcome and update on priority EJ actions underway at EPA and engage the membership in dialogue following his remarks. NEJAC will spend the majority of time during this meeting deliberating on final recommendations to EPA regarding the multiyear strategic plan and updates on the work of various NEJAC working groups. The NEJAC will then hold a public listening session to close out the meeting.
- **January 14 - Establishing a baseline for Objective 1.2 (Climate Adaptation) Long Term Performance Goals (LTPGs):** OP continues to work closely with all the Programs and Regions through the Cross-EPA Work Group on Climate Adaptation and the Performance Measures Subgroup to establish baselines for the LTPGs in Objective 1.2 of the draft FY'22-FY'26 Strategic Plan. OP sent a data call for baseline information to all the Programs and Regions. The information is due to OP by **January 14.** The baseline data will then be used to determine the targets for the Annual Performance Goals in the Strategic Plan.

Office of Research and Development

Acting Assistant Administrator Signature Items

- **5170 for ORD Society of Toxicology/ToxExpo** for **March 27-31, 2022** at the San Diego Convention Center, CA.

Hot Topics

- **ORD is planning a tabletop exercise demonstrating tools for addressing tribal waste management and response needs.** The Tribal Waste and Response (TWAR) Committee will choose the tools needed from the Emergency Response Research site and EPA Resilience Tools Wizard to design a table-top exercise to learn and use ORD tools. The tabletop is scheduled for

March 2022. On December 13th, ORD briefed the TWAR Committee describing a selection of waste tools that the Tribes could use in their response and recovery efforts following all types of disasters.

- **EPA provides support to the NC Department of Agriculture and Consumer Services (NCDA&CS) in evaluating cleaning and disinfection protocols for commercial farm equipment.** Commercial vehicles contaminated with African swine fever, foot and mouth disease, and highly pathogenic avian influenza viruses or other biological contaminants could pose potential risks to human and animal health following a disease outbreak or incident. The operational procedures for decontaminating vehicles exposed to viruses and bacteria are challenging and knowledge gaps exist. Viable options for returning vehicles to pre-incident risk levels are of immediate need. At the request of NCDA&CS, EPA conducted a study in May of 2021 to evaluate potential vulnerabilities in the NCDA&CS cleaning and disinfection standing operating procedures with the purpose of identifying vehicle locations where contaminated material may be overlooked during cleaning and disinfection operations. Recently, EPA and NCDA&CS coauthored a report providing insight into the performance of NC's cleaning and disinfection standing operating procedures and technologies when confronted with foreign animal disease outbreaks with the goal to limit the spread through well practiced cleaning and disinfection procedures and efficacious treatments. NC Department of Agriculture and Consumer Services Emergency Programs Director, John Howard, thanked ORD researchers for their continued support of NC's farm cleaning and disinfection efforts in preparation for African swine fever and other foreign animal disease impacts.
- On **December 17, 2021**, the draft Hexavalent Chromium IRIS assessment went to EPA Agency review (Step 2) for a six-week period ending **January 28, 2022**, with 'showstopper' comments requested within four weeks by **January 14, 2022**.

Office of Water

Hot Topics

- **Beginning next week**, EPA and Army are hosting three virtual public hearings to provide an overview and get feedback on the "Revised Definition of 'Waters of the United States'" proposed rule. The public hearings will be held on **January 12, 2022** from 10 AM to 1 PM Eastern; **January 13, 2022** from 2 PM to 5 PM Eastern; and **January 18, 2022** from 5 PM to 8 PM Eastern. Registration is currently open online and the agencies will hear from up to 150 speakers. On **December 7, 2021**, the "Revised Definition of 'Waters of the United States'" proposed rule published in the *Federal Register,* and the public comment period is open until **February 7, 2022**.
- On **Monday January 10**, EPA Administrator Michael S. Regan will announce three Water Infrastructure Finance and Innovation Act (WIFIA) loans—totaling nearly $396 million—to the City of Baltimore, Maryland. These WIFIA loans will enable the city to proactively implement projects to improve the reliability and resiliency of its water systems. Through WIFIA, the city will save approximately $100 million while project construction and operation are expected to create an estimated 2,700 jobs.

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/5/2022 10:22:30 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Thursday, January 6
Attachments: OAR Minamata and APMMN Background Rev.docx; Pre-Brief for DA McCabe meeting prep_Goffman_Jan 6 2022.pptx; Materials and Agenda for 1/6/22 Fuels Biweekly; OAR EJ Coordinator Final Candidates Discussion - Thur or Mon

Goffman, Joseph Calendar
Goffman.Joseph@epa.gov
On Thursday, January 6, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

Su	Mo	Tu	We	Th	Fr	Sa
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23	24	25	26	27	28	29
30	31					

Busy
Out of Office
Tentative
Working Elsewhere
Free
Outside of Working Hours

January 2022

Thu, Jan 6

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 9:55 AM	Comms weekly
	9:55 AM – 10:00 AM	**Free**
	10:00 AM – 10:20 AM	Weekly w/Joe Goffman
	10:20 AM – 10:30 AM	**Free**
	10:30 AM – 10:55 AM	OAR EJ Coordinator Candidates Discussion (1 email)
	10:55 AM – 11:00 AM	**Free**

■	11:00 AM – 11:45 AM	Fuels Bi-weekly (1 email)
□	**11:45 AM – 12:00 PM**	**Free**
■	12:00 PM – 1:00 PM	Lunch/Management Time
■	1:00 PM – 2:00 PM	AA Level Coordination Meeting on Minamata Convention on Mercury (1 word doc)
□	**2:00 PM – 2:10 PM**	**Free**
▨	2:10 PM – 2:40 PM	OAR Meet & Greet with Region 6
□	**2:40 PM – 2:45 PM**	**Free**
■	2:45 PM – 3:25 PM	Pre-briefing on preparing DA McCabe for upcoming meetings with RAs and with AdvaMed (1 ppt)
□	**3:25 PM – 3:30 PM**	**Free**
■	3:30 PM – 3:55 PM	Scheduling Meeting
□	**3:55 PM – 4:00 PM**	**Free**
■	4:00 PM – 4:30 PM	Biofuels Report to Congress
■	4:30 PM – 5:00 PM	EtO Discussion (to discuss EtO monitoring and what tools the agency has at its disposal to do so and also what funding is needed for it)
□	**After 5:00 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/6/2022 10:53:13 AM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
Subject: Re: : Proposed Reconsideration of the 2020 MON RTR (SAN 6494.1)

Got the mon action memo so you just have mercury cell for concurrence to send to OMB.

Ann (Campbell) Ferrio
Chief of Staff
Office of Air and Radiation
(202) 566-1370

On Jan 5, 2022, at 8:33 PM, Goffman, Joseph <Goffman.Joseph@epa.gov> wrote:

Thanks. Talked to Mike about timing yesterday and I think we're in synch. I now have this and the mercury chlor-alkali in my immediate queue, right? Anything else?

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Wednesday, January 5, 2022 8:24 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Subject: : Proposed Reconsideration of the 2020 MON RTR (SAN 6494.1)

Joe, the attached is ready for your review and signature on the action memo. Tomás has reviewed and concurred (attached). Currently the program is targeting next week for signature; however, if I should be communicating a different timeframe for this action consistent with any recent discussions, please let me know.

Thank you,

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Chang, Alice <Chang.Alice@epa.gov>
Sent: Wednesday, January 5, 2022 1:48 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Iglesias, Amber <Iglesias.Amber@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>; Noonan, Jenny <Noonan.Jenny@epa.gov>; Olson, Heather <Olson.Heather@epa.gov>
Subject: RE: FOR YOUR REVIEW: Proposed Reconsideration of the 2020 MON RTR (SAN 6494.1)

Ann – reviving the movement of this package and picking up where we had left off. Please see the attached FR notice and action memo addressing Tomas' edits.

We are continuing to refine the comms plan to address the EJ outreach component. In the meantime, let us know if you need anything else.

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Monday, December 20, 2021 8:18 AM
To: Koerber, Mike <Koerber.Mike@epa.gov>; Chang, Alice <Chang.Alice@epa.gov>
Cc: Lin, Walter <lin.walter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>; Lubetsky, Jonathan <Lubetsky.Jonathan@epa.gov>; Olson, Heather <Olson.Heather@epa.gov>
Subject: FW: FOR YOUR REVIEW: Proposed Reconsideration of the 2020 MON RTR (SAN 6494.1)

Please see Tomas' comments/edits below. Feel free to send the revised package back through when completed.

Thanks,

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Saturday, December 18, 2021 2:29 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>
Subject: RE: FOR YOUR REVIEW: Proposed Reconsideration of the 2020 MON RTR (SAN 6494.1)

Thank you Ann. A few comments:

Ex. 5 Deliberative Process (DP)

Hope you have a good weekend!

Tomás

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Thursday, December 16, 2021 12:59 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>
Subject: FOR YOUR REVIEW: Proposed Reconsideration of the 2020 MON RTR (SAN 6494.1)
Importance: High

Tomas, the attached is ready for your review and concurrence. There is no deadline associated with this action, however, given the recent release of the response to ACC's petition, the program is eager to move this to signature.

Thank you,

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Morgan, Ruthw <morgan.ruthw@epa.gov>
Sent: Thursday, December 16, 2021 11:16 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Lubetsky, Jonathan <Lubetsky.Jonathan@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Olson, Heather <Olson.Heather@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Chang, Alice <Chang.Alice@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>; OAPREGPROCESSING <OAPREGPROCESSING@epa.gov>
Subject: For Signature Proposed Reconsideration of the 2020 MON RTR (SAN 6494.1)
Importance: High

Attached is the signature package for the proposed Reconsideration of the 2020 National Emission Standards for Hazardous Air Pollutants (NESHAP): Miscellaneous Organic Chemical Manufacturing Residual Risk and Technology Review (SAN 6494.1).

POC: Amber Iglesias
202-564-3175

Thanks!

Ruthw Morgan – 202 564-1326

Message

From: Culligan, Kevin [Culligan.Kevin@epa.gov]
Sent: 1/6/2022 8:03:54 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Tsirigotis, Peter [Tsirigotis.Peter@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Profeta, Timothy [Profeta.Timothy@epa.gov]
Subject: RE: Power Sector Actions and Schedule
Attachments: 2022-1-6 Power Sector elements-timing V2.pptx

We went back and updated the relevant slides:

Ex. 5 Deliberative Process (DP)

I plan to send you a copy of the whitepaper either tonight or tomorrow AM that you can share. We are also independently sharing with DOE at the staff level.

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Wednesday, January 05, 2022 8:43 PM
To: Culligan, Kevin <Culligan.Kevin@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: Power Sector Actions and Schedule

Hi, Kevin. I may end up talking to CPO on Friday about our power sector actions. I don't think I need to make a presentation (famous last words!), but I was planning to use slides 7 and 8 and maybe 9 in the attached as my cheat sheet (or share on screen if it comes to that). Please take a look and let me know what, if anything, needs to be updated. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

Message

From: Moeller, Njeri [Moeller.Njeri@epa.gov]
Sent: 1/10/2022 10:13:43 PM
To: OAR Briefings [OAR_Briefings@epa.gov]
CC: Koerber, Mike [Koerber.Mike@epa.gov]; Koerber, Mike [Koerber.Mike@epa.gov]
Subject: Briefing Materials: January 11 Carbonell Briefing - Pre-call in advance of Consultation on Taconite RTR
Attachments: Taconite INTERNAL Background Pager-OAR_01-11-2022.docx

Please see the attached materials for the following briefing:

Tuesday, January 11 @ 4:00pm – Pre-call in advance of Consultation on Taconite RTR

Njeri Moeller (she/her)
U.S. Environmental Protection Agency
OAR/OAQPS IO Special Assistant – Detail
109 TW Alexander Drive
Research Triangle Park, NC 27711
Phone: 919-541-1380 |Email: Moeller.njeri@epa.gov

Message

From: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Sent: 1/12/2022 4:54:49 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: RE: Taconite RTR consultation
Attachments: Suggested Talking Points - Consultation on Taconite RTR2 (002).docx

Hi Joe, thanks and that works for me – here is the script and suggested TPs which came in my overnight reading folder. Per the discussion we had yesterday, the expected format is that the tribes will make introductions, followed by EPA introductions and a general welcome/opening, followed then by presentations/questions from the Fond du Lac Band and the Leech Lake Band. Would you like to do the general welcome/opening and then hand it off to me to open the discussion? And then you can close the meeting? Best,

Tomás

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Wednesday, January 12, 2022 11:50 AM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Taconite RTR consultation

My instinct is to kick it off, welcome and thank the participants, etc., and then turn it over to you to lead the substantive discussion. On the pre-brief yesterday, someone mentioned a run-of-show or script and the author discussed it as well, but I haven't seen anything along these lines. Have you? Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Wednesday, January 12, 2022 10:03 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Subject: Taconite RTR consultation

Hi Joe, of course I forgot to raise this at our general discussion yesterday evening – would you prefer to lead the consultation this afternoon, or should I plan on doing it? I do not have a strong preference. Best,

Tomás

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/12/2022 10:00:01 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Thursday, January 13
Attachments: 2022 01 13 Secretary Paulson TPG - Call Sheet.docx; Asbestos Pipe Replacement InfoBrief OAR 1.13.2022.docx; OAR_ARP_mobilemonitoring_sensors_summary_2022January12_FINAL.pptx; RE: Video-call: Remarks: RFS Stakeholder Meeting ; Call Sheet - AdvaMed 01112022_OAR.docx; 2022 01 13 Meeting w Gina McCarthy on Power Sector.pptx

Goffman, Joseph Calendar
Goffman.Joseph@epa.gov
On Thursday, January 13, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

Su	Mo	Tu	We	Th	Fr	Sa
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23	24	25	26	27	28	29
30	31					

Busy — Tentative — Free
Out of Office — Working Elsewhere — Outside of Working Hours

January 2022

Thu, Jan 13

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 10:00 AM	Video-call: Meeting with Secretary Hank Paulson (1 word doc)
	10:00 AM – 10:30 AM	Management Time
	10:30 AM – 11:10 AM	Asbestos Pipe Replacement: Infrastructure Bill Funding Discussion (1 word doc)
	11:10 AM – 11:15 AM	**Free**
	11:15 AM – 12:00 PM	American Rescue Plan Regional Office Direct Awards (1 ppt)

■	12:00 PM – 12:30 PM	Lunch/Management Time
■	12:30 PM – 1:00 PM	Meeting with GM Motors re: GHG rule finalization and questions on alignment with California program
■	1:00 PM – 1:25 PM	Comms weekly
□	**1:25 PM – 1:30 PM**	**Free**
■	1:30 PM – 2:00 PM	Video-call: Remarks: RFS Stakeholder Meeting (1 email)
■	2:00 PM – 2:20 PM	Weekly w/Joe Goffman
□	**2:20 PM – 2:30 PM**	**Free**
■	2:30 PM – 3:00 PM	EXTERNAL: Video-call with Advanced Medical Technology Association (AdvaMed) CEO (Confirmed) (1 word doc)
■	3:00 PM – 3:30 PM	Meeting with EPA & Clean Cooking Alliance re: whole USG approach to cookstoves/household energy
■	3:30 PM – 3:55 PM	Scheduling Meeting
□	**3:55 PM – 4:00 PM**	**Free**
■	4:00 PM – 4:30 PM	Video-call: Meeting with Gina McCarthy (1 ppt)
▨	4:00 PM – 5:00 PM	Biofuels Report to Congress Briefing
□	**After 5:00 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Fond du Lac Band of Lake Superior Chippewa

Reservation Business Committee

1720 Big Lake Rd.
Cloquet, MN 55720
Phone (218) 879-4593
Fax (218) 879-4146

November 16, 2021

Chairman
Kevin R. Dupuis, Sr.

Secretary/Treasurer
Ferdinand Martineau, Jr.

Dist. I Representative
Wally J. Dupuis

Dist. II Representative
Bruce M. Savage

Dist. III Representative
Roger M. Smith, Sr.

Executive Director,
Tribal Programs
Miyah M. Danielson

Executive Director,
Tribal Enterprises
Terry Savage

Tomás Carbonell
Deputy Assistant Administrator for Stationary Sources
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, D.C. 20460
carbonell.tomas@epa.gov

Joseph Goffman
Principal Deputy Assistant Administrator, Office of Air and Radiation
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, D.C. 20460
goffman.joseph@epa.gov

Re: Request for Tribal Consultation Regarding Taconite Iron Ore Processing Residual Risk and Technology Review

Dear Mr. Carbonell and Mr. Goffman:

On behalf of the Fond du Lac Band of Lake Superior Chippewa ("Band") I write to request government-to-government consultation with EPA regarding EPA's National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing Residual Risk and Technology Review ("Taconite Rule").

As you know, the Band is a federally recognized Indian tribe that has been engaged in extensive efforts to protect its air, water, and treaty resources from air emissions related to taconite ore processing facilities ("Taconite Plants") in the region. As part of these efforts the Band challenged EPA's 2020 Taconite Rule, 85 Fed. Reg. 45,476 (July 28, 2020), in the U.S. Court of Appeals for the D.C. Circuit, based on, among other things, EPA's failure to set statutorily-required limits for mercury and other hazardous air pollutants that Taconite Plants emit. Minnesota v. U.S. Environmental Protection Agency, D.C. Cir. Nos. 20-1392 & 20-1393 (filed September 28, 2020). EPA subsequently conceded in a separate district court case that its Taconite Rule does not include all the emission limits for Taconite Plants that the Clean Air Act requires. Joint Motion to Extend Deadlines Under Court Order, *Blue Ridge Environmental Defense League v. Regan*, No. 1:16-cv-364-CRC, D.D.C., April 13, 2021.

Subsequently, based on EPA's commitment to set the missing emission limits and the District Court's order that EPA complete them no later than November 16, 2023, the Band and other petitioners agreed with EPA that the D.C. Circuit case would be held in abeyance until November 16, 2023 to allow EPA time to revise its Taconite Rule.[1] Now that EPA has started that process, it is important that it consults with the Band on the process it intends to follow to conduct the Residual Risk and Technology Review (RTR).

Tribal Consultation

Tribal consultation is required by President Biden's policies and priorities. On the day of his inauguration President Biden issued Executive Order 13900 (Protecting Public Health and the Environment and Resorting Science to Tackle the Climate Change Crisis), 86 Fed. Reg. 7037 (Jan. 20, 2021) which focused on public health and environmental justice. That Executive Order provides:

> Our Nation has an abiding committee to empower our workers and communities; promote and protect our public health and the environment; and conserve our national treasures and monuments. Where the federal government has failed to meet that commitment in the past, it must advance environmental justice. In carrying out this charge, the Federal Government must be guided by the best science and be protected by processes that ensure the integrity of Federal decision-making. It is, therefore, the policy of my Administration to listen to the science; to improve public health and protect our environment; to ensure access to clean air and water; to limit exposure to dangerous chemicals and pesticides; to hold polluters accountable, including those who disproportionally harm communities of color and low-income communities; to reduce greenhouse gas emissions; to bolster resilience to the impacts of climate change; to restore and expand our national treasures and monuments; and to prioritize both environmental justice and the creation of the well-paying union jobs necessary to deliver these goals.

86 Fed. Reg. at 7037. Shortly thereafter on January 26, 2021 President Biden issued a memorandum recognizing that Indian tribes are "sovereign governments" and that it is a priority of the Administration "to make respect for Tribal sovereignty and self-governance, commitment to fulfilling Federal trust and treaty responsibilities to Tribal Nations, and regular, meaningful, and robust consultation with Tribal Nations cornerstones of Federal Indian policy." In that memorandum President Biden also reaffirmed the Tribal consultation principles set out in Executive Order 13175 (Nov. 6, 2000) (Consultation and Coordination with Indian Tribal Governments).

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[1] Given that this request involves on-going litigation, I am copying the Band's attorneys and the Department of Justice attorneys representing EPA in the litigation.

Ultimately, EPA's tribal consultation obligation is based on the United States' unique trust responsibility to Indian tribes. And, importantly, there is a significant overlap in addressing environmental justice and engaging in meaningful tribal consultation. Taken together, these two orders issued from the White House affirm the Biden Administration's promise to respect the federal Indian trust responsibility and engage with Tribes on matters that will impact tribal lands, resources, treaty rights, and tribal health.

Taconite RTR

The establishment of a strong Taconite Rule that reduces mercury and all other hazardous air pollutants that Taconite Plants emit by the maximum achievable degree is necessary for the Band's health and welfare. Accordingly, the Band must remain involved as EPA conducts its rulemaking to fix the Taconite Rule. In particular, it is important that EPA consult with the Band regarding the data EPA intends to collect for the rulemaking, the control technology EPA considers, and the pollutants EPA intends to test.

EPA's Taconite Rule also implicates serious environmental justice issues. The Fond du Lac Reservation, the Band's permanent home along the St. Louis River, is downwind of many Taconite Plants. In particular, unchecked Taconite mercury emissions could have significant impacts on mercury levels in the St. Louis River, which is the most utilized fishery on the Band's Reservation. Therefore, prompt and meaningful government to government consultation with EPA is necessary to discuss these issues and the taconite industries impacts to the Band's resources, rights, and interests.

To date, EPA staff have engaged respectfully with the Band's staff, including keeping our staff informed of the rulemaking progress and giving the Band an opportunity to provide feedback on the information collection request (ICR) EPA intends to send to Industry. We thank you for these opportunities to meaningfully engage with the agency as it moves through the rulemaking process and would like to emphasize the positive relationship we have cultivated thus far. However, as we have learned that decisions will soon be made regarding the ICR and rulemaking process, it is important that Band leadership has an opportunity to discuss the rulemaking with EPA leadership.

Ultimately, because the Taconite Rule will have a direct impact on the Band's air and water quality, on Band member's health, and on Band member's ability to engage in cultural practices, including subsistence fishing, EPA must take the time to engage with the Band's RBC as it revises the Taconite Rule. The new Taconite Rule provides EPA with an opportunity to engage in a transparent process that respects tribal consultation, recognizes science, and advances environmental justice. Therefore, the Band formally requests an opportunity for the Reservation Business Committee to engage in government-to-government discussions with EPA leadership regarding the new Taconite RTR.

I have asked Sandi Davis, executive assistant for the Band, to assist with scheduling a meeting. You can reach Sandi at sandidavis@fdlrez.com.

We thank you in advance for your willingness to discuss this matter and to ensure tribal rights are acknowledged and protected.

Sincerely,

Kevin DuPuis
Chairman, Fond du Lac Band of Lake Superior Chippewa

cc: Penny Lassiter, lassiter.penny@epa.gov
Mark Kasman, kasman.mark@epa.gov
Peter Tsirigotis, tsirigotis.peter@epa.gov
Rochelle Boyd, boyd.rochelle@epa.gov
Perry Rosen, perry.rosen@usdoj.gov

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/13/2022 12:28:17 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Millett, John [Millett.John@epa.gov]
Subject: RE: FOR YOUR REVIEW: WaPo Response

Ex. 5 Deliberative Process (DP)

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Wednesday, January 12, 2022 8:00 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: RE: FOR YOUR REVIEW: WaPo Response

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Wednesday, January 12, 2022 5:34 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: FOR YOUR REVIEW: WaPo Response

Joe, et. al., please find attached OAR's response to the WaPo request below for your review. There is one response outstanding still but I did not want to delay beginning your review until I received it – I will simply send it along once I have it.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Lewis, Josh <Lewis.Josh@epa.gov>
Sent: Monday, January 10, 2022 4:51 PM

To: Campbell, Ann <Campbell.Ann@epa.gov>; Hilosky, Nick <Hilosky.Nick@epa.gov>; Brooks, Becky <Brooks.Becky@epa.gov>; Goldberg, Ruby <Goldberg.Ruby@epa.gov>; Tyler, Tom <Tyler.Tom@epa.gov>; Aguirre, Janita <Aguirre.Janita@epa.gov>
Cc: Conger, Nick <Conger.Nick@epa.gov>; Carroll, Timothy <Carroll.Timothy@epa.gov>
Subject: WaPo inquiry due COB Wednesday: questions related to our environmental regulatory tracker

Hi all – we have a request in from Washington Post. More background in the email at the bottom of this chain. Immediately below, I've sorted the actions by AAship. Assuming I've done this correctly, what I need from each of you is to review the actions w/in your office and answer the following:
(1) Is this an action EPA is reviewing? Yes/No/Decision pending
(2) Explanation: (if necessary):

Please provide the information directly under each action (similar to what I started for the OAR actions), and please use publicly available information (e.g., from the semiannual reg agenda, etc). Please provide this information by COB Wednesday (or sooner, if you have it ready before then). And obviously feel free to delegate this w/in your office, but whatever you send back should be cleared through your IO. OP and OPA will then review, and once finalized OPA will send the responses to the Post.

Thanks. Please call if you have any questions.

OAR:

Changing New Source Review guidance
https://www.epa.gov/nsr/forms/draft-guidance-interpretation-begin-actual-construction-under-new-source-review [epa.gov]
(1) Is this an action EPA is reviewing? Yes/No/Decision pending
(2) Explanation: (if necessary):

Imposing EPA cost-benefit rule
https://www.epa.gov/sites/production/files/2018-06/documents/epa_frdoc_0001-22431.pdf [epa.gov]
(1) Is this an action EPA is reviewing? Yes/No/Decision pending
(2) Explanation: (if necessary):

Reversing leak detection and repair rules for hydrofluorcarbons
https://www.epa.gov/section608/stationary-refrigeration-leak-repair-requirements [epa.gov]
(1) Is this an action EPA is reviewing? Yes/No/Decision pending
(2) Explanation: (if necessary):

Weakening the regional haze rule
https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_- [epa.gov]

Revising commercial and industrial solid waste standards
https://www.epa.gov/stationary-sources-air-pollution/commercial-and-industrial-solid-waste- [epa.gov]

Finalizing ozone National Ambient Air Quality Standards
https://www.govinfo.gov/content/pkg/FR-2017-06-28/pdf/2017-13437.pdf [gcc02.safelinks.protection.outlook.com]
Is this an action EPA is reviewing: Yes
Explanation (if necessary): More information here: https://www.epa.gov/ground-level-ozone-pollution/epa-reconsider-previous-administrations-decision-retain-2015-ozone

Changing cross-state air pollution requirements

https://www.epa.gov/csapr [epa.gov]
Adopting petroleum refinery sector rule
https://www.epa.gov/stationary-sources-air-pollution/petroleum-refinery-sector-rule-risk-and-technology-review-and-
new#:~:text=Rule%20Summary&text=When%20fully%20implemented%20in%202018,volatile%20organic%20compounds%20(VOC). [epa.gov]
Denying Clean Air Act Section 126 petitions
https://eelp.law.harvard.edu/2020/01/clean-air-act-section-126-petitions/ [gcc02.safelinks.protection.outlook.com]
Setting emissions standards for major industries
https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous [epa.gov]
Reversing sewage treatment air pollutant standards
https://www.federalregister.gov/documents/2017/10/26/2017-23067/national-emission-standards-for-hazardous-air-pollutants-publicly-owned-treatment-works-residual [gcc02.safelinks.protection.outlook.com]
Testing for heavy-duty vehicles and engines
https://www.federalregister.gov/documents/2020/05/12/2020-05963/improvements-for-heavy-duty-engine-and-vehicle-test-procedures-and-other-technical-amendments [gcc02.safelinks.protection.outlook.com]

Reducing power plant mercury and air toxics standards
https://www.epa.gov/mats/regulatory-actions-final-mercury-and-air-toxics-standards-mats-power-plants [epa.gov]
Is this an action EPA is reviewing: Yes
Explanation (if necessary): Proposed rule at OMB for E.O. 12866 review

Creating self-audit program for oil and gas facilities
https://www.epa.gov/enforcement/existing-owner-clean-air-act-audit-program-oil-and-natural-gas-exploration-and#:~:text=EPA%20is%20making%20this%20self,Reducing%20Excess%20Emissi [epa.gov]
Creating new power plant emissions accounting
https://www.epa.gov/sites/production/files/2019-08/documents/projectemissionsaccountingfactsheet_07032019.pdf [epa.gov]
Collecting oil and natural gas industry emissions data
https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/withdrawal-2016-information-request-oil-and [epa.gov]

OW:
Dumping PFAS chemicals on a temporary basis
https://www.epa.gov/pfas/interim-strategy-and-polyfluoroalkyl-substances-federally-issued-national-pollutant-discharge [epa.gov]
Creating a loophole in water pollution discharge rules
https://www.epa.gov/newsreleases/epa-issues-draft-guidance-clarifying-wastewater-permit-requirements-under-maui-decision [epa.gov]
Changing the Clean Water Act's criminal negligence standard
https://www.federalregister.gov/documents/2020/12/14/2020-26777/criminal-negligence-standard-for-state-clean-water-act-402-and-404-programs [gcc02.safelinks.protection.outlook.com]

OLEM
Rolling back coal ash standards, Phase 2
https://www.epa.gov/coalash/coal-ash-rule [epa.gov]
Delaying the chemical disaster rule
https://www.washingtonpost.com/climate-environment/2019/11/21/trump-reverses-safety- [gcc02.safelinks.protection.outlook.com]
Weakening industry cleanup requirements

https://www.epa.gov/newsreleases/epa-finds-existing-requirements-effectively-address-financial-risks-three-industries [epa.gov]

Granting federal coal waste permits

https://www.epa.gov/coalash/permit-programs-coal-combustion-residual-disposal-units [epa.gov]

(may be more appropriate for R6):

Removing copper filter cake from hazardout materials list

https://www.federalregister.gov/documents/2017/10/02/2017-21112/hazardous-waste-management-system-identification-and-listing-of-hazardous-waste [gcc02.safelinks.protection.outlook.com]

OCSPP:

Changing pyrethroid pesticide approval process

https://www.federalregister.gov/documents/2019/11/12/2019-24514/pesticide-registration-review-proposed-interim-decisions-for-several-pyrethroids-notice-of [gcc02.safelinks.protection.outlook.com]

Implementing the pesticide applicators rule

https://www.epa.gov/pesticide-worker-safety/agricultural-worker-protection-standard-wps [epa.gov]

Banning N-methylpyrrolidone (NMP)

https://public-inspection.federalregister.gov/2021-00115.pdf [gcc02.safelinks.protection.outlook.com]

Revising pesticide rules for endangered species

This one apparently revised how the government gauges pesticide effects on endangered species – we don't have a link.

Not EPA:

CEQ:

Changing endangered species pesticide consultations

https://www.govinfo.gov/content/pkg/FR-2020-01-10/pdf/2019-28106.pdf [gcc02.safelinks.protection.outlook.com]

NRC:

Easing uranium mines groundwater protections

https://www.federalregister.gov/documents/2019/01/31/2019-00435/ground-water-protection-at-uranium-in-situ-recovery-facilities [gcc02.safelinks.protection.outlook.com]

On Jan 6, 2022, at 6:56 PM, Eilperin, Juliet <Juliet.Eilperin@washpost.com> wrote:

Dear Nick and Tim,

We're updating our environmental tracker [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com] so we can assess what has changed in national environmental policy since Biden took office, and we just wanted to run something by you. We have several dozen Trump-era policies where it appears the Biden administration has not targeted. We want to just double check that this is accurate. In some cases, it is likely because the policies were not finalized. But in some cases, Trump officials did weaken environmental regulation, and we want to make sure these policies are not being reassessed. Would you mind taking a look, and letting us know by early next week if EPA has taken action on any of these items?

Thanks so much, and we are including the titles we've given these rollbacks and a relevant link with each entry (in all cases but one):

Changing New Source Review guidance

https://www.epa.gov/nsr/forms/draft-guidance-interpretation-begin-actual-construction-under-new-source-review [epa.gov] [gcc02.safelinks.protection.outlook.com]

Rolling back coal ash standards, Phase 2

https://www.epa.gov/coalash/coal-ash-rule [epa.gov] [gcc02.safelinks.protection.outlook.com]

Imposing EPA cost-benefit rule

https://www.epa.gov/sites/production/files/2018-06/documents/epa_frdoc_0001-22431.pdf [epa.gov] [gcc02.safelinks.protection.outlook.com]

Changing endangered species pesticide consultations

https://www.govinfo.gov/content/pkg/FR-2020-01-10/pdf/2019-28106.pdf [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Changing pyrethroid pesticide approval process

https://www.federalregister.gov/documents/2019/11/12/2019-24514/pesticide-registration-review-proposed-interim-decisions-for-several-pyrethroids-notice-of [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Implementing the pesticide applicators rule

https://www.epa.gov/pesticide-worker-safety/agricultural-worker-protection-standard-wps [epa.gov] [gcc02.safelinks.protection.outlook.com]

Reversing leak detection and repair rules for hydrofluorcarbons

https://www.epa.gov/section608/stationary-refrigeration-leak-repair-requirements [epa.gov] [gcc02.safelinks.protection.outlook.com]

Delaying the chemical disaster rule

https://www.washingtonpost.com/climate-environment/2019/11/21/trump-reverses-safety- [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Weakening the regional haze rule

https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_- [epa.gov] [gcc02.safelinks.protection.outlook.com]

Revising commercial and industrial solid waste standards

https://www.epa.gov/stationary-sources-air-pollution/commercial-and-industrial-solid-waste- [epa.gov] [gcc02.safelinks.protection.outlook.com]

Easing uranium mines groundwater protections

https://www.federalregister.gov/documents/2019/01/31/2019-00435/ground-water-protection-at-uranium-in-situ-recovery-facilities [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Finalizing ozone National Ambient Air Quality Standards

https://www.govinfo.gov/content/pkg/FR-2017-06-28/pdf/2017-13437.pdf [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Changing cross-state air pollution requirements

https://www.epa.gov/csapr [epa.gov] [gcc02.safelinks.protection.outlook.com]

Adopting petroleum refinery sector rule

https://www.epa.gov/stationary-sources-air-pollution/petroleum-refinery-sector-rule-risk-and-technology-review-and-new#:~:text=Rule%20Summary&text=When%20fully%20implemented%20in%202018,volatile%20organic%20compounds%20(VOC). [epa.gov] [gcc02.safelinks.protection.outlook.com]

Denying Clean Air Act Section 126 petitions

https://eelp.law.harvard.edu/2020/01/clean-air-act-section-126-petitions/ [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Setting emissions standards for major industries

https://www.epa.gov/stationary-sources-air-pollution/risk-and-technology-review-national-emissions-standards-hazardous [epa.gov] [gcc02.safelinks.protection.outlook.com]

Reversing sewage treatment air pollutant standards

https://www.federalregister.gov/documents/2017/10/26/2017-23067/national-emission-standards-for-hazardous-air-pollutants-publicly-owned-treatment-works-residual [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Removing copper filter cake from hazardout materials list
https://www.federalregister.gov/documents/2017/10/02/2017-21112/hazardous-waste-management-system-identification-and-listing-of-hazardous-waste [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]
Collecting oil and natural gas industry emissions data
https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/withdrawal-2016-information-request-oil-and [epa.gov] [gcc02.safelinks.protection.outlook.com]
Weakening industry cleanup requirements
https://www.epa.gov/newsreleases/epa-finds-existing-requirements-effectively-address-financial-risks-three-industries [epa.gov] [gcc02.safelinks.protection.outlook.com]
Dumping PFAS chemicals on a temporary basis
https://www.epa.gov/pfas/interim-strategy-and-polyfluoroalkyl-substances-federally-issued-national-pollutant-discharge [epa.gov] [gcc02.safelinks.protection.outlook.com]
Creating a loophole in water pollution discharge rules
https://www.epa.gov/newsreleases/epa-issues-draft-guidance-clarifying-wastewater-permit-requirements-under-maui-decision [epa.gov] [gcc02.safelinks.protection.outlook.com]
Testing for heavy-duty vehicles and engines
https://www.federalregister.gov/documents/2020/05/12/2020-05963/improvements-for-heavy-duty-engine-and-vehicle-test-procedures-and-other-technical-amendments [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]
Reducing power plant mercury and air toxics standards
https://www.epa.gov/mats/regulatory-actions-final-mercury-and-air-toxics-standards-mats-power-plants [epa.gov] [gcc02.safelinks.protection.outlook.com]
Creating self-audit program for oil and gas facilities
https://www.epa.gov/enforcement/existing-owner-clean-air-act-audit-program-oil-and-natural-gas-exploration-and#:~:text=EPA%20is%20making%20this%20self,Reducing%20Excess%20Emissi [epa.gov] [gcc02.safelinks.protection.outlook.com]
Creating new power plant emissions accounting
https://www.epa.gov/sites/production/files/2019-08/documents/projectemissionsaccountingfactsheet_07032019.pdf [epa.gov] [gcc02.safelinks.protection.outlook.com]
Granting federal coal waste permits
https://www.epa.gov/coalash/permit-programs-coal-combustion-residual-disposal-units [epa.gov] [gcc02.safelinks.protection.outlook.com]
Banning N-methylpyrrolidone (NMP)
https://public-inspection.federalregister.gov/2021-00115.pdf [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]
Changing the Clean Water Act's criminal negligence standard
https://www.federalregister.gov/documents/2020/12/14/2020-26777/criminal-negligence-standard-for-state-clean-water-act-402-and-404-programs [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]
Revising pesticide rules for endangered species
This one apparently revised how the government gauges pesticide effects on endangered species – we don't have a link.

Thanks so much for this,
Juliet

Message

From: Peacock, Grant [Peacock.Grant@epa.gov]
Sent: 1/13/2022 9:19:44 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Shaw, Betsy [Shaw.Betsy@epa.gov]; Edwards, Jonathan [Edwards.Jonathan@epa.gov]; Tsirigotis, Peter [Tsirigotis.Peter@epa.gov]; Dunham, Sarah [Dunham.Sarah@epa.gov]; Grundler, Christopher [grundler.christopher@epa.gov]; Hyde, Courtney [Hyde.Courtney@epa.gov]; Wolfe, Michael [Wolfe.Michael@epa.gov]; Lewis, Josh [Lewis.Josh@epa.gov]; Rowson, David [Rowson.David@epa.gov]; Veal, Lee [Veal.Lee@epa.gov]; Griggs, John [Griggs.John@epa.gov]; Cherepy, Andrea [Cherepy.Andrea@epa.gov]; Hengst, Benjamin [Hengst.Benjamin@epa.gov]; Bunker, Byron [bunker.byron@epa.gov]; Burch, Julia [Burch.Julia@epa.gov]; Lubetsky, Jonathan [Lubetsky.Jonathan@epa.gov]; Gunning, Paul [Gunning.Paul@epa.gov]; Newberg, Cindy [Newberg.Cindy@epa.gov]; Hopkins, Daniel [Hopkins.Daniel@epa.gov]; Koerber, Mike [Koerber.Mike@epa.gov]; Kornylak, Vera S. [Kornylak.Vera@epa.gov]; Brachtl, Megan [Brachtl.Megan@epa.gov]; Costa, Shelley [Costa.Shelley@epa.gov]; Whitlow, Jeff [Whitlow.Jeff@epa.gov]; Saltman, Tamara [Saltman.Tamara@epa.gov]; Monroe, Scott [Monroe.Scott@epa.gov]; LaRue, Steven [LaRue.Steven@epa.gov]; Mathias, Scott [Mathias.Scott@epa.gov]; Bullard, Pamela [Bullard.Pamela@epa.gov]; Alpert, Adina [Alpert.Adina@epa.gov]; Santiago, Juan [Santiago.Juan@epa.gov]; White, Sharon [White.Sharon@epa.gov]; Diaz, Charlene [diaz.charlene@epa.gov]; Wilds, Edward [Wilds.Edward@epa.gov]; White, Rick [White.Rick@epa.gov]; Stafford, Andrea [Stafford.Andrea@epa.gov]; Fine, Steven [fine.steven@epa.gov]; Siegel, Kelly C. [Siegel.KellyC@epa.gov]; Shoaff, John [Shoaff.John@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]; Watkins, Erica [Watkins.Erica@epa.gov]; Clark, Mike S. [Clark.Michael@epa.gov]; OAR Briefings [OAR_Briefings@epa.gov]; Suzuki, Debra [Suzuki.Debra@epa.gov]; Senter, Stephen [Senter.Stephen@epa.gov]; Millar, Emily [Millar.Emily@epa.gov]; Holden, Patricia [Holden.Patricia@epa.gov]; Marusiak, Eleanor [Marusiak.Eleanor@epa.gov]; Kabanda, Thierry [Kabanda.Thierry@epa.gov]; Rakosnik, Delaney [rakosnik.delaney@epa.gov]; Henning, Julie [henning.julie@epa.gov]; Ward, Hillary [Ward.Hillary@epa.gov]; Biton, Leiran [biton.leiran@epa.gov]; Hamjian, Lynne [Hamjian.Lynne@epa.gov]; Greene, Cynthia [Greene.Cynthia@epa.gov]; Walker, Lakeshia [Walker.Lakeshia@epa.gov]; Schumm, Krystal [Schumm.Krystal@epa.gov]; Zaremski, Sara [zaremski.sara@epa.gov]; Vincent, Marc [Vincent.Marc@epa.gov]
CC: DeLuca, Isabel [DeLuca.Isabel@epa.gov]; Millett, John [Millett.John@epa.gov]
Subject: January Business Review Materials
Attachments: Jan 2022 OAR Business Review Agenda.docx; FY 2022 Bowling Chart_Jan.xlsx; FY 22 Ideas Improvements Celebrations_Jan.xlsx

Good Afternoon All,

Attached are the materials for the January 18, 4:00 PM-5:00 PM, OAR Business Review, which include the:

- Agenda;
- Bowling Chart; and
- MBR Supplemental (processes improved, employee ideas, celebrations).

Please remember that all Business Review materials are internal to the EPA.

Let us know if you have any questions.

Thanks,
Grant Peacock
Office of Program Management Operations
Office of Air and Radiation
(202) 564-6732

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/14/2022 8:25:14 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Tuesday, January 18
Attachments: ORIA Strategic Plan FY22-24 Draft January 7 2022.docx; MM2A.OARUpdate01.18.22.docx; January Business Review Materials; For Your Review and Concurrence: OMB Package - Proposed Rule: FIP Addressing Regional Ozone Transport for the 2015 Ozone NAAQS (SAN 8670); ORIA Strategic Plan FY22-24 Draft January 7 2022.docx

Additional materials:

- (1 email): 2015 ozone transport – comments by Tuesday, January 18

Goffman, Joseph Calendar
Goffman.Joseph@epa.gov
On Tuesday, January 18, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Busy | Tentative | Free
Out of Office | Working Elsewhere | Outside of Working Hours

January 2022

Tue, Jan 18

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 9:55 AM	OAR Senior Staff
	9:55 AM – 10:00 AM	**Free**
	10:00 AM – 10:40 AM	ORIA FY 2022-2024 Strategic Plan (1 word doc)

☐	**10:40 AM – 10:45 AM**	**Free**
■	10:45 AM – 11:25 AM	Major MACT to Area (MM2A) Potential to Emit (PTE) Rulemaking (1 word doc)
☐	**11:25 AM – 11:30 AM**	**Free**
■	11:30 AM – 12:00 PM	OTAQ Weekly
■	12:00 PM – 1:00 PM	Lunch/Management Time
■	1:00 PM – 1:30 PM	Weekly Check-In with Joe
■	1:30 PM – 1:55 PM	Climate Visioning Session
☐	**1:55 PM – 2:00 PM**	**Free**
■	2:00 PM – 3:00 PM	Senior Staff Meeting
☐	**3:00 PM – 4:00 PM**	**Free**
■	4:00 PM – 5:00 PM	OAR Business Review (1 email)
■	5:00 PM – 5:25 PM	General Discussion
☐	**5:25 PM – 5:30 PM**	**Free**
■	5:30 PM – 6:00 PM	Discussion on ARP Air Monitoring Grants
☐	**After 6:00 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
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202.343.9167 office

Pronouns: He/Him/His

BEFORE THE ENVIRONMENTAL APPEALS BOARD
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

In re: Limetree Bay Terminals, LLC and Limetree Bay Refining, LLC Docket No. EPA-PAL-VI-001/2019	APPEAL NO. CAA 20-02M PETITION FOR REVIEW OF THE LIMETREE BAY TERMINALS AND LIMETREE BAY REFINING PLANTWIDE APPLICABILITY LIMIT PERMIT

PETITION FOR REVIEW
SUBMITTED BY ST. CROIX ENVIRONMENTAL ASSOCIATION, CENTER FOR BIOLOGICAL DIVERSITY, SIERRA CLUB, and ELIZABETH NEVILLE

TABLE OF CONTENTS

Page

TABLE OF AUTHORITIES iii

TABLE OF EXHIBITS vii

I. INTRODUCTION AND ISSUES PRESENTED FOR REVIEW 1

II. THRESHOLD PROCEDURAL REQUIREMENTS 2

III. FACTUAL BACKGROUND 2

- A. History of the Refinery 2
- B. Application for PAL Permit 5
- C. Environmental Justice Analysis 5
- D. Public Participation Process and Petitioners' Comments 6
- E. Endangered Species Consultation 7
- F. Issuance of Final Permit 7

IV. STATUTORY AND REGULATORY FRAMEWORK 8

- A. The Clean Air Act 8
- B. Environmental Justice Rules 9
- C. Language Access Requirements 10
- D. The Endangered Species Act 10

V. STANDARD OF REVIEW 12

VI. ARGUMENT 12

- A. EPA Clearly Erred by Failing to Treat the Refinery as a New Source or a Major Modified Source Subject to PSD Permitting Requirements and Disregarding the Reactivation Policy 12
  - 1. EPA Clearly Erred by Failing to Treat the Refinery as a "New Source" 14
  - 2. EPA Clearly Erred by Improperly Departing From, and Purporting to Eliminate, the Reactivation Policy 19
    - a) EPA violated its own Guidance Rule 20
    - b) EPA misinterpreted the PAL Regulations' reliance upon the Reactivation Policy 20
- B. EPA Clearly Erred by Issuing a PAL Permit That Grossly Inflates the Emissions Caps 22

TABLE OF CONTENTS
(continued)

Page

C. EPA Clearly Erred by Not Requiring PAL Permit Conditions That Ensure Compliance with the NAAQS or Avoid Further Burdening the Environmental Justice Community of South Central St. Croix 25

D. EPA Clearly Erred by Failing to Provide Individuals with Limited English Proficiency Meaningful Access to the Public Participation Process for the Limetree Permit 29

1. EPA Clearly Erred by Failing to Assess St. Croix's Limited English Proficiency Population 29

2. EPA Clearly Erred by Relying on Outdated U.S. Census Data to Determine That There Was Not a Significant Limited English Proficiency Population in St. Croix 32

3. EPA Clearly Erred When It Failed to Translate Vital Documents, Including the Public Notice and Permit Fact Sheet, for St. Croix's Limited English Proficiency Population 33

E. EPA Clearly Erred by Issuing the Permit Without Adequate ESA Consultation 35

1. EPA Failed to Consult with FWS on Loggerhead and Green Sea Turtles and the Caribbean Roseate Tern 36

2. EPA Violated Procedural Obligations for Informal Consultation on Over Twenty Other Federally Listed Species 39

VII. CONCLUSION 43

REQUEST FOR ORAL ARGUMENT 45

STATEMENT OF COMPLIANCE WITH THE WORD LIMITATION 46

CERTIFICATION OF SERVICE 47

TABLE OF AUTHORITIES

Page(s)

Cases

Am. Rivers v. FERC,
895 F.3d 32 (D.C. Cir. 2018) 43

Am. Rivers v. U.S. Army Corps of Eng'rs,
271 F. Supp. 2d 230 (D.D.C. 2003) 44

Cmtys. for a Better Env't v. Cenco Ref. Co.,
179 F. Supp. 2d 1128 (C.D. Cal. 2001) 13, 17

Ctr. for Biological Diversity v. Bernhardt,
No. 18-73400, 2020 U.S. App. LEXIS 38033 (9th Cir. Dec. 7, 2020) 43

Defs. of Wildlife v. Flowers,
414 F.3d 1066 (9th Cir. 2005) 12

Defs. of Wildlife v. U.S. Dep't of the Interior,
931 F.3d 339 (4th Cir. 2019) 39

In re Jordan Dev. Co., L.L.C,
UIC Appeal Nos. 18-06, et al., 2019 WL 3816212 (EAB Aug. 8, 2019) 27, 35

Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.,
463 U.S. 29 (1983) 22, 35

Nat. Res. Def. Council v. Houston,
146 F.3d 1118 (9th Cir. 1998) 12, 38

Pac. Rivers Council v. Thomas,
30 F.3d 1050 (9th Cir. 1994) 11

Res. Ltd., Inc. v. Robertson,
35 F.3d 1300 (9th Cir. 1994) 38

Sierra Club v. Babbitt,
65 F.3d 1502 (9th Cir. 1995) 11

Tenn. Valley Auth. v. Hill,
437 U.S. 153 (1978) 10

Wisconsin Elec. Power Co. v. Reilly,
893 F.2d 901 (7th Cir. 1990) 14

Page(s)

Environmental Appeals Decisions

In re Ash Grove Cement Co.,
7 E.A.D. 387 (EAB 1997) 35

In re Chem. Waste Mgmt.,
6 E.A.D. 66 (EAB 1995) 9, 26

In re City of Marlborough, Mass. Easterly Wastewater Treatment Facility,
12 E.A.D. 235 (EAB 2005) 12

In re Deseret Power Elec. Coop.,
14 E.A.D. 212 (EAB 2008) 12

In re Desert Rock Energy Co., LLC,
14 E.A.D. 484 (EAB 2009) 11, 36, 38, 43

In re EcoEléctrica,
L.P., 7 E.A.D. 56 (EAB 1997) 9, 10, 34

In re Energy Answers Arecibo, LLC,
16 E.A.D. 294 (EAB 2014) 9, 10, 27

In re Envotech L.P.,
6 E.A.D. 260 (EAB 1996) 26, 27

In re Indeck-Elwood, LLC,
13 E.A.D. 126 (EAB 2006) 11, 36, 37

In re Pio Pico Energy Ctr.,
16 E.A.D. 56 (EAB 2013) 27, 28, 29

In re Shell Gulf of Mex., Inc. & Shell Offshore, Inc.,
15 E.A.D. 103 (EAB 2010) 9, 10

In re Shell Offshore, Inc.,
15 E.A.D. 536 (EAB 2012) 10

In re Town of Concord Dep't of Pub. Works,
16 E.A.D. 514 (EAB 2014) 12, 21, 22

In re Veolia ES Tech. Sols., L.L.C.,
18 E.A.D. 194 (EAB 2020) 12, 21

In re Weber # 4-8,
11 E.A.D. 241 (EAB 2003) 12

Page(s)

Statutes

16 U.S.C.
§ 1531 10
§ 1536(a)(2) 11, 36, 37, 43
§ 1536(a)(3) 37

42 U.S.C.
§ 7411(a)(4) 14
§§ 7470–7492 ..... 8, 13
§ 7473 8
§ 7475 ..... 8, 13
§ 7479 ..... 8, 9, 13
§ 7503 8

Other Authorities

40 C.F.R.
§ 124 ..... 1, 2, 12, 36, 46
§ 2.503 20
§ 2.506 20
§ 51.165 8
§ 51.166 ..... 8, 9, 13
§ 52.21 ..... *passim*
§ 52.24 8

50 C.F.R.
§ 402.02 ..... *passim*
§ 402.13(c) 11
§ 402.13(c)(1) 40
§ 402.14(a) 11, 12, 37
§ 402.14(c)(1)(i) 40
§ 402.16(a)(2) 44

U.S. EPA Order No. 1000.32, *Compliance with Executive Order 13166: Improving Access to Services for Persons with Limited English Proficiency*, (issued July 28, 2011, updated Feb. 10, 2017) 10, 29, 31, 32, 33, 34

35 Fed. Reg. 8,491 (June 2, 1970) 36

35 Fed. Reg. 18,313, 18,319 (Dec. 2, 1970) 36

42 Fed. Reg. 28,543 (June 3, 1977) 36

51 Fed. Reg. 19,926, 19,949 (June 3, 1986) 37

Page(s)

52 Fed. Reg. 41,943, 42,064 (Nov. 2, 1987) 36

59 Fed. Reg. 7629 ..... 9, 10, 26, 33

65 Fed. Reg. 50,121 (Aug. 11, 2000) 10, 29, 32, 33

67 Fed. Reg. 41,455 (June 18, 2002) 10, 30, 33

67 Fed. Reg. 80,186 (Dec. 31, 2002) ..... *passim*

76 Fed. Reg. 58,867 (Oct. 24, 2011) 36

79 Fed. Reg. 38,213 (July 3, 2014) 36

79 Fed. Reg. 53,851 (Sept. 10, 2014) 36

81 Fed. Reg. 20,058 (Apr. 6, 2016) 36, 38

81 Fed. Reg. 42,268 (June 29, 2016) 36

82 Fed. Reg. 16,668 (Apr. 5, 2017) 36

83 Fed. Reg. 2,916 (Jan. 22, 2018) 36

83 Fed. Reg. 4,153 (Jan. 30, 2018) 36

85 Fed. Reg. 51,650 (August 21, 2020) 9

85 Fed. Reg. 66,230 (Oct. 19, 2020) 20, 21

86 Fed. Reg. 7037 (Jan. 20, 2021) 9

Page(s)

TABLE OF EXHIBITS

Ex. 1: Matthew P. Johnson, Black Gold of Paradise: Negotiating Oil Pollution in the US Virgin Islands, 1966–2012, October 2019

Ex. 2: Hovensa Cleanup Comes to 42 Million Gallons So Far, St. Croix Source, March 11, 2008

Ex. 3: Nation's Second Largest Refinery to Pay More Than $5.3 Million Penalty for Clean Air Act Violations _ Smog- and asthma-causing emissions to be cut by 8,500 tons per year, January 26, 2011

Ex. 4: Hess Corporation 2011 Annual Report

Ex. 5: US Virgin Islands sues oil company over shuttered refinery, Associated Press, September 15, 2015

Ex. 6: Fast Track: Limetree Bay Will Be Ready To Re-Open Oil Terminal In April!, Virgin Islands Free Press, January 22, 2016

Ex. 7: Email Chain re: Limetree Bay Terminal (LBT) Status Update 3/5/2019 [FOIA ED_002591_00000120_0001-15]

Ex. 8: Letter from William L. Wehrum to LeAnn Johnson Koch Perkins Coie, re: Limetree Bay Terminals, St. Croix, U.S. Virgin Islands -Permitting Questions, dated April 5, 2018

Ex. 9: Fact Sheet: List of Agency Actions for Review, The White House, January 20, 2021

Ex. 10: Order re Petition for Objection to Permit, *In the Matter of Monroe Electric Generating Plant* ("Monroe Order")

Ex. 11: Edward E. Reich Memo to Sandra S. Gardebring re PSD and NSPS Applicability to a Reactivated Source, October 3, 1980

Ex. 12: Press Release: Hess Announces Charge Related to Closure of HOVENSA Joint Venture Refinery, Hess Corporation, January 18, 2012

Ex. 13: Hess Corporation 2012 Annual Report

Ex. 14: ArcLight, Freepoint to buy Hovensa St. Croix refinery, plan storage hub, Reuters, December 1, 2015

Page(s)

Ex. 15: David P. Howekamp Memo to Robert T. Connery, Esq., Holland & Hart, re Supplemental PSD Applicability Determination Cyprus Casa Grande Corporation Copper Mining and Processing Facilities, November 6, 1987

Ex. 16: Limetree Bay Terminal January 2019 Environmenal Assessment Report

Ex. 17: Sandy Point, Green Cay and Buck Island National Wildlife Refuges Comprehensive Conservation Plan, U.S. Department of the Interior, Fish and Wildlife Service, Southeast Region, September 2010

Ex. 18: Recovery Plan, Caribbean Roseate Tern (Sterna dougallii), September 24, 1993

Ex. 19: Harry A. Beatty, Birds of St. Croix

Ex. 20: EPA Statement of Basis / Proposed Final Remedy, February 14, 2008

Ex. 21: Geographic Response Plan Map: VI-2, in Report produced by Florida FWC - Fish and Wildlife Research Institue, May 27, 2011

I. INTRODUCTION AND ISSUES PRESENTED FOR REVIEW

This Petition requests review of Plantwide Applicability Limit ("**PAL**") Permit No. VI-001/2019 ("**Permit**")[1] that the U.S. Environmental Protection Agency ("**EPA**") issued[2] to Limetree Bay Refining, LLC and Limetree Bay Terminals, LLC under the parent company of Limetree Bay Ventures, LLC (collectively, "**Limetree**") for its oil refinery and storage facility located in St. Croix, U.S. Virgin Islands ("**Refinery**"). The St. Croix Environmental Association, Center for Biological Diversity, Sierra Club, and Elizabeth Neville (collectively, "**Petitioners**") petition the Environmental Appeals Board ("**EAB**" or "**Board**") pursuant to 40 C.F.R. § 124.19(a) to review:

(1) whether the Refinery is ineligible to receive a PAL permit given its many years of shutdown and should have been considered a new source under applicable PAL and Prevention of Significant Deterioration ("**PSD**") regulations;

(2) whether the Permit contains impermissibly high emissions caps;

(3) whether the Permit insufficiently addresses environmental justice ("**EJ**") issues despite EPA finding that there would be disproportionate impacts on the EJ community;

(4) whether EPA complied with applicable language access and translation requirements for individuals with limited English proficiency ("**LEP**"); and

(5) whether EPA failed to satisfy the Endangered Species Act ("**ESA**") requirement to consult on the Permit's impacts on threatened and endangered species. The former EPA Administrator's decision to issue this Permit as a PAL Permit, with excessively high emissions

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[1] *See* EPA-R02-OAR-2019-0551-0162, December 2, 2020, Final Plantwide Applicability Limit Permit for Limetree Bay Terminals, LLC and Limetree Bay Refining, LLC, St. Croix, U.S. Virgin Islands. Subsequent references to documents in the administrative record will be cited as *AR-XXXX*. The administrative record is available at www.regulations.gov under Docket Id. EPA-R02-OAR-2019-0551.

[2] EPA Region 2 (the "Region") ordinarily handles this type of permitting in the U.S. Virgin Islands, but in an unusual intervention, former EPA Administrator, Andrew Wheeler, signed and issued the Permit on December 1, 2020.

caps, without appropriate consideration of environmental justice issues, and without sufficient consultation on threatened and endangered species, is based on clearly erroneous findings of fact and conclusions of law. Accordingly, Petitioners respectfully request that the Board vacate and remand the Permit to EPA.

II. THRESHOLD PROCEDURAL REQUIREMENTS

Petitioners satisfy the threshold requirements for filing a petition for review under 40 C.F.R. part 124 because:

1. Petitioners filed timely comments with the Region on November 24, 2019. See 40 C.F.R. § 124.19(a)(2); AR-0137 ("**PC**"); and

2. The issues Petitioners raise in this Petition for Review were raised during the comment period, preserving them for review, or were not reasonably ascertainable during the public comment period because EPA raised them for the first time in the final Permit or its response to public comments. *See* 40. C.F.R § 124.19(a)(4)(ii).

III. FACTUAL BACKGROUND

A. History of the Refinery

The Permit would allow Limetree to undertake large-scale refining operations at a facility that was been shut down for over eight years and to emit harmful air pollutants into the surrounding environment that is home to vulnerable communities and over two dozen threatened and endangered species.

The Refinery was previously owned by Hovensa, LLC ("**Hovensa**"), a joint venture between Hess Corporation ("**Hess**") and Petroleos de Venezuela, and was originally constructed by Hess Oil Virgin Islands Company in 1966. Ex. 1 (Matthew P. Johnson, *Black Gold of Paradise: Negotiating Oil Pollution in the US Virgin Islands, 1966–2012*, Environmental History 24 (2019):

766-792), at 768, 781.[3] Between 1987 and 2008, the Refinery released approximately as much petroleum into the groundwater as four times that of the 1989 Exxon Valdez spill, with "approximately 95 percent of recoverable petroleum products [being] recovered" amounting to 42 million gallons of petroleum product. Ex. 2 (*Hovensa Cleanup Comes to 42 Million Gallons So Far*, St. Croix Source, March 9, 2008).[4]

In 2011, Hovensa settled allegations by EPA and the U.S. Department of Justice that it violated the Clean Air Act ("**CAA**") by making emissions-increasing modifications to the Refinery without first obtaining preconstruction permits or installing required pollution control devices. Ex. 3 (*Nation's Second Largest Refinery to Pay More Than $5.3 Million Penalty for Clean Air Act Violations / Smog- and asthma-causing emissions to be cut by 8,500 tons per year*, EPA News Release, Jan. 26, 2011) at 1.[5] Hovensa agreed to pay a $5.3 million civil penalty and entered a consent decree requiring the installation of $700 million of new pollution control and monitoring technology. EPA then acknowledged that "[h]igh concentrations of SO2 and NOx, two key pollutants emitted from refineries, can have adverse impacts on human health, and are significant contributors to acid rain, smog, and haze." *Id.* The consent decree also required Hovensa to "set aside nearly $4.9 million for projects to benefit the environment of the U.S. Virgin Islands." *Id.*

Rather than implement the required pollution controls and pay for mitigating the damage it has caused to Virgin Islands environment, in early 2012, Hovensa shut down the Refinery because it was no longer profitable. *See* PC at 3-5. In its 2011 Annual Report, Hess, part owner of the Hovensa joint venture, acknowledged that "as a result of Hovensa's decision to shut down

[3] Also available at https://academic.oup.com/envhis/article-abstract/24/4/766/5520015.
[4] Also available at https://stcroixsource.com/2008/03/11/hovensa-cleanup-comes-42-million-gallons-so-far/#:~:text=The%20Exxon%20Valdez%20spilled%20about,fisheries%20after%20nearly%2019%20years.
[5] Also available at https://archive.epa.gov/epapages/newsroom_archive/newsreleases/2e321f78933fa2e685257824005812cd.html.

its refinery, which was announced in January 2012, Hovensa believes that it will not be required to make material capital expenditures pursuant to this consent decree." Ex. 4 (Hess Corporation 2011 Annual Report) at 39.[6] Subsequently, as discussed below, Hovensa repeatedly and publicly expressed intentions to shut down the refining operations and operate the facility as a long-term oil storage terminal. PC at 4-6.

In September 2015, the U.S. Virgin Islands filed a lawsuit against Hess for more than $1 billion alleging "a pattern of misconduct by executives at Hess," who "conspired to strip the facility's assets in order to leave the government with claims against a broke, polluted and inoperable refinery." Ex. 5 (*US Virgin Islands sues oil company over shuttered refinery*, Associated Press, Sept. 15, 2015) at 2.[7] Within hours of the filing, Hovensa announced that it would file for Chapter 11 bankruptcy, "allowing it to pursue the sale of the refinery for use as a simple storage facility." *Id.*

In December 2015, Hovensa sold the Refinery to Limetree. PC at 5. Initially, Limetree communicated its intention to operate the facility as an oil storage terminal and to potentially dismantle part of the refinery and sell off the scrap metal. *Id.* at 5-6. In 2016, Limetree reopened part of the facility for oil storage and announced a 10-year storage lease agreement with China Petroleum & Chemical Corp. (Sinopec), and hired a marketing director "to head Limetree Bay's storage marketing effort." *See* Ex. 6 (*Fast Track: Limetree Bay Will Be Ready To Re-Open Oil Terminal In April!*, Virgin Islands Free Press, Jan. 22, 2016).

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[6] Also available at https://www.annualreports.com/HostedData/AnnualReportArchive/h/NYSE_HES_2011.pdf.
[7] Also available at https://www.businessinsider.com/ap-us-virgin-islands-sues-oil-company-over-shuttered-refinery-2015-9 .

B. Application for PAL Permit

In fall 2018, Limetree began having biweekly meetings with EPA to discuss plans for "expansion/modification" of the facility, targeting a January 2020 "restart date." Ex. 7 (Tomiak Sept. 28, 2018 Email) at ED_002591_00000120-00011-12.[8] Former Administrator Wheeler communicated to the EPA team to "fully cooperate" in the effort. *Id.* at ED_ 002591_00000120-00015. On November 26, 2018, nearly seven years after the Refinery ceased refining operations, Limetree applied for a PAL permit. *See* AR-0236 ("**Permit Application**"). Limetree based its Permit Application on an April 5, 2018 letter from former EPA Assistant Administrator William Wehrum that concluded the Refinery should be treated as the reactivation of an "idled" facility, rather than a "new source," against longstanding EPA Reactivation Policy and PSD preconstruction permitting regulations. Ex. 8 ("**Wehrum Letter**").[9] On September 20, 2019, EPA Region 2 issued a draft PAL permit to Limetree, proposing plant-wide emissions limits for Sulfur Dioxide, Nitrogen Oxides, Volatile Organic Compounds, Carbon Monoxide, Particulate Matter, Particulate Matter 10, and Particulate Matter 2.5. *See* AR-0001 ("**Draft Permit**").

C. Environmental Justice Analysis

As detailed in Petitioners' comments and the citations therein, St. Croix is home to vulnerable communities of color that suffer worse health outcomes than the national average and have limited access to quality healthcare resources. PC at 13-15. These communities are disproportionately vulnerable to certain health conditions, including conditions caused or aggravated by oil refining activities, such as heart disease, respiratory disease, and cancer. *Id.*

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[8] Also available at https://foiaonline.gov/foiaonline/api/request/downloadFile/ED_002591_00000120_00_dc8e3928-0e4b-a7e5-cddb-6f06d4990549.pdf/d6daa5ef-457e-4124-bdf0-02825e2ee156.

[9] Also available at https://www.epa.gov/sites/production/files/2018-04/documents/limetree_2018.pdf.

In June 2019, Limetree submitted an Environmental Justice Analysis Air Modeling Report to EPA. AR-0060 ("**Modeling Report**"). While the Modeling Report acknowledged that the areas surrounding the Refinery are "communities of concern," it concluded there were "no EJ impacts" because its modeling showed that air quality impacts from the Refinery would not violate national ambient air quality standards ("**NAAQS**"). *Id.* at 4 (relying on conclusion in Hovensa's 2004 EJ analysis).

EPA disagreed, finding instead that there would be disproportionate impacts on the EJ community. On September 19, 2019, EPA issued its Final Environmental Justice Analysis, which found that "it is difficult to conclude that the operation of the facility under the flexibility allowed by the PAL, and the uncertainties in the modeling and background concentrations, will not contribute to a disproportionately high and adverse human health or environmental effect on the community." AR-0058 ("**EJA**") at 14. EPA concluded that "in light of the burden already experienced by the nearby low income and minority populations, Region 2 is requiring Limetree to resume an ambient air monitoring network that will measure NO_2, SO_2, and $PM_{2.5}$." *Id.*

D. Public Participation Process

EPA held a public availability session on November 7, 2019, followed by a public hearing on November 8, 2019. AR-0165 ("**Public Notice**"). All public notices and press releases regarding the Draft Permit were only published in English and did not mention that translation could be made available. *See* Public Notice; AR-0045 ("**Press Release**"). Neither the transcript of the public hearing nor the public availability presentation slides mention that translation of documents or oral interpretation could be made available for LEP individuals. *See* AR-0173, ("**Public Hearing Transcript**"); AR-0187 ("**Public Availability Session Presentation**"). The record is entirely devoid of documents translated into languages other than English.

E. Endangered Species Consultation

St. Croix is also home to 25 endangered and threatened species that are likely to be adversely impacted by the restart of refining activity. *See* PC at 17-25. St. Croix is particularly vulnerable to hurricanes and tropical storms, which can increase the probability of oil spills; for example, in 1989, Hurricane Hugo caused a spill of 10,000 barrels of oil at the Refinery. *Id.* at 22.

On February 19, 2020, EPA requested concurrence from the Fish and Wildlife Service ("**FWS**") with its determination that the air pollution impacts of the Permit were not likely to adversely affect four federally-protected species, improperly omitting the roseate tern, loggerhead sea turtle, and North and South Atlantic Distinct Population Segments ("**DPS**") of the green sea turtles from consideration. *See* AR-0180. On August 11, 2020, EPA requested similar concurrence from the National Marine Fisheries Service ("**NMFS**") on nineteen protected species. *See* AR-0181. EPA received concurrence from FWS and NMFS that the permitted activity was not likely to adversely affect the species on February 28, 2020 (AR-0184) and September 3, 2020 (AR-0186), respectively.

F. Issuance of Final Permit and Petitioners' Comments

On November 24, 2019, Petitioners submitted comments objecting to the Draft Permit on a least five grounds: (1) EPA failed to treat the refinery as a "new" or modified source subject to PSD preconstruction permitting requirements, PC at 3-8; (2) the Permit's emissions caps were improperly high, PC at 8-10; (3) EPA failed to adequately address EJ issues due to failure to translate documents and insufficient modeling to assess public health measures, PC at 10-17; and (4) inadequate consultation under the ESA for federally-listed species, PC at 17-25.

On December 1, 2020, EPA issued the Permit. EPA released its Response to Comments on the same day, acknowledging that under this Permit, Limetree could "relax previously

enforceable [emissions] limitations." AR-0163 ("**RTC**") at 63. While EPA addressed some of Petitioners' comments, it clearly erred regarding the issues presented to the Board herein.

IV. STATUTORY AND REGULATORY FRAMEWORK

A. The Clean Air Act

Congress amended the CAA in 1977 to expand and strengthen provisions governing pre-construction review of impacts on air quality. This process, known as New Source Review ("**NSR**"), requires new major stationary sources of air pollution, as well as existing major sources undertaking major modifications, to obtain preconstruction permits that impose strict requirements and limitations on facilities' operation. 42 U.S.C. §§ 7475, 7503; 40 C.F.R §§ 51.165, 51.166, 52.21, 52.24.

The CAA establishes separate requirements for major sources located in "clean air" attainment areas and those located in areas that have failed to attain national air quality standards. In "clean air" areas—where the objective is the prevention of significant deterioration of air quality—Part C of Title I of the Act, 42 U.S.C. §§ 7470–7492, specifies that no "major emitting facility" may begin construction or undertake major modifications without first demonstrating that emissions from construction or operation of the facility will not exceed applicable limitations. 42 U.S.C. § 7475(a)(3). Additionally, the PSD program requires installation of the best available control technology ("**BACT**") prior to construction or modification. *Id.* § 7475(a)(4). PSD permittees must also conduct a detailed "analysis of ambient air quality in the area." 40 C.F.R. § 52.21(m)(3).

The PSD program applies to "major emitting facilities" 42 U.S.C. § 7479(1). If a facility falls within any one of 28 listed industrial categories, which includes petroleum refineries, then it is a major source if it emits at least 100 tons per year of any regulated pollutant *See* 42 U.S.C. § 7473; 42 U.S.C. § 7479(l); 40 C.F.R. § 52.21(b)(1)(i)(a).

Certain existing major stationary sources may apply for a PAL permit, which has a 10-year duration. 67 Fed. Reg. 80,186 (Dec. 31, 2002) ("**PAL Regulations**"). A PAL permit sets plantwide emissions limits (PALs), in tons per year, for regulated air pollutants. Among other conditions, PAL permits are only available "for any ***existing*** major stationary source," and for non-major modifications. 40 C.F.R. § 51.166(w)(1)(i)-(ii) (emphasis added). Furthermore, "emissions associated with units that were . . . shutdown" must be "subtracted" from the plantwide emissions limit. PAL Regulations at 80,285/3; 40 C.F.R. § 52.21(aa)(6)(iii).

B. Environmental Justice Rules

EPA is required to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations." Exec. Order No. 12,898, *Fed. Actions to Address Env'l Justice in Minority Populations and Low-Income Populations*, 59 Fed. Reg. 7629 (Feb. 11, 1994) ("**EJ Order**").[10] The Board requires that EPA comply with the EJ Order pursuant to its CAA authority and consider environmental justice in the permitting process when there is any "superficially plausible" claim that a minority or low-income population may be disproportionately affected by a particular facility. *In re Shell Gulf of Mex., Inc. & Shell Offshore, Inc.* ("***Shell 2010***"), 15 E.A.D. 103, 148 n.71 (EAB 2010) (citations omitted); *In re EcoEléctrica, L.P.*, 7 E.A.D. 56, 69 n.17 (EAB 1997);

[10] Petitioners note that 85 Fed. Reg. 51650 (August 21, 2020), entitled *Streamlining Procedures for Permit Appeals*, purports to restrict the Board's ability to review EPA's compliance with executive orders. However, this procedural rule is included on The White House List of Agency Actions for Review pursuant to Executive Order 13990, entitled *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*, "that are, or may be inconsistent with, or present obstacles to," environmental justice, and it is reasonably foreseeable that this procedural rule may be revoked in the near future. Exec. Order. 13990, 86 Fed. Reg. 7037 (Jan. 20, 2021); Ex. 9 [also available at: https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/20/fact-sheet-list-of-agency-actions-for-review/]. Due to this review, combined with the Board's long history of reviewing EPA's compliance with environmental justice rules, *In re EcoEléctrica*, L.P., 7 E.A.D. 56 (EAB 1997); *In re Shell Gulf of Mex., Inc. & Shell Offshore, Inc.*, 15 E.A.D. 103 (EAB 2010); *In re Chem. Waste Mgmt.*, 6 E.A.D. 66 (EAB 1995); *In re Energy Answers Arecibo, LLC*, 16 E.A.D. 294 (EAB 2014), and the gravity of this unique situation whereby EPA found a disproportionately high and adverse impact to an environmental justice community due to the proposed Permit activity under Executive Order 12898, see EJA at 14, Petitioners posit that the issues described herein warrant Board review.

In re Shell Offshore, Inc. ("***Shell 2012***"), 15 E.A.D. 536 (EAB 2012); *accord* RTC at 77. If EPA determines that there is a disproportionately high or adverse impact, "then appropriate action should be pursued to minimize or mitigate such concerns." AR-0064, U.S. EPA Region 2, *Interim Environmental Justice Policy*, 22-23, 27 (Dec. 2000) ("**Region 2's EJ Policy**"); *accord In re Energy Answers Arecibo, LLC*, 16 E.A.D. 294, 327 (EAB 2014).

C. Language Access Requirements

EPA is required to ensure that LEP individuals are able to meaningfully participate in the permitting process. *See* EJ Order at 7632; *see* also Exec. Order No. 13,166; 65 Fed. Reg. 50,121 (Aug. 11, 2000) ("**LEP Executive Order**"). For example, federal agencies are required to "translate crucial public documents, notices, and hearings relating to human health or the environment for limited English speaking populations." EJ Order at 7632. The U.S. Department of Justice and EPA established compliance standards for the LEP Executive Order. 67 Fed. Reg. 41,455 (June 18, 2002), ("**LEP Guidance**"); U.S. EPA Order No. 1000.32, *Compliance with Executive Order 13166: Improving Access to Services for Persons with Limited English Proficiency*, (issued July 28, 2011, updated Feb. 10, 2017) ("**LEP Order**").

D. The Endangered Species Act

In 1973, Congress enacted the ESA to conserve the nation's endangered and threatened fish, wildlife, and plants and their natural habitats. 16 U.S.C. § 1531. The Supreme Court held that Congress's "plain intent" in enacting the ESA "was to halt and reverse the trend toward species extinction, whatever the cost." *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184-85 (1978). Toward this goal, Section 7(a)(2) of the ESA mandates that:

> Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species . . . .

16 U.S.C. § 1536(a)(2). Section 7(a)(2) also mandates that "each agency shall use the best scientific and commercial data available" in making its determinations. *Id.* Federal agencies have a substantive duty to ensure none of their actions, including issuing a permit, is likely to jeopardize listed species or destroy or adversely modify their critical habitat. *In re Desert Rock Energy Co., LLC*, 14 E.A.D. 484, 509 (EAB 2009). "Action[s]" include "all activities or programs of any kind, authorized, funded, or carried out, in whole or in part, by Federal agencies . . . ." 50 C.F.R. § 402.02; *see also Pac. Rivers Council v. Thomas*, 30 F.3d 1050, 1054 (9th Cir. 1994) ("Congress intended to enact a broad definition of agency action in the ESA").

To fulfill this duty, EPA must consult with the relevant wildlife agencies prior to approving any discretionary action, including permitting, that "may affect listed species or critical habitat." 50 C.F.R. § 402.14(a); *see also Sierra Club v. Babbitt*, 65 F.3d 1502, 1504-05 (9th Cir. 1995). The term "may affect" is construed broadly to include any possible effect, whether beneficial, benign, adverse, or of an undetermined character. *In re Indeck-Elwood, LLC*, 13 E.A.D. 126, 196 (EAB 2006); *Desert Rock Energy*, 14 E.A.D. at 516 n. 33.

An agency may fulfill its consultation duties through "informal" consultation if the action is "not likely to adversely affect" the listed species or critical habitat. If the wildlife service concurs in writing with the "not likely to adversely affect" finding, the consultation process is concluded and no further action is necessary. 50 C.F.R. § 402.13(c). If the agency determines that its proposed action may affect a listed species or its critical habitat, then formal consultation is required. 50 C.F.R. § 402.14(a). However, it is the action agency that "has the ultimate duty to ensure that its actions are not likely to jeopardize listed species." *Defs. of Wildlife v. Flowers*, 414 F.3d 1066, 1069-70 (9th Cir. 2005); *see also Nat. Res. Def. Council v. Houston*, 146 F.3d 1118,

1127 (9th Cir. 1998) (finding agency failed to meet its "independent responsibilities under the ESA" when it failed to "request a formal consultation").

V. STANDARD OF REVIEW

The Board may review a permit decision when it is "based on a finding of fact or conclusion of law that is clearly erroneous" or when it involves an "exercise of discretion or an important policy consideration that the [Board] should, in its discretion, review." 40 C.F.R 124.19(a)(4)(i); *see also In re Deseret Power Elec. Coop.*, 14 E.A.D. 212, 226, 239 (EAB 2008). When evaluating a permit for clear error, the EAB considers the administrative record as a whole "to determine whether the permit issuer exercised considered judgment in rendering its decision . . . [and] provided a cogent explanation for its permitting decision." *In re Veolia ES Tech. Sols., L.L.C.*, 18 E.A.D. 194, 207-09 (EAB 2020) (citations omitted); *see also In re Town of Concord Dep't of Pub. Works*, 16 E.A.D. 514, 523-24 (EAB 2014) (remanding permit where Region failed to exercise "considered judgment"). The permit issuer is not "free to disregard, without explanation, inconsistencies raised by petitioners in the facts or determinations in the permitting record." *Id.*; *see also In re Weber # 4-8*, 11 E.A.D. 241, 246 (EAB 2003) (vacating permit where Region failed to adequately consider comments before issuing permit). For technical issues, the Board determines whether the Region "duly considered the issues raised in the comments and whether the approach ultimately adopted by the Region is rational in light of the information in the record." *In re City of Marlborough, Mass. Easterly Wastewater Treatment Facility*, 12 E.A.D. 235, 251-52 (EAB 2005) (citation omitted) (remanding permit for failure to ensure compliance with water quality standards).

VI. ARGUMENT

A. EPA Clearly Erred by Failing to Treat the Refinery as a New Source Subject to PSD Permitting Requirements and Disregarding the Reactivation Policy

Pursuant to the CAA's permitting schemes, and EPA's regulations and policies implementing them, EPA should have classified the reactivating Refinery as a new source or a major modification, subject to the more stringent permitting requirements under the PSD program.

See generally 42 U.S.C. §§ 7470–7492; PC at 3-8. Instead, despite the Refinery's eight years of shutdown, EPA erroneously decided to withdraw its Reactivation Policy and issue Limetree a PAL permit.

The CAA requires PSD preconstruction permits prior to construction and/or operation of a "new major stationary source" and for "major modifications" to an existing stationary source, in attainment and unclassifiable areas. *See* 42 U.S.C. §§ 7475(a) & 7479(2)(C); 40 C.F.R. 52.21(2)(ii). Certain "existing" major sources, however, may obtain PAL permits with fewer regulatory requirements. *See* 40 C.F.R. 51.166(w)(1)(i).

Under EPA's longstanding Reactivation Policy interpreting the CAA and implementing regulations, it is established that:

> Where facilities are reactivated after having been permanently shutdown, operation of the facility will be treated as operation of a new source. Alternatively, shutdown and subsequent reactivation of a long-dormant facility may trigger PSD review by qualifying as a major modification.

Ex. 10 (*In re Monroe Electric Generating Plant Entergy Louisiana, Inc.*, Petition No. 6-99-2, (Administrator, EPA, June 11, 1999) ("***Monroe***") at 8 & n. 9 (collecting sources for Reactivation Policy from 1978 onwards))[11]; *see also Cmtys. for a Better Env't v. Cenco Ref. Co.*, 179 F. Supp. 2d 1128, 1143-46 (C.D. Cal. 2001) (applying the Reactivation Policy and finding that a six-year shutdown was likely to trigger PSD review in granting an injunction).

In issuing the Permit, EPA withdrew this policy, violating its own rules on withdrawing and implementing new guidance. EPA clearly erred by improperly departing from, and purporting

[11] Also available at https://www.epa.gov/sites/production/files/2015-08/documents/entergy_decision1999.pdf.

to eliminate, its longstanding Reactivation Policy, and by failing to treat the Refinery restart as a new source for PSD permitting.[12]

1. EPA Clearly Erred by Failing to Treat the Refinery as a "New Source"

EPA erroneously disregarded and disavowed its "***well-established policy*** that reactivation of a permanently shutdown facility will be treated as operation of a ***new source*** for purposes of PSD review." *Monroe* at 8 (emphasis added). As explained by a former EPA Administrator:

> The key determination to be made under this policy is whether the facility to be reactivated was "permanently shutdown." In general, EPA has explained that whether or not a shutdown should be treated as permanent depends on the ***intention of the owner*** or operator ***at the time of shutdown*** based on all facts and circumstances. Shutdowns of ***more than two years. . . are presumed to be permanent***. In such cases it is up to the facility owner or operator to rebut the presumption.

Id. (emphasis added). In applying the *Monroe* factors, EPA looks to the duration of the shutdown and the intent of the owner at the time of the shutdown. PSD preconstruction permits are required upon reactivation where contemporaneous statements by owners evince intent to permanently close a facility. *See, e.g.*, Ex. 11 (Memorandum from E. Reich, Director, Stationary Source Enforcement Division, to S. S. Gardebring, Director, Enforcement Division, Region V (Oct. 3, 1980) (cement kiln required PSD permitting where it was shut down for over three years, removed from State's emissions inventory, and described by owner as permanently closed)). This presumption of permanent shutdown may be overcome only if "the owner or operator has demonstrated a ***continuous intent to reopen***," which means "continuously demonstrate concrete

[12] The restart of the Refinery's long-shutdown emissions units should alternatively be considered a "major modification" subject to PSD permitting, as it constitutes a "physical change in, or change in the method of operation of, a stationary source." 42 U.S.C. § 7411(a)(4); 40 C.F.R. § 52.21(b)(2)(i); *Monroe*, at 10 (citing *Wisconsin Elec. Power Co. v. Reilly*, 893 F.2d 901, 908 (7th Cir. 1990) (noting that "courts considering the modification provisions of NSPS and PSD have assumed that 'any physical change' means precisely that") (citations omitted); *see also* PC at 3. The reactivation of these units does not qualify for any of the regulatory exemptions from this definition. *See, e.g.*, *Monroe*, at 10-11 (discussing the most common exemptions).

plans to restart the facility sometime in the ***reasonably foreseeable future***." *Monroe* at 9-10 (emphasis added).

The record here establishes that the Refinery shut down in January 2012, based upon multiple consistent statements by Refinery owners at the time of shutdown and in subsequent years. Documents reflecting these statements are collected in a list titled "Limetree Reactivation Fact Documents Post-Wehrum Letter." AR-0238. For example, a January 18, 2012 press release states: "Hess Corporation announced today that it will take a $525 million after-tax charge against its fourth quarter 2011 earnings as a result of the shutdown of the Hovensa L.L.C. refinery . . . Following the shutdown, the complex will operate as an oil storage terminal." Ex. 12 (*Hess Announces Charge Related to Closure of Hovensa Joint Venture Refinery*, Press Release, Jan. 18, 2012).[13] Hess's 2012 Annual Report repeatedly discusses the shutdown of refining operations and its plans to operate the facility as an oil storage terminal, along with the attendant shutdown costs and enforcement actions in connection with Hovensa's environmental violations. Ex. 13 (*Hess Corporation 2012 Annual Report*) at 2, 10-11, 15-16, 54-55, 101.[14] Nearly two years after the shutdown, an October 2013 presentation for Hovensa's executive committee, entitled "Shut Down Cash Cost Summary ($MM)," detailed "Shutdown and Mothball" costs, "Personnel Exit Cash Costs," and other "Shutdown Cash Costs." AR-0237 at 9, Tab A. Importantly, the presentation estimated shutdown costs in December 2011, actual costs in 2012, and forecast and planned shutdown costs from 2013 to "2016++", showing that the Refinery owners intended to keep it shutdown well into the future. *Id.* During the period from 2013 to 2017, Hovensa continued to

[13] Also available at: https://investors.hess.com/news-releases/news-release-details/hess-announces-charge-related-closure-hovensa-joint-venture.
[14] Also available at: https://investors.hess.com/static-files/ad76ecba-abf1-4024-aa40-2b9c84fb4cd2.

notify the Virgin Islands Division of Environmental Protection each year that "it [was] not subject to payment of fees" under the Division's operating permit program regulations. AR-0234.

The record thus establishes that "at the time of the shutdown" in 2012 and for "more than two years" afterwards, the Refinery shutdown was "presumed to be permanent" under the Reactivation Policy. *Monroe* at 8-10. EPA has not contradicted this established shutdown and "acknowledges that some of this evidence indicates Hovensa pursued the option of permanently converting the facility to an oil storage and transfer facility." RTC at 112. Indeed, EPA agreed in the RTC that the eight year "period of time invokes the presumption that the facility was permanently shut down under the Reactivation Policy." *Id.* at 111. However, EPA erroneously concluded that Limetree rebutted this presumption.

Far from expressing a "continuous intent to reopen," *Monroe* at 9-10, the Refinery's owners consistently expressed their intent, from 2012 until 2018, to shut down the refinery and operate it as an oil storage terminal. EPA did not cite any statement by the owner of continuous intent to reopen the Refinery in its RTC. at 112. Rather, EPA stated that "actions sometimes speak louder than words." *Id.* But here, the clear message was that the Refinery was shut down and there was an 8-year period of ***inaction***, at least with respect to oil refining, the relevant activity for purposes of the CAA. EPA mischaracterized the Hess statements as "simply … about the facts on the ground after the refinery operations were idled while other operations were not." *Id.* However, even when Limetree purchased the Refinery in 2015, its parent company expressed plans to operate the facility as an oil terminal and dismantle part of the Refinery to sell off the scrap metal. *See* PC at 6; *see also* Ex. 14 (*ArcLight, Freepoint to buy Hovensa St. Croix refinery, plan storage hub*, Reuters, Dec. 1, 2015).[15] EPA also did not adequately address other owner and stakeholder

[15] Also available at https://www.reuters.com/article/us-hovensa-refinery-storage-idUSKBN0TK4TM20151201.

statements Petitioners raised in comments, PC at 4-6, merely declaring that many of the press reports "are based on the perceptions of other parties." RTC at 112. EPA's decision to summarily dismiss this evidence, and instead rely on post-hoc statements from Limetree's attorneys about a previous owner's intent years prior (discussed below), is clearly erroneous because it is fails to consider all the relevant information.

EPA claims that the fact that Limetree "continuously operated the oil storage and terminal operations, wastewater treatment plant, and power generation equipment" and that Hovensa and Limetree maintained some permits for the facility weighs against a finding that the facility was shut down. RTC at 111-112. However, as noted by Petitioners in their comments, most of the permits were required for the oil storage and wastewater treatment facilities, as well as for the containment of hazardous waste at the site, and the law is clear that a facility can be deemed "shut down" with respect to the relevant operations (here, refining) even if other equipment on site is maintained. PC at 7, *citing Cmtys. for a Better Env't,* 179 F. Supp. 2d at 1128.

It was not until 2018, over six years after the shutdown, that Limetree attorneys expressed intent to restart refining activity, writing to EPA to request concurrence that the Reactivation Policy should not apply and to request that a "new source" PSD permit not be required. AR-0237. In responding to their request, Assistant Administrator William Wehrum relied on the Limetree attorneys' statements that the Refinery operations had been merely "idling" although he also incongruously stated that "final idling of all refinery units" was completed on February 21, 2012. Wehrum Letter (Ex. 8) at 3. Mr. Wehrum noted that Limetree "represents that neither it nor Hovensa made any statements to any party or issued any press release indicating any intent not to restart the plant in the future," *id.* at 2, which is contradicted by the evidence in the record discussed

above. Based on this self-serving description of the evidence provided by Limetree, Mr. Wehrum found "continuous intent to restart the refinery operations." *Id.*

Significantly, evidence of more "recent efforts to reopen the facility" does not suffice to rebut the presumption of shutdown under the Reactivation Policy. *Monroe* at 9-10 ("Once it is found that an owner or operator has no real plan to restart a particular facility, such owner or operator cannot overcome this suggestion that the shutdown was intended to be permanent by later pointing to the most recent efforts to reopen the facility") & n. 11 ("This approach for assessing the intent of the owner or operator is consistent with the general notion that a company cannot sit indefinitely on a governmental permission to emit air pollution without showing some definite intention to use it.") (collecting citations). Change in ownership indeed "represents further attenuation... between shutdown and prospective reactivation" and, though not determinative, is probative of permanent shutdown. *See* Ex. 15 (Letter from D. Howekamp, Director, Air Management Division, EPA Region IX, Nov. 7, 1987).

Neither the Limetree attorneys' letter to EPA, the Wehrum Letter, nor the RTC addressed or acknowledged the repeated contemporaneous statements by Hess and Hovensa from 2012 onwards that the Refinery had been "shut down" in 2012 and remained shut down for several years thereafter. Indeed, the Wehrum Letter failed to cite any actual record evidence. Mr. Wehrum ignored all contradictory evidence and misapplied the Reactivation Policy, including by failing to analyze whether the owners had an "original intent not to permanently shut down" the Refinery; whether they had "continuous intent" to reopen it in the "reasonably foreseeable future"; and whether "for at least some period of the shutdown, the shutdown was intended to be permanent." *Monroe* at 9-10; Wehrum Letter at 2-3; PC at 5-6. After the Wehrum Letter, EPA prepared a document for the record entitled, "Limetree Reactivation Fact Documents Post-Wehrum Letter."

AR-0238.[16] This document lists 13 documents, ranging from 2012 to 2015, that confirm that the Refinery was shut down in 2012 with no continuous intent to restart. *See* e.g. Exs. 11, 12.

The record establishes that the refining operations were shut down in early 2012 and remained shut down for over six years afterwards. This shutdown period exceeded the two-year period that EPA "presume[s] to be permanent," *Monroe* at 8-10, and it is clear that the intention of the owner at the time of the shutdown was to transition the facility to oil storage. Contemporaneous statements by Refinery owners and stakeholders confirm this. Limetree attorneys and EPA failed to overcome the presumption that the shutdown was permanent. EPA therefore clearly erred by failing to treat the Refinery as a "new source" under the PSD permitting regulations.

2. EPA Clearly Erred by Improperly Departing From, and Purporting to Eliminate, the Reactivation Policy

Faced with overwhelming evidence that the Refinery had permanently shut down and its reactivation should have undergone PSD new source permitting under the Reactivation Policy, the Administrator announced that:

> Since EPA has concluded that the Reactivation Policy is no longer an appropriate policy in the context of the existing NSR regulations, the Agency is not applying it in this permitting action.

RTC at 108. This was the first notice that Petitioners (and the public) received that EPA would jettison its forty-two-year-old Reactivation Policy. Petitioners and the public thus were denied the opportunity to comment on the abandonment of the Reactivation Policy before EPA issued the Permit.

[16] This one-page document lists no author, but metadata for the Adobe Acrobat file reveals that the author was Joseph Siegel, a senior attorney in EPA Region II. This document was posted to the permitting docket on December 2, 2020.

a) EPA violated its own Guidance Rule

By abruptly abandoning the Reactivation Policy without any notice or adequate explanation, and without following the procedures in EPA's own recently-issued guidance rule, EPA acted with clear error.

On November 18, 2020, a final EPA rule on guidance signed by then-Administrator Wheeler became effective. 85 Fed. Reg. 66,230 (Oct. 19, 2020) ("**Guidance Rule**").[17] Thirteen days later, Mr. Wheeler violated that rule. The Guidance Rule requires EPA to first seek "public comment on the Agency's intent to withdraw a significant active guidance document," and publish a notice in the Federal Register announcing that intent. *Id.* at 66,239 (40 C.F.R. § 2.506(b)(1) & (2)). *Monroe* and the five EPA Reactivation Policy guidance documents cited therein, *Monroe* at 8, n.9, meet the definitions of "active guidance document" and "significant guidance document." *See* Guidance Rule at 66,238 (40 C.F.R. § 2.503). Yet there is no evidence that EPA sought public comment or published notice of its intent to withdraw the Reactivation Policy. EPA further violated the Guidance Rule by adopting new guidance – that a long-shutdown facility is not a "new source" subject to PSD requirements – without first fulfilling its public notice and comment requirements. *Id.* at 66,239 (40 C.F.R. § 2.506(a)(1) & (2)).

b) EPA misinterpreted the PAL Regulations' reliance upon the Reactivation Policy

Not only did EPA's withdrawal of the Reactivation Policy violate its own Guidance Rule, it highlights how EPA clearly erred in issuing this Permit. A permit issuer acts with clear error when it does not exercise "considered judgment" in its permitting decisions, *see, e.g.*, *Town of Concord*, 16 E.A.D. at 523-24, or when it disregards, without explanation, "inconsistencies raised

[17] Petitioners note that this regulation, entitled *EPA Guidance; Administrative Procedures for Issuance and Public Petitions*, is included on the White House "List of Agency Actions for Review." Ex. 9. As this regulation remains in place as of February 2, 2021, Petitioners hereby bring this issue to the Board for review.

by petitioners in the facts or determinations in the permitting record." *Veolia ES Tech. Sols.*, 18 E.A.D. at 207-209 (citations omitted). The Administrator's evasion of PSD permitting and the RTC's terse announcement that, for the first time, EPA was abandoning the Reactivation Policy lacks "considered judgment" and does not adequately explain EPA's inconsistent positions on the Reactivation Policy, and is thus clearly erroneous.

EPA's explanations for abandoning the Reactivation Policy in the permitting record are internally contradictory. The explanations consist of arguments that the Reactivation Policy is inconsistent with what EPA refers to as "2002 NSR Reform Rule," 67 Fed. Reg. 80,186 (referred to here as "**PAL Regulations**"). *See* RTC at 109-111 ("Under this current framework in the NSR regulations, the Reactivation Policy no longer serves the purpose that it did under the pre-Reform NSR regulations, when sources could seek to establish baseline emissions by demonstrating that emissions experienced before the last 24 months were more representative of normal operations.") But the RTC conveniently ignores that the 2002 NSR rule that sets forth PAL Regulations ***cited and relied upon*** the Reactivation Policy, as described in *Monroe*, and that it was a central element necessary to implement the rule. Importantly, the rule ***depends*** on application of the Reactivation Policy to determine whether emissions units are "permanently shutdown" for PAL emissions calculations. PAL Regulations at 80,208-80,209 & n. 30 (stating that "for any emissions unit that is permanently shut down or dismantled since the 24-month period, its emissions must be subtracted from the PAL level" and citing *Monroe* for propositions that whether shutdown should be treated as permanent depends on the intention of the owner or operator at the time of shutdown, and that shutdowns of more than 2 years are presumed to be permanent). The 2002 rule references *Monroe* as the agency's definitive interpretation for when stationary sources and emissions units are "permanently shutdown" for purposes of emissions calculations. *Id.* There is no hint that the

Reactivation Policy is inconsistent with the rule in any respect. The RTC attempts to explain away a long-standing agency policy by claiming inconsistencies with the 2002 rule which itself cites the policy—and these supposed inconsistencies have never been noted by the EPA in the 18 years since the 2002 rule issued until EPA's response on this Permit. EPA is attempting to misrepresent the 2002 rule to disavow the Reactivation Policy and issue the Permit to Limetree. This is clearly erroneous agency action. *See In re Town of Concord Dep't of Pub. Works*, 16 E.A.D. 514, 523-24 (EAB 2014); *see also, for example Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.,* 463 U.S. 29, 43 (1983) (rejecting agency action based on "an explanation for its decision that runs counter to the evidence before the agency.").

B. EPA Clearly Erred by Issuing a PAL Permit That Grossly Inflates the Emissions Caps

EPA clearly erred by issuing the Permit with emissions caps based on a period with some of the Refinery's highest emissions, from January 2009 – December 2010, which immediately preceded the Refinery's CAA violations, and by failing to subtract emissions from units that were permanently shut down since the 24-month baseline period. *See* PC at 8-10. In the RTC, EPA admits that certain units were shut down starting in 2011 but fails to account for that fact in its calculations. RTC at 102 ("EPA's understanding is that Limetree chose this 24-month period for its baseline emissions because Hovensa began shutting down portions of the refinery in 2011 and, as a result, 2009/2010 represents the most recent period of full operation of the facility.").

EPA regulations authorizing the Plantwide Applicability Limit (PAL) describe it as a "source-wide cap on emissions [that] is one way of making sure that emissions increases from your major stationary source do not occur." PAL Regulations at 80,207/1. The Permit here does the opposite: it creates caps on emissions significantly higher than source-wide emissions since 2011. The Permit's grossly inflated emissions caps eliminate the incentive to install "voluntary

emissions controls" or to "improve process efficiency" as envisioned by PAL Regulations because there is already so much headroom under the inflated emissions caps. *See* PAL Regulations at 80,207/3.

EPA facilitated this harmful outcome by violating its own PAL Regulations. Those regulations require that "[e]missions associated with units that were permanently shutdown after [the PAL's 24-month baseline period] ***must be subtracted*** from the PAL level." PAL Regulations at 80,285/3. A "10-year actuals PAL" is created by adding "baseline actual emissions" for each regulated pollutant, from all emissions units, to an additional significant emissions increase level for each emissions unit. *Id.* "Baseline actual emissions," relevant to the Limetree PAL, are defined as:

> the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 10-year period immediately preceding . . . the date a complete permit application is received by the Administrator for a permit required under this section.

Id. at 80,278/3 (40 C.F.R. § 52.21). The Limetree PAL is based on baseline emissions from the Refinery reflecting the average emissions rate (in tons per year, "tpy") over the years 2009-2010, when the full Refinery was operating – its most polluting years that lead to the charges resulting in the consent decree, *see* RTC at 84 – plus significant emissions increases for each PAL pollutant. Accordingly, the Permit's cap for volatile organic compounds is an astonishing 6,094 tpy; for nitrogen oxides, 5,594 tpy; and for sulfur dioxide, 1,482 tpy. Permit, Enclosure 1, at 3. In sharp contrast, these were the facility-wide emissions for these same pollutants during the following years, in tons per year:

Year	**VOCs**	**NO_x**	**SO_2**
2012[18]	944	1,101	131

[18] AR-0230 (Limetree 2012 Title V/Part 70 Permit Emissions Inventory & 2011 Revision (July 12, 2013)).

2014[19]	659	493	47
2016[20]	292	556	10
PAL	*6,094*	*5,594*	*1,482*

Critically, the PAL Regulations require that "[e]missions associated with units that were permanently shutdown after this 24-month period [2009-2010 here] ***must be subtracted*** from the PAL level." PAL Regulations at 80,285/3 (40 C.F.R. § 52.21(aa)(6)(iii)) (emphasis added). This, EPA did not do (or claim to do): the PAL levels in the Permit are based upon the average rate, in tons per year, of all emissions units that were operating at the Refinery during 2009-2010, including all units that shut down in 2011-2012 and remained shutdown thereafter. As discussed above, PAL Regulations use the standard set out in *Monroe* to determine whether emissions units were "permanently shut down." *See* PAL Regulations at 80,208-80,209 & n.30.

EPA's error caused the Limetree emissions caps to be unlawfully inflated—to more than 10 times the 2012 emissions rate for sulfur dioxide and 5 times the emissions rates for volatile organic compounds and nitrogen oxide—because it did not follow its own PAL Regulations intended to reflect that "in calculating the net emissions increase for reactivation of long dormant sources potentially subject to PSD, the source is considered to have ***zero emissions as its baseline***." *Monroe* at 14. It is undisputed that EPA did not assign the shutdown units zero emissions for their baseline emissions when establishing the PALs.

The EPA cannot have it both ways. EPA may not create PAL Regulations that incorporate and refer to the Reactivation Policy to maintain the integrity of permissible PAL caps and then

[19] AR-0232 (Limetree 2014 Title V/Part 70 Permit Emissions Inventory (July 14, 2015)).
[20] AR-0234 (Limetree 2016 Title V/Part 70 Permit Emissions Inventory (July 11, 2017)).

turn around and arbitrarily jettison the Reactivation Policy and the applicable calculation rules in granting the Permit. This is clear error that necessitates vacating the Permit.

C. EPA Clearly Erred by Not Requiring PAL Permit Conditions That Ensure Compliance with the NAAQS or Avoid Further Burdening the Environmental Justice Community of South Central St. Croix

In response to Limetree's Modeling Report, EPA made the rare finding that "EPA cannot conclude that the operation of the refinery under the PAL will assure compliance with the NAAQS in the EJ community" and "there is in fact a disproportionate burden in South-Central St. Croix." RTC at 71, 76. EPA reached the troubling conclusion that "it is difficult to conclude that the operation of the facility under the flexibility allowed by the PAL, and the uncertainties in the modeling and background concentrations, will not contribute to a disproportionately high and adverse human health or environmental effect on the community." EJA at 14.

The only permit condition that EPA required to address this finding of disproportionate impact is an ambient air quality monitoring network that includes resuming five SO_2 monitors in place when Hovensa operated, adding one new NO_2 monitor, and one new $PM_{2.5}$ monitor. *Id.* at 59; *see* Permit at 37-40. In its EJ Analysis, EPA stated that this modeling network "will ensure that any exceedance or violation of the health-based NAAQS will not go unnoticed," and that EPA maintains "discretion to reopen the PAL permit if a reduction is necessary to avoid causing or contributing to a NAAQS violation and avoid further burdening the environmental justice community in South Central St. Croix." *Id.* at 15.

EPA clearly erred under the EJ Order because EPA made a finding that the Refinery would have a disproportionate impact on an EJ community but did not condition the permit to ensure that such impacts do not occur. *See In re Chem. Waste Mgmt. of Ind., Inc. Permitee*, 6 E.A.D. 66, 74 (EAB 1995) (holding that "if the operation of a facility would have an adverse impact on the health or environment of the surrounding community, [EPA] would be required to include permit terms

or conditions that would ensure that such impacts do not occur"). The Board and Region 2's EJ Policy identify two broad areas in which EPA should exercise its discretion under EJ Order: "(1) public participation, and (2) the omnibus authority - *i.e.*, EPA's authority under various statutory and regulatory provisions to set conditions as it determines necessary in order to protect human health and the environment." Region 2's EJ Policy; *see also In re Envotech L.P.*, 6 E.A.D. 260, 278 (EAB 1996) (citing *Chem. Waste Mgmt.*, 6 E.A.D. at 73).

Petitioners supported the presence of an ambient air monitoring network but did not believe that ambient monitoring alone would be enough to assure compliance with NAAQS or protect the community. PC at 12. Petitioners commented that EPA's approach was fundamentally reactive and foreseeably ineffective to address immediate health impacts from a NAAQS violation, especially since the Refinery is not required to report a violation for 15 days. *Id.* at 13. Petitioners also shared concern that EPA was repeating history by requiring essentially the same monitoring and self-reporting approach EPA used with Hovensa, which resulted in residents becoming "violently ill" from excessive air pollution and ultimately resulting in multi-million dollar fines for CAA violations. *Id.*

EPA responded that the ambient air quality monitoring is sufficient to address Petitioners' EJ concerns because the monitoring will "alert EPA to any possible exceedance or violation," which EPA can then address by exercising its authority to either reopen the Permit or address the violations through the State Implementation Plan ("SIP") process. RTC at 62, 68. To support its approach, EPA asserts that it has considerable discretion to determine how best to implement its mandate within the existing confines of law. RTC at 68-69.

First, the precedent that EPA relies on to support its exercise of discretion is distinguishable because in each case EPA was able to make a finding that the underlying permit would *not* have a

disproportionate impact because of compliance with the NAAQS. *See Energy Answers Arecibo*, 16 E.A.D. at 326 (modeled emissions show compliance with the NAAQS and EPA conducted human health risk assessment that showed facility likely would not pose concern to human health); *In re Pio Pico Energy Ctr.*, 16 E.A.D. 56, 91 n.30 (EAB 2013) (modeled results indicate that proposed emissions of the pollutants would not cause or contribute to a violation of the NAAQS); *cf. In re Jordan Dev. Co., L.L.C.*, UIC Appeal Nos. 18-06, et al., 2019 WL 3816212 (E.P.A.), at *13-14 (EAB Aug. 8, 2019) (EPA reasonably exercised its discretion not to require additional permit conditions requested by EJ petitioner when EPA determined that the proposed conditions of the permit "will be sufficient" to prevent contamination of surface waters and "more was not needed."); *Envotech*, 6 E.A.D. at 281 (EPA reasonably exercised its discretion when it determined the permit would "ensur[e] the protection of the [Underground Sources of Drinking Water] upon which the minority or low-income community may rely.") (citation omitted). Here, because EPA "could not conclude that the NAAQS are protected," its decision not to require additional permit conditions that would minimize or mitigate the impacts is clearly erroneous. RTC at 71, 88.

Second, EPA's response is clearly erroneous because it does not provide a reasoned explanation for how the ambient air quality monitoring will protect the community from suffering the disproportionate impacts from the Refinery. According to EPA's explanation, the monitoring merely alerts the EPA of a problem after the fact. *See* RTC at 90-91. EPA's response raises more concern for Petitioners because EPA explains that it might wait until it collects three years of averaged NAAQS exceedance data before it finds a violation of the NAAQS standard warranting reopening the Permit. *Id.* at 92-93. While EPA could, in the event of regular exceedances of the NAAQS at the ambient monitors, take immediate enforcement action, reopen the Permit, or make revisions through the SIP process, the Permit does not include any assurances that this will actually

happen. Permit at 37-40. As Petitioners pointed out in their comment, this approach is fundamentally reactive and exposes the community surrounding the Refinery to high concentration levels of air pollution in exceedance of the NAAQS for the 15 days it takes the Refinery to report the incident and even longer if it has to wait for EPA to reopen the Permit, all without any idea as to whether they are in harm's way. PC at 13. Further, as written, the ambient monitoring conditions of the Permit allow the Refinery to operate without the ambient monitors for the first six months of operation, exacerbating the threat to the community's public health. Permit at 37-40.

Third, EPA's decision to require only ambient air quality monitoring at the operational stage in response to EJ concerns was clearly erroneous because the evidence in the record shows that the Refinery has historically—and will likely continue—to violate the NAAQS. EPA itself acknowledged in the RTC that there may be adverse impacts on nearby communities because the historic ambient monitors in operation prior to the shutdown of the Refinery showed exceedances and violations of the 1-hour SO_2 NAAQS from 2008 to 2011. RTC at 60. Further, EPA admits that "the PAL does authorize increases in the short-term emission rate at different units as long as the annual PAL is not exceeded" which "has implications for the 1-hour NO2, 1-hour SO2, and 24-hour PM2.5 NAAQS." *Id.* Given the evidence of historic pollution, the uncertainties in the Refinery's modeling, and EPA's finding that the community suffers disproportionate adverse impacts, EPA should have taken affirmative action to minimize and mitigate the risk, rather than choosing this "wait and see" approach. EPA clearly erred by not exercising its omnibus authority under the CAA to condition the Permit to ensure the Refinery's air emissions do not violate the NAAQS or harm the community. RTC at 62 (EPA has the authority to reduce the PAL if "a reduction is necessary to avoid causing or contributing to a NAAQS or PSD increment violation").

In its RTC, EPA suggested that "the clear purpose" of the PAL provisions is "to ensure that a PAL does not cause a NAAQS or increment violation." *Id.* Thus, EPA should have denied or conditioned the Permit to reduce the emissions as necessary to comply with the NAAQS and protect the community.

D. EPA Clearly Erred by Failing to Provide Individuals with Limited English Proficiency Meaningful Access to the Public Participation Process for the Limetree Permit

EPA acknowledged in its RTC that it is required to provide meaningful access to any LEP individuals under the LEP Executive Order. *See* RTC at 88-89 (explaining that the LEP Order sets out EPA's expectations and requirements to comply with the LEP Executive Order). Despite these requirements and obligations, EPA did not assess St. Croix's LEP population, did not use the most recently available U.S. Census data and other information regarding St. Croix's LEP population, and did not translate vital documents for St. Croix's LEP population. These failures constitute clear error and warrant review by the Board.

1. EPA Clearly Erred by Failing to Assess St. Croix's Limited English Proficiency Population

Federal agencies including the EPA apply a four-factor balancing test to determine the appropriate means to provide meaningful access to LEP individuals. *See* LEP Guidance at 41,459. One factor is determining "the number or proportion of LEP individuals in the eligible service population." *Id.*

Evidence in the record indicates that there is an LEP population in the area surrounding the Refinery. For instance, Petitioners presented U.S. Census data that showed that a significant percentage of the population in the U.S. Virgin Islands, particularly in St. Croix are LEP individuals. PC at 16-17. Specifically, about one-third of the U.S. Virgin Islands population over age five (28,041 people out of 98,905 total population) speak a language other than English, and

of this group, over 4,000 individuals speak English "not well" or "not at all." *Id.* (citing USVI 2010 Census, Detailed Crosstabulations, Fig. 1-8). Consistent with LEP Guidance to consult other data, LEP Guidance at 41,460, Petitioners also submitted other evidence that there are LEP individuals in the area, including information from FEMA, the Virgin Islands Housing Authority, the Virgin Islands Police Department, and historic evidence of "bonded aliens" from non-U.S. islands who worked at the Refinery. *Id.* at 16-17. In fact, EPA's EJA includes a FEMA table showing that 28.7% of the population in South Central St. Croix, the area where the Refinery is located, is Hispanic or Latino. *See* EJA at 4. Yet, there is no indication in the administrative record that EPA ever assessed whether it should provide language access to LEP individuals before issuing the Permit.

In its RTC, EPA did not deny its failure to conduct an LEP assessment before issuing the Permit. Instead, EPA reasoned that the assessment was unnecessary because EPA was not first contacted by an LEP individual. RTC at 89. Specifically, EPA stated:

> EPA was not made aware before or during either the public availability session or public hearing that there were LEP individuals in need of translation, so the Agency did not have an opportunity to make the assessment with respect to oral translation. No comments either verbally or orally at the hearing or any communication requests were received in any language besides English or from people with LEP.

Id. First, EPA's reasoning is clearly erroneous on its face, because LEP individuals cannot contact EPA if they are unaware of the existence of a public comment period, public availability session, or public hearing. The public notice and press release announcing the public comment period for the Draft Permit, the public availability session, and the public hearing were only published in English, so LEP individuals had no way to know that they could or should engage in this public participation process and should contact EPA for language assistance services. *See* Public Notice; Press Release. EPA's LEP Order anticipates this dilemma and makes clear that "lack of awareness of the existence of a particular program may effectively deny LEP individuals meaningful access,"

so "it is important for federal agencies to regularly assess the needs of eligible service populations in order to determine whether certain critical outreach materials should be translated into other languages." LEP Order at 10-1. Second, EPA ignores the fact that Petitioners put EPA on notice that there were LEP individuals when they submitted their public comment letter on November 24, 2019 requesting translation of vital documents in Spanish and French Creole. *See* PC at 15-17. This public comment was submitted only 17 days after the public hearing, and EPA could reasonably have republished the Public Notice and other outreach materials at that time to ensure that any LEP individuals were given meaningful access to the permitting process. Also, as noted above, EPA's September 2019 EJA noted that 28.7% of the population in the Refinery's area were Hispanic or Latino. EJ Analysis, at 4.

Third, EPA's response misconstrues the LEP Order. EPA claims that it did not need to conduct an LEP assessment based on the LEP Order, which states "at the first point of contact with an LEP individual, EPA staff will make an initial assessment of the need for language assistance services." RTC at 89 (quoting LEP Order at 7). However, EPA misconstrues this sentence to mean that it does not need to provide language assistance services *unless* first contacted by an LEP individual. The LEP Order explains what EPA should do if contacted by an LEP individual, but not to the exclusion of taking other affirmative steps to provide meaningful access. *See* LEP Order at 7-8. Under the LEP Order, EPA should have applied the four-factor test to "assess the need to provide oral and written services in languages other than English" by first determining "the number or proportion of LEP individuals in the eligible service population . . . ." *Id.* at 3.

Finally, EPA's response is inconsistent with the LEP Executive Order, which states that "it is the responsibility of EPA"—not the LEP individual—"to take reasonable steps to ensure that communications between the EPA and the LEP individual are not impaired as a result of the

individual's limited English proficiency." LEP Executive Order at 50,121. EPA clearly failed to meet this responsibility.

2. EPA Clearly Erred by Relying on Outdated U.S. Census Data to Determine That There Was Not a Significant Limited English Proficiency Population in St. Croix

Petitioners demonstrated that a significant percentage of the U.S. Virgin Islands population that is likely to be directly affected by the Permit is LEP. PC at 15-17. In addition to other evidence, Petitioners cited the latest U.S. Census data from 2010 which showed that close to one-third of the U.S. Virgin Islands population over age 5 (28,041 people out of 98,905 total population) speak a language other an English, and of this group, over 4,000 individuals speak English "not well" or "not at all." *Id.* (citing USVI 2010 Census, Detailed Crosstabulations, Fig. 1-8).

EPA responded by citing and summarizing outdated U.S. Census data from 2000. RTC at 89. Relying on this outdated data from nearly 20 years ago, EPA determined that it did not need to provide translation of vital documents because there is a "very low proportion of LEP population in the USVI." *Id.*

EPA's conclusion is clearly erroneous because it is not based on the most recent and best available data. At a minimum, EPA should have relied on the most recent U.S. Census data which showed that a higher percentage of the population in the area has LEP. EPA was aware that U.S. Census data from 2010 was available because EPA referenced the 2010 data in its EJ Analysis and Petitioners cited the 2010 data in their comment. *See* EJA at 3 (stating, "[a]ccording to the 2010 Census, there are 106,405 residents in the US. Virgin Islands," and "[i]n a 2018 report by FEMA the area is characterized as 75% minority based on the 2010 U.S. Census."); PC at 16.

EPA's conclusion is also clearly erroneous because EPA did not consult other data sources, instead only citing the 2000 U.S. Census data. The LEP Guidance directs EPA to consult other

data when assessing the LEP population. For example, LEP Guidance at 41,460 states "[o]ther data should be consulted . . . including the latest census data for the area served, data from school systems and from community organizations, and data from state and local governments." EPA never responded to the other evidence and data presented in Petitioners' comments which showed a significant LEP population. RTC at 88-89; PC at 16-17 (citing evidence from FEMA, the Virgin Islands Housing Authority, the Virgin Islands Police Department).

3. EPA Clearly Erred When It Failed to Translate Vital Documents, Including the Public Notice and Permit Fact Sheet, for St. Croix's Limited English Proficiency Population

EPA is required to "translate crucial public documents, notices, and hearings relating to human health or the environment for limited English speaking populations." *See* 59 Fed. Reg. at 7629, 7632. The Board has found that publishing the notice of a preliminary permit decision, the opportunity for comment, and public hearing in languages other than English "are among the kinds of actions specifically encouraged by the environmental justice Executive Order." *EcoEléctrica*, 7 E.A.D. at 68 n.16.

Classification of a document as "vital" depends upon "the importance of the program, information, encounter, or service involved, and the consequence to the LEP individual if the information in question is not provided accurately or in a timely manner." LEP Order at 10. It follows that "[t]he more important the activity, information, service, or program, or the greater the possible consequences of the contact to the LEP individuals, the more likely language services are needed." *Id.* The LEP Order's list of "vital" documents includes "notices of permit, brochures, fact sheets, and press releases" because these "documents are intended for public outreach or a broad audience." LEP Order at 10-11.

There are no documents in the record, including vital documents, translated into languages other than English. *See, e.g.,* Public Notice, Press Release, AR-0105 ("**Permit Fact Sheet**").

There is also no indication that EPA ever assessed whether there was an LEP population in the area before issuing the Permit and engaging in a public participation process, nor assessed "the importance of the program, information, encounter, or service involved, and the consequence to the LEP individual if the information in question is not provided accurately or in a timely manner." LEP Order at 10.

Petitioners requested that EPA translate vital documents for the Draft Permit, such as the Public Notice and the Permit Fact Sheet. PC at 15-17. EPA failed to provide a direct response to this comment. In response, EPA inexplicably stated that "it is unclear which specific documents the commenter believes EPA should have translated" even though Petitioners' comment clearly stated that EPA must prepare translation of public outreach documents such as the Public Notice and Permit Fact Sheet. RTC at 89; *cf.* PC at 15-16.

EPA also claimed that it was not required to translate the Draft Permit and Permit Application because they were "detailed and lengthy technical documents." RTC at 89 (citing U.S. EPA Region 2, Order No. R-1500.1, *Region 2 Policy on Translations and Interpretations* (Dec. 10, 1997)). However, Region 2's translation policy states that translation is appropriate "when a document is intended primarily for communication with members of the public" such as "fact sheets about, or summaries of, important EPA actions, such as . . . final permits . . . notices or announcements of public hearings or meetings . . . ." AR-0190 (EPA Region 2's Translation Policy) at 2.

EPA's RTC provides no other explanation for its decision not to translate vital documents, stating simply "EPA has not provided translation given the specific facts of this permit action." RTC at 90. This conclusory statement does not meet the Board's standard that agencies cogently explain their decisions supported by the record. *See Jordan Dev.*, 2019 WL 3816212, at *4, *15

n.4 (citing *In re Ash Grove Cement Co.*, 7 E.A.D. 387, 397 (EAB 1997) ("[A]cts of discretion must be adequately explained and justified.")); *see also Motor Vehicles Mfrs. Ass'n*, 463 U.S. at 48-49 ("We have frequently reiterated that an agency must cogently explain why it has exercised its discretion in a given manner . . . .") (citations omitted).

EPA's responses do not meaningfully respond to Petitioners' request for translation of vital documents; instead, EPA either ignores the relevant evidence presented, misconstrues the applicable standards, or provides conclusory statements without explanation. EPA's decision to deny meaningful access to the public participation process for LEP individuals is clearly erroneous and warrants review by the Board.

E. EPA Clearly Erred by Issuing the Permit Without Adequate ESA Consultation

EPA violated the ESA by failing to appropriately consult with FWS and NMFS to ensure its issuance of the Permit will not jeopardize the continued existence of threatened or endangered species in the project area. *See* 16 U.S.C. § 1536(a)(2).[21]

The Refinery's air, water and other environmental impacts may affect 25 federally listed species: 9 managed by FWS (hawksbill, leatherback, loggerhead, and North and South Atlantic Distinct Population Segments (DPSs) of the green sea turtles when in terrestrial habitat; West Indian manatees; St. Croix ground lizards; and least and roseate terns); and 21 managed by NMFS (the five types of sea turtles while in the marine habitat; blue, fin, sei, and sperm whales; giant manta ray; Nassau grouper; oceanic whitetip shark; Central and Southwest Atlantic DPS of the scalloped hammerhead shark; and boulder star, elkhorn, lobed star, mountainous star, pillar, rough

[21] EPA does not dispute that issuance of the Permit was a "final permit decision," subject to ESA consultation requirements. *See* 40 C.F.R. § 124.15(a); 50 C.F.R. § 402.02; *see also Indeck-Elwood*, 13 E.A.D. at 212 (failure to consult is reviewable by the Board); *Desert Rock Energy*, 14 E.A.D. at 509 (remanding to agency in part to address ESA compliance).

cactus, and staghorn corals).[22] Petitioners' comments described the negative impacts the Refinery's water discharges, noise pollution, light pollution, climate pollution, and air pollution would have on these species, and expressed concern that, at the time of Petitioners' comments, the record demonstrated no evidence that EPA had consulted with FWS or NMFS. PC at 17-25. Many other comment letters expressed similar concerns. AR-0152, AR-0160, AR-0118, AR-0130, AR-0142, AR-0143, AR-0148, AR-0150, AR-0152, AR-0158. Despite the scale of the Refinery's potential impacts on a significant number of imperiled species, EPA failed to adequately ensure that its action would not jeopardize these listed species. Specifically, EPA failed to conduct any consultation on loggerhead and green sea turtles and the Caribbean roseate tern, and violated consultation requirements for the other listed species. This constitutes clear error warranting that the Board vacate and remand the Permit.

1. EPA Failed to Consult with FWS on Loggerhead and Green Sea Turtles and the Caribbean Roseate Tern

EPA failed altogether to consult with FWS on the impacts of permitting the Refinery on the loggerhead sea turtle, the North and South Atlantic Distinct Population Segments (DPSs) of the green sea turtles, and the Western Hemisphere DPS of the Caribbean roseate tern. *See* AR-0180; AR-0184.

EPA is required to consult where its actions "will likely affect" a listed species. 16 U.S.C. § 1536(a)(3). The threshold for a "may affect" determination triggering EPA's consultation duty

[22] Final listing rules for the roseate tern, 52 Fed. Reg. 41,943, 42,064 (Nov. 2, 1987); hawksbill and leatherback sea turtles, 35 Fed. Reg. 8,491 (June 2, 1970), Northwest Atlantic Ocean DPS of loggerhead sea turtle, 76 Fed. Reg. 58,867 (Oct. 24, 2011), and North and South Atlantic Distinct Population Segments (DPSs) of the green sea turtles, 81 Fed. Reg. 20,058 (Apr. 6, 2016); West Indian manatees, 82 Fed. Reg. 16,668 (Apr. 5, 2017); St. Croix ground lizards, 42 Fed. Reg. 28,543 (June 3, 1977); blue, fin, sei, or sperm whales, 35 Fed. Reg. 18,313, 18,319 (Dec. 2, 1970); giant manta ray, 83 Fed. Reg. 2,916 (Jan. 22, 2018); Nassau grouper, 81 Fed. Reg. 42,268 (June 29, 2016); oceanic whitetip shark, 83 Fed. Reg. 4,153 (Jan. 30, 2018); Central and Southwest Atlantic DPS of the scalloped hammerhead shark, 79 Fed. Reg. 38,213 (July 3, 2014); and boulder star, elkhorn, lobed star, mountainous star, pillar, rough cactus, and staghorn corals, 79 Fed. Reg. 53,851 (Sept. 10, 2014).

is low. *See* 50 C.F.R. § 402.14(a); Interagency Cooperation–Endangered Species Act of 1973, as Am.; Final Rule, 51 Fed. Reg. 19,926, 19,949 (June 3, 1986) ("Any possible effect . . . triggers the formal consultation requirement."); *Indeck-Elwood*, 13 E.A.D. at 196 (same). ESA provides that in fulfilling the consultation requirements, "each agency shall use the best scientific and commercial data available." 16 U.S.C. § 1536(a)(2).

EPA's issuance of the Permit may affect the loggerhead and green sea turtles, as well as the Caribbean roseate tern. The best available science demonstrates that loggerhead and green sea turtles are found in the project area. AR-0186 at 8, 10 (noting that green turtles particularly are "present year-round in the action area where they nest and use nearshore areas such as seagrass beds and coral habitats for refuge and foraging."). In fact, green sea turtle nesting "is reported as increasing on Sandy Point." AR-0186 at 8. Limetree itself reported that "[g]reen turtles, hawksbills and a loggerhead turtle were seen during the site surveys." Ex. 16 (2019 Environmental Assessment Report) at 130. NOx pollution contributes to the threatened status of the present sea turtles and turtle species are at risk from mercury—a developmental and reproductive toxin. AR-0205 at 12-100, 14-24, 14-27. Toxins from air pollution and exposure to hydrocarbons from oil spills may also injure sea turtles. AR-0170 at 40; 81 Fed. Reg. at 20071 (petroleum contamination "adversely affects turtles by external fouling, ingestion, and interference with olfactory perception and food supply").

EPA failure to consult with FWS on the green and loggerhead sea turtles cannot be remedied by NMFS' post-hoc statement that the FWS "did not include green sea turtles in their concurrence letter even though nesting by this species is reported as increasing on Sandy Point, but the effects determination for green sea turtles ***would likely be the same*** as that for the other two sea turtle species [hawksbill and leatherback]." AR-0186 at 8 (emphasis added). First, this

ignores EPA's own failure to consider impacts to the green and loggerhead sea turtles. Second, as courts have made clear, "[t]he failure to respect the process mandated by [the ESA] cannot be corrected with post-hoc assessments of a done deal." *Nat. Res. Def. Council*, 146 F.3d at 1129; *see also Desert Rock Energy*, 14 E.A.D. at 515-516 (quoting same). Post-hoc rationalization by another agency cannot substitute for EPA's compliance with its ESA duties—particularly where FWS is the expert consulting agency for nesting sea turtles, not NMFS. *See, e.g.*, *Nat. Res. Def. Council*, 146 F.3d at 1127 (finding agency failed to meet its "independent responsibilities under the ESA" when it failed to "request a formal consultation"); *Res. Ltd., Inc. v. Robertson*, 35 F.3d 1300, 1304 (9th Cir. 1994) ("An agency cannot 'abrogate its responsibility to ensure that its actions will not jeopardize a listed species[.]'") (citation omitted). In its RTC, EPA offered no explanation for why it failed to consult on the loggerhead and green sea turtles, simply stating its "evaluation and determination and the Services' concurrence is included in the record for this permitting action and is incorporated by reference as part of this response." RTC at 96.

The roseate tern, whose range encompasses all of the U.S. Virgin Islands, Ex. 17 (2010 FWS Sandy Point, Green Cay and Buck Island National Wildlife Refuges Comprehensive Conservation Plan) at 43-44; Ex. 18 (1993 FWS Roseate Tern Recovery Plan) at 3, 7, 10-11, 15 (noting vast migration path and largest breeding colonies in the Virgin Islands, its "stronghold"), has also been observed at Krause Lagoon, adjacent to the Refinery. Ex. 19 (Birds of St. Croix). The Permit may affect these terns by exposing them to pollutants that can cause irreversible lung damage. *See e.g.,* AR-0137 at 20; AR-0205 at 8-34, 12-80, 15-2, 15-27 (EPA assessment concluding "birds report physiological responses to air pollutants, including PM [particulate matter]"). Despite these threats, EPA neither mentioned the roseate tern during its abbreviated consultation process with FWS, nor acknowledged that EPA previously considered the tern to

"occur in the vicinity of the facility" in assessing remedies for site contamination by Hovensa. Ex. 20 (EPA Statement of Basis/Proposed Final Remedy Decision, VID 980536080) at 3.

In the RTC, EPA acknowledged its omission of the roseate tern but explained that while the tern is a threatened species in the U.S. Virgin Islands, "the IPaC tool used for identifying FWS species, does not list this species in the vicinity of the project and impact area." RTC at 96. This response is not sufficient to support EPA's failure to consult on the roseate tern and to use best scientific and commercial data available, particularly when other data generated and publicized by the EPA, FWS, and other sources indicates the roseate tern occurs in the project area. *See* Exs. 16-19; *Defs. of Wildlife v. U.S. Dep't of the Interior*, 931 F.3d 339, 346 (4th Cir. 2019) (noting "[t]he best-available-data standard also means [an agency] is not free to disregard other 'available biological information'" and the agency "must seek out and consider all existing scientific data relevant to the decision . . . ") (citations omitted). EPA's failure to consult on the loggerhead and green sea turtles and roseate tern constitutes a clear error and a violation of the ESA.

2. EPA Violated Procedural Obligations for Informal Consultation on Over Twenty Other Federally Listed Species

EPA failed to satisfy the ESA's procedural obligations for informal consultation with FWS and NMFS regarding twenty-three other endangered and threatened species that the Refinery may affect.

To properly engage in informal consultation, an agency "shall include information similar to the types of information described for formal consultation at § 402.14(c)(1) sufficient for the Service to determine if it concurs." 50 C.F.R. § 402.13(c)(1). Section 402.14(c)(1)(i) requires "[a] description of the proposed action, including any measures intended to avoid, minimize, or offset effects of the action." It directs agencies to "provide sufficient detail to assess the effects of the action on listed species and critical habitat, including: (A) The purpose of the action; (B) The

duration and timing of the action; (C) The location of the action; (D) The specific components of the action and how they will be carried out; (E) Maps, drawings, blueprints, or similar schematics of the action; and (F) Any other available information related to the nature and scope of the proposed action relevant to its effects on listed species or designated critical habitat." 50 C.F.R. § 402.14(c)(1)(i).

The ESA clarifies that the "action area" encompasses "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." 50 C.F.R. § 402.02. The "effects of the action" include "all consequences to listed species or critical habitat that are caused by the proposed action[.]" *Id.* Effects are measured against the "environmental baseline" for the species, which should reflect the status quo of no refinery operations. The baseline also includes the "past and present impacts of all Federal, State or private actions and other human activities in the action area . . . ." *Id.*

EPA's February 19, 2020 consultation request to FWS did not comply with these obligations. EPA's request to FWS was a cursory one-page letter that only covered four species in the project area (West Indian manatee, hawksbill sea turtle, leatherback sea turtle, and the St. Croix ground lizard), leaving out other species over which FWS has authority, as discussed above. *See* AR-0180. EPA's request for consultation, and FWS's concurrence, also omitted key information, including that leatherback sea turtles nest at Sandy Point National Wildlife Refuge, a critical habitat, AR-0170 at 34, and that leatherback, hawksbill, and green sea turtles nest at Canegarden Bay and Manchenil Beach, which are directly in the facility's modeled air pollution plume. Ex. 21 (Geographic Response Plan Map: VI-2); AR-0180; *compare* AR-0181 at 26-27 (failing to acknowledge nesting beaches in concluding "[s]pecies expected to transit past impacted areas, so any exposures would be short-term"). Limetree itself has reported "as many as 14 turtle

nests in this area at one time including nests which were laid by leatherbacks" at the project site. Ex. 16 at 130 (2019 Environmental Assessment Report). Yet EPA's concurrence request says little more about the Refinery except its location and that it "would like to restart operations at the former HOVENSA refinery" without any specific components of the action. AR-0180. It attaches just three air modeling figures to illustrate the project and concludes there will be no effect on the four species.

Further, EPA inaccurately described the action by stating that the Permit "does not introduce new emissions compared to those emitted by the HOVENSA refinery." AR-0180 at 1. EPA made no mention of the baseline conditions on the project site—a total shutdown of refinery operations for the past nine years—nor described the full scope of the facility or its functions. EPA further narrowed its consultation request by only referencing the project's potential for air impacts, saying nothing of its other operational impacts to the project area, including water pollution, vessel strikes, noise and disturbance, trash and debris, light pollution, and risk of oil and chemical spills, particularly in light of increasing frequency and intensity of storms. *See, e.g.*, RTC at 97 (EPA stated that it need not address impacts from "Limetree's vessels on the south shorelines of St. Croix including Cane Garden Beach" and other impacts from the Refinery such as polystyrene accidents, oil spills, and ship strikes because "[t]hese issues related to operations at the facility unrelated to the PAL permit"). Based in part on this improperly narrow view of "action area," "effects of the action," and "environmental baseline" in clear violation of §402.02, EPA concluded that the Permit will have no effect on these four species. AR-0180 at 2. In response, FWS sent EPA a cursory 1.5-page concurrence with EPA's determination of "not likely to adversely affect" that largely imported language from EPA's request (including its omission of green and loggerhead sea turtles). AR-0184 at 2.

Similar to its consultation with FWS, when it requested concurrence from NMFS on twenty-one species, EPA focused exclusively on air emissions in determining that the Permit "may affect" but was not likely to adversely affect "all listed species in general, including the leatherback turtle, the Nassau Grouper, and the endangered corals." AR 0181; *see id* at 23-24 (chart listing species present). EPA again erred by ignoring the many non-air impacts from restarting the shuttered refinery. AR-0181, *see also* RTC at 97. In its September 4, 2020 concurrence letter, NMFS acknowledged that the action area "means all areas affected directly or indirectly by the Federal action, and not just the immediate area involved." AR-0186 at 5. NMFS also acknowledged that effects of the action mean "all consequences to listed species or critical habitat that are caused by the proposed action." *Id.* at 8. As noted above, effects are measured against the "environmental baseline," which reflects current conditions and threats to listed species in the area and includes the past and present impacts of all Federal, State or private actions in the action area. 50 C.F.R. § 402.02. None of these factors were mentioned, let alone assessed in the request and concurrence letters, rendering the consultation inadequate. *See, e.g.*, *Am. Rivers v. FERC*, 895 F.3d 32, 47 (D.C. Cir. 2018) (analysis arbitrary when failing to account for effects of all relevant conditions on threatened species).

EPA's "no adverse effect" conclusion further improperly relied on vague assertions including that "Limetree will create an Endangered Species Management Plan to address the numerous ESA-listed species that occur in the Action Area, including listed corals, fish, marine mammals, sea turtles and birds. The plan will be provided to NMFS for review prior to the start of operations." AR-0181 at 16. The substance of this proposed Endangered Species Management Plan is not clear (nor is it ever mentioned again), though it suggests EPA admits that the Permit action will indeed impact listed species. EPA may not rely on uncertain, non-binding mitigation

plan to arrive at its conclusion of no adverse effect. *See, e.g.*, *Ctr. for Biological Diversity v. Bernhardt*, No. 18-73400, 2020 U.S. App. LEXIS 38033, at *36, *54 (9th Cir. Dec. 7, 2020) (agency violated the ESA by "relying upon uncertain, nonbinding mitigation measures in reaching its no-adverse-effect conclusion . . . "); *Desert Rock Energy*, 14 E.A.D. at 515-16 (agency could not cure consultation deficiencies with a permit condition).

The RTC further underscores that EPA clearly erred in issuing the Permit without having adequately considered the aggregate effects of the action in light of the imperiled status of the species at issue and the environmental baseline. *See* 16 U.S.C. § 1536(a)(2); *Am. Rivers v. U.S. Army Corps of Eng'rs*, 271 F. Supp. 2d 230, 255 (D.D.C. 2003) ("The ESA requires that all impacts of agency action . . . be addressed in the consultation's jeopardy analysis.") (citations omitted). EPA's RTC on this issue was brief and dismissive, incorporating by reference the faulty concurrence requests and concurrences. RTC at 96. EPA's cursory responses to comments do not remedy the above-described errors. The Board should vacate the Permit for failing to comply with the ESA. In the alternative, the Board should direct EPA to reinitiate consultation with FWS and NMFS pursuant to 50 C.F.R.§ 402.16(a)(2) to correct the errors that originated in EPA's incomplete consultation requests and failure to consider relevant scientific information.

VII. CONCLUSION

For the foregoing reasons, the Region clearly erred in issuing the Permit over Petitioners' objections and Petitioners respectfully request that the Board vacate and remand PAL Permit No. VI-001/2019.

(signature page follows)

Respectfully submitted,

Date: February 3, 2021

By: _____

Elizabeth Leigh Neville, Esq.
In her individual capacity,
and on behalf of:
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Center for Biological Diversity,
and Sierra Club

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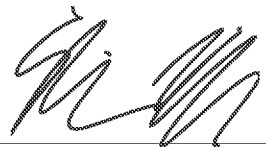
REQUEST FOR ORAL ARGUMENT

Petitioners respectfully request oral argument before the Board on its Petition for Review of PAL Permit No. VI-001/2019 because it believes oral argument will assist the Board.

STATEMENT OF COMPLIANCE WITH THE WORD LIMITATION

In accordance with 40 C.F.R. § 124.19(d)(1)(iv) & (d)(3), I hereby certify that this Petition for Review does not exceed 14,000 words. Not including the transmittal letter, caption, tables of contents, authorities and attachments, figures, signature block, certification of service, and statement of compliance with the word limitation, this Petition contains **13,049** words.



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CERTIFICATE OF SERVICE

I hereby certify that on February 3, 2021 a copy of the foregoing Petition for Review in Appeal No. CAA 20-02M/Docket No. VI-001/2019 was filed electronically with the Clerk of the Environmental Appeals Board using the EAB eFiling System, and was served on the following by electronic mail. I hereby certify that the emailed copy is identical to that filed using the EAB eFiling System:

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From: Dunham, Sarah [Dunham.Sarah@epa.gov]
Sent: 1/18/2022 7:09:04 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]
CC: Hengst, Benjamin [Hengst.Benjamin@epa.gov]; Charmley, William [charmley.william@epa.gov]
Subject: FW: Heavy-Duty 2027 rule, status of interagency review
Attachments: HD NPRM RIA Comments_20220114_EPA responses.docx; SAN 7165 RIN 2060-AU41 HD2027 Preamble and Regs 20220114_EPA responses.docx

Joe, Ale-

Ex. 5 Deliberative Process (DP)

We will let you know if and when we get more comments.

From: Charmley, William <charmley.william@epa.gov>
Sent: Tuesday, January 18, 2022 12:56 PM
To: Dunham, Sarah <Dunham.Sarah@epa.gov>
Cc: Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Burch, Julia <Burch.Julia@epa.gov>; Phillips, Tuana <phillips.tuana@epa.gov>
Subject: Heavy-Duty 2027 rule, status of interagency review

Sarah,

Ex. 5 Deliberative Process (DP)

Tomorrow we have a call with OMB and DOE, as DOE wanted to discuss the topic of Heavy-Duty ZEVs. The OIRA staff have also asked for a staff-level meeting for later in the week, and we've provided a few options to them for that meeting.

We will make sure to ask the OIRA staff there views on next steps when we meet with them, to get a sense of where they think we are at in the overall interagency review process.

Thanks
Bill

Nos. 20-1530, 20-1531, 20-1778, and 20-1780

In the Supreme Court of the United States

STATE OF WEST VIRGINIA, ET AL., PETITIONERS

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.

ON WRITS OF CERTIORARI
TO THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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Additional Captions Listed On Inside Cover

THE NORTH AMERICAN COAL CORPORATION, PETITIONER

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.

WESTMORELAND MINING HOLDINGS LLC, PETITIONER

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.

THE STATE OF NORTH DAKOTA, PETITIONER

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.

QUESTIONS PRESENTED

1. Whether petitioners have standing to invoke this Court's appellate jurisdiction.

2. Whether the Clean Air Act, 42 U.S.C. 7401 *et seq.*, unambiguously limits the measures that the Environmental Protection Agency may consider in determining the "best system of emission reduction," 42 U.S.C. 7411(a)(1), for existing sources to measures that can be applied to and at the level of an individual regulated source.

TABLE OF CONTENTS

Page

Opinion below 2
Jurisdiction 2
Statutory provisions involved 2
Statement:
A. The Clean Air Act 2
B. The Clean Power Plan 5
C. The CPP Repeal and Affordable Clean Energy Rules 7
D. Proceedings below 8
Summary of argument 10
Argument 14
I. Petitioners lack standing to invoke this Court's appellate jurisdiction 15
A. The court of appeals' decision will not cause the CPP to take effect 16
B. Petitioners are not injured by the court of appeals' vacatur of the ACE Rule 17
C. Petitioners seek what would in substance be an impermissible advisory opinion intended to constrain EPA in its future rulemaking 18
D. This Court should dismiss the certiorari petitions for lack of standing or, in the alternative, vacate the D.C. Circuit's holding that Section 7411 does not unambiguously preclude outside-the-fenceline measures 21
II. The CPP Repeal and ACE Rules rested on an erroneous view of Section 7411 23
A. Section 7411 does not unambiguously compel the interpretation in the CPP Repeal and ACE Rules 24
1. The CPP Repeal and ACE Rules rest on an interpretation that limits both States and EPA to inside-the-fenceline measures 24

EPA-HQ-2022-2545

Table of Contents—Continued: Page

2. Section 7411(d)(1)(A) should not be construed to limit state plans to inside-the-fenceline measures 26
3. Nothing in Section 7411(a)(1) unambiguously limits EPA's BSER to inside-the-fenceline measures 30

B. Petitioners' text-based arguments lack merit .. 33
1. Petitioners' arguments do not support a categorical rule against inclusion of outside-the-fenceline measures in the BSER 33
2. Petitioners' arguments focused on generation shifting are unsound 38

C. Petitioners' reliance on various interpretive canons is misplaced 44
1. Petitioners cannot support their interpretation by characterizing the CPP as involving a "major question" 44
2. The constitutional-avoidance canon is inapplicable here 50
3. The federalism canon undermines, rather than supports, the interpretation adopted in the CPP Repeal and ACE Rules 51

Conclusion 52

Appendix — Statutory provisions 1a

TABLE OF AUTHORITIES

Cases:

Alabama Ass'n of Realtors v. *Department of Health & Human Servs.*, 141 S. Ct. 2485 (2021) 46

Alaska Dep't of Envtl. Conservation v. *EPA*, 540 U.S. 461 (2004) 29

American Elec. Power Co. v. *Connecticut*, 564 U.S. 410 (2011) 26, 42, 45

ED_006533_00001505-00005

EPA-HQ-2022-2545

Cases—Continued: Page

Arizonans for Official English v. *Arizona*, 520 U.S. 43 (1997) 15
Biden v. *Sierra Club*, 142 S. Ct. 46 (2021) 22
Camreta v. *Greene*, 563 U.S. 692 (2011) 23
Chevron U.S.A. Inc. v. *Natural Res. Def. Council, Inc.*, 467 U.S. 837 (1984) 25
Clapper v. *Amnesty Int'l USA*, 568 U.S. 398 (2013) 19, 20
Diamond v. *Charles*, 476 U.S. 54 (1986) 15, 18, 21
EPA v. *EME Homer City Generation, L. P.*, 572 U.S. 489 (2014) 31
Essex Chem. Corp. v. *Ruckelshaus*, 486 F.2d 427 (D.C. Cir. 1973), cert. denied, 416 U.S. 969 (1974) 42
FDA v. *Brown & Williamson Tobacco Corp.*, 529 U.S. 120 (2000) 47
FERC v. *Electric Power Supply Ass'n*, 577 U.S. 260 (2016) 39
Federal Land Bank v. *Bismarck Lumber Co.*, 314 U.S. 95 (1941) 37
Gonzales v. *Oregon*, 546 U.S. 243 (2006) 46
Gundy v. *United States*, 139 S. Ct. 2116 (2019) 50
Hollingsworth v. *Perry*, 570 U.S. 693 (2013) 15, 20
Hughes v. *Talen Energy Mktg., LLC*, 578 U.S. 150 (2016) 26
Lawrence v. *Chater*, 516 U.S. 163 (1996) 22
Lujan v. *Defenders of Wildlife*, 504 U.S. 555 (1992) 15
Massachusetts v. *EPA*, 549 U.S. 497 (2007) 18, 45
Michigan v. *EPA*, 576 U.S. 743 (2015) 3
Murray Energy Corp., In re, 788 F.3d 330 (D.C. Cir. 2015) 19, 21

ED_006533_00001505-00006

EPA-HQ-2022-2545

Cases—Continued: Page

National Fed'n of Indep. Bus. v. *Department of Labor*, No. 21A244, 2022 WL 120952 (U.S. Jan. 13, 2022) 46, 48
New Jersey v. *EPA*, 517 F.3d 574 (D.C. Cir. 2008), cert. dismissed, 555 U.S. 1162, and cert. denied, 555 U.S. 1169 (2009) 38
Sierra Club v. *Costle*, 657 F.2d 298 (D.C. Cir. 1981) 42
Susan B. Anthony List v. *Driehaus*, 573 U.S. 149 (2014) 20
Train v. *Natural Res. Def. Council, Inc.*, 421 U.S. 60 (1975) 29
TransUnion LLC v. *Ramirez*, 141 S. Ct. 2190 (2021) 19
Trump v. *New York*, 141 S. Ct. 530 (2020) 21
U.S. Bancorp Mortg. Co. v. *Bonner Mall P'ship*, 513 U.S. 18 (1994) 22
Union Elec. Co. v. *EPA*, 427 U.S. 246 (1976) 29
United States v. *Munsingwear, Inc.*, 340 U.S. 36 (1950) 22
Utility Air Regulatory Grp. v. *EPA*, 573 U.S. 302 (2014) 43, 47
Van Buren v. *United States*, 141 S. Ct. 1648 (2021) 33
West Virginia v. *EPA*, 577 U.S. 1126 (2016) 7, 20
Whitman v. *American Trucking Ass'ns*, 531 U.S. 457 (2001) 50

Constitution, statutes, and regulations:

U.S. Const. Art. III 15, 19
Clean Air Act, 42 U.S.C. 7401 *et seq.* 2
42 U.S.C. 7408-7410 3
42 U.S.C. 7408(a) 29

ED_006533_00001505-00007

EPA-HQ-2022-2545

Statutes and regulations—Continued: Page

42 U.S.C. 7409(a) 29
42 U.S.C. 7409(b)(1) 50
42 U.S.C. 7410 ..... 29, 30, 31, 37
42 U.S.C. 7410(a)(1) 29
42 U.S.C. 7410(a)(2)(A) 29, 31, 37
42 U.S.C. 7410(a)(2)(D)(i)(I) 30
42 U.S.C. 7411 ..... *passim*, 1a
42 U.S.C. 7411(a) 30, 1a
42 U.S.C. 7411(a)(1) ..... *passim*, 1a
42 U.S.C. 7411(a)(2) 3, 1a
42 U.S.C. 7411(a)(3) 34, 1a
42 U.S.C. 7411(a)(5) 34, 2a
42 U.S.C. 7411(a)(7) 32, 2a
42 U.S.C. 7411(a)(7)(B) 35, 2a
42 U.S.C. 7411(b) 3, 3a
42 U.S.C. 7411(b)(1)(A) 3, 3a
42 U.S.C. 7411(b)(1)(B) 3, 3a
42 U.S.C. 7411(d) ..... *passim*, 5a
42 U.S.C. 7411(d)(1) ..... *passim*, 5a
42 U.S.C. 7411(d)(1)(A) ..... *passim*, 5a
42 U.S.C. 7411(d)(1)(A)(i) 3, 5a
42 U.S.C. 7411(d)(1)(A)(ii) 3, 5a
42 U.S.C. 7411(d)(2)(A) 4, 30, 6a
42 U.S.C. 7411(g)(4)(B) 32, 8a
42 U.S.C. 7411(h)(1) 32, 9a
42 U.S.C. 7411(j)(1)(C) 32, 13a
42 U.S.C. 7412 3
42 U.S.C. 7491(b)(2)(A) 33
42 U.S.C. 7491(g)(2) 33
42 U.S.C. 7607(b)(1) 21
42 U.S.C. 7607(d)(5) 20

ED_006533_00001505-00008

EPA-HQ-2022-2545

Statutes and regulations—Continued: Page

42 U.S.C. 7651(b) 31
42 U.S.C. 7651b(a)(1) 37
42 U.S.C. 7651f(b)(2) 32
Clean Air Act Amendments of 1977,
Pub. L. No. 95-95, § 109(c)(1)(A), 91 Stat. 700 32
Clean Air Act Amendments of 1990,
Pub. L. No. 101-549, § 403(a), 104 Stat. 2631 32
Clean Air Amendments of 1970,
Pub. L. No. 91-604, § 4(a), 84 Stat. 1683 32
28 U.S.C. 2106 22
40 C.F.R.:
Section 60.22a(b)(5) 30
Section 60.33b(d)(2) 38

Miscellaneous:

70 Fed. Reg. 28,606 (May 18, 2005) 38
80 Fed. Reg. 64,510 (Oct. 23, 2015) 5
Regional Greenhouse Gas Initiative,
https://rggi.org 28, 49
Webster's New International Dictionary of the English Language (2d ed. 1959) 31

ED_006533_00001505-00009

In the Supreme Court of the United States

No. 20-1530

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v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.

No. 20-1531

THE NORTH AMERICAN COAL CORPORATION, PETITIONER

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.

No. 20-1778

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No. 20-1780

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ON WRITS OF CERTIORARI
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FOR THE DISTRICT OF COLUMBIA CIRCUIT

BRIEF FOR THE FEDERAL RESPONDENTS

EPA-HQ-2022-2545

OPINION BELOW

The opinion of the court of appeals (J.A. 53-255) is reported at 985 F.3d 914.

JURISDICTION

The judgment of the court of appeals was entered on January 19, 2021. The petitions for writs of certiorari were filed on April 29, 2021 (No. 20-1530), April 30, 2021 (No. 20-1531), and June 18, 2021 (Nos. 20-1778 and 20-1780). The petitions were granted on October 29, 2021. The jurisdiction of this Court rests on 28 U.S.C. 1254(1).

STATUTORY PROVISIONS INVOLVED

Pertinent statutory provisions are reproduced in an appendix to this brief. App., *infra*, 1a-15a.

STATEMENT

In 2019, the Environmental Protection Agency (EPA) repealed a 2015 rule regulating power plants' emissions of greenhouse gases. Although some regulated plants had made dire predictions that the emission limits in the 2015 rule would transform the power industry, the rule was stayed before it had any effect, and those limits were swiftly achieved through market-based forces alone. In the decision at issue here, the court of appeals vacated the repeal of the 2015 rule, but stayed the vacatur indefinitely pending further rulemaking because the rule was obsolete. As a result, *no* regulation currently applies. Petitioners, who oppose stricter regulation, are not injured by that status quo and do not ask this Court to change it. Instead, they urge the Court to constrain EPA's authority in *future* rulemakings.

A. The Clean Air Act

The Clean Air Act (CAA), 42 U.S.C. 7401 *et seq.*, "establishes a series of regulatory programs to control air

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EPA-HQ-2022-2545

pollution from stationary sources." *Michigan* v. *EPA*, 576 U.S. 743, 747 (2015). Under one such program, the EPA Administrator identifies "categories of stationary sources" that "cause[], or contribute[] significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare." 42 U.S.C. 7411(b)(1)(A). Once EPA lists a source category, Section 7411(b) requires the agency to establish "Federal standards of performance for new sources within such category." 42 U.S.C. 7411(b)(1)(B). New sources are stationary sources constructed after an applicable Section 7411 "standard of performance" has been proposed. 42 U.S.C. 7411(a)(2). A "standard of performance" is

> a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

42 U.S.C. 7411(a)(1).

When EPA establishes a standard for emissions of an air pollutant from new sources within a category, it must also regulate emissions of that pollutant from *existing* sources within the same category, unless the pollutant is regulated under the National Ambient Air Quality Standards (NAAQS) program, 42 U.S.C. 7408-7410, or the National Emission Standards for Hazardous Air Pollutants (NESHAP) program, 42 U.S.C. 7412. See 42 U.S.C. 7411(d)(1)(A)(i) and (ii).

Section 7411(d) establishes a framework of "cooperative federalism for the regulation of existing sources." J.A. 74. For each source category subject to regulation

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EPA-HQ-2022-2545

under Section 7411(d), EPA first identifies the "system[s] of emission reduction" that are "adequately demonstrated"; next determines the "best" of those systems, "taking into account" factors including "cost," "nonair quality health and environmental impact," and "energy requirements"; and finally derives from that system an "achievable" "degree of emission limitation." 42 U.S.C. 7411(a)(1). EPA promulgates "emission guidelines" that identify the degree of emission limitation achievable through the application of the best system of emission reduction (BSER) as determined by the Administrator. J.A. 74.

Each State must then "submit to the Administrator a plan" to achieve the degree of emission limitation identified by EPA. 42 U.S.C. 7411(d)(1). That plan must "(A) establish[] standards of performance for any existing source for [the] air pollutant," and "(B) provide[] for the implementation and enforcement of such standards of performance." *Ibid.* Although such standards must "reflect[] the degree of emission limitation achievable through the application of the [BSER]," 42 U.S.C. 7411(a)(1), States need not compel regulated sources to adopt the particular components of the BSER itself, J.A. 144. And EPA's emission guidelines must also permit a State, "in applying a standard of performance to any particular source," to "take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies." 42 U.S.C. 7411(d)(1). If a State elects not to submit a plan, or submits a plan that EPA does not find "satisfactory," EPA must promulgate a plan that establishes federal standards of performance for the State's existing sources. 42 U.S.C. 7411(d)(2)(A).

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EPA-HQ-2022-2545

B. The Clean Power Plan

In the 1970s, pursuant to Section 7411, EPA identified fossil-fuel-fired power plants as stationary sources that cause, or contribute significantly to, air pollution. 80 Fed. Reg. 64,510, 64,527 (Oct. 23, 2015). In 2015, EPA promulgated two rules—the New Source Rule and the Clean Power Plan (CPP)—that addressed carbon-dioxide (CO_2) emissions from power plants. The New Source Rule established standards of performance for new fossil-fuel-fired power plants. *Id.* at 64,510. EPA noted its prior finding that "[greenhouse-gas] air pollution may reasonably be anticipated to endanger public health or welfare," *id.* at 64,530, and emphasized that power plants are "by far the largest emitters" of greenhouse gases among stationary sources in the United States, *id.* at 64,522.

Because CO_2 is not regulated under either the NAAQS or the NESHAP program, EPA was also required to regulate CO_2 emissions from *existing* fossil-fuel-fired power plants. J.A. 496. To establish emission guidelines for state plans, see J.A. 273, EPA first identified the BSER. After considering the statutory criteria and "the types of strategies that [S]tates and owners and operators of [power plants] are already employing to reduce [CO_2] from affected sources," J.A. 298; see J.A. 542-551, EPA found that the BSER included three types of measures: (1) improving heat rate (*i.e.*, the amount of fuel that must be burned to generate a unit of electricity) at coal-fired steam plants; (2) substituting increased generation from lower-emitting natural-gas combined-cycle plants for generation from higher-emitting steam plants (which are primarily coal-fired); and (3) substituting increased generation from new zero-emitting renewable energy sources for generation from fossil-fuel-

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EPA-HQ-2022-2545

fired plants. J.A. 86, 299. The latter two measures are known as "generation shifting" because they involve shifting electricity generation from higher-emitting sources to lower-emitting ones. J.A. 583.

EPA determined the amount of heat-rate improvement and generation shifting in the BSER—also known as the "level of stringency," J.A. 590—based on what existing sources had historically accomplished, J.A. 946. EPA adjusted the stringency downward, to a "reasonable" rather than the "maximum possible" level, to give affected sources "headroom" to achieve the prescribed emission reductions. J.A. 590. EPA then determined the "degree of emission limitation achievable through the application of the [BSER]," 42 U.S.C. 7411(a)(1), expressed as two emission performance rates: 1305 pounds of CO_2 per megawatt-hour for fossil-fuel-fired steam plants, and 771 pounds of CO_2 per megawatt-hour for stationary combustion turbines. J.A. 300.

EPA explained that a State would "have to ensure, through its plan, that the emission standards it establishes for its sources individually, in the aggregate, or in combination with other measures undertaken by the [S]tate, represent the equivalent of" those performance rates. J.A. 302-303. EPA emphasized, however, that its guidelines did not mandate any particular approach to compliance. J.A. 299-300. Thus, neither States nor sources were required to apply the specific measures identified in the BSER "to their maximum extent, or even at all." J.A. 300.

The CPP required States to submit their plans in 2018, J.A. 486, and established an eight-year period, from 2022 to 2030, for States to "achieve the full required reductions to meet the CO_2 performance rates," J.A. 487. EPA projected that, by 2030, nationwide CO_2

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EPA-HQ-2022-2545

power-plant emissions would be 32% lower than 2005 levels. J.A. 290.

Numerous States and private parties petitioned for review of the CPP. J.A. 88. This Court stayed the rule pending review. *West Virginia* v. *EPA*, 577 U.S. 1126 (2016). After the en banc court of appeals heard oral argument, the "litigation was held in abeyance and ultimately dismissed as the EPA reassessed its position." J.A. 88.

C. The CPP Repeal And Affordable Clean Energy Rules

In 2019, EPA finalized the two rulemakings at issue here. J.A. 1725.

First, EPA promulgated the CPP Repeal Rule. J.A. 1725. Based on its reassessment of Section 7411, J.A. 1739-1740, EPA determined that the statutory "text and reasonable inferences from it" make "clear" that a "system" of emission reduction under Section 7411(a)(1) "is limited to measures that can be applied to and at the level of the individual source," J.A. 1769. EPA concluded that generation shifting is not such a measure and that the CPP therefore "contravene[d] the plain language of [Section 7411(a)(1)]." J.A. 1763. Based on its view that the CPP was a "major rule," EPA further determined that, absent "a clear-statement from Congress," the term "'system of emission reduction'" should not be read to encompass "generation-shifting measures." J.A. 1770-1771. EPA acknowledged, however, that "[m]arket-based forces ha[d] already led to significant generation shifting in the power sector," J.A. 1785, and that there was "likely to be no difference between a world where the CPP is implemented and one where it is not," J.A. 1921; see J.A. 1672-1678.

Second, EPA promulgated the Affordable Clean Energy (ACE) Rule, a new set of emission guidelines for

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EPA-HQ-2022-2545

existing coal-fired steam plants. J.A. 1787. In light of "the legal interpretation adopted in the repeal of the CPP," J.A. 1787—which "limit[ed] 'standards of performance' to systems that can be applied at and to a stationary source," J.A. 1796—EPA found the BSER to be heat-rate improvement alone, J.A. 1800. EPA listed various technologies that could improve heat rate, J.A. 1803-1809, and identified the "degree of emission limitation achievable" by "providing ranges of expected [emission] reductions associated with each of the technologies," J.A. 1811.

EPA stated that, under the ACE Rule, States would have "discretion in setting standards of performance," and that affected sources would "have flexibility in how they comply with those standards." J.A. 1892. But EPA determined that compliance measures "should correspond with the approach used to set the standard in the first place," J.A. 1894, and therefore must "apply at and to an individual source and reduce emissions from that source," J.A. 1893. EPA concluded that various measures besides generation shifting—namely, biomass co-firing (*e.g.*, burning trees or energy crops with coal), averaging (*i.e.*, allowing multiple sources to average their emissions to meet an emission-reduction goal), and trading (*i.e.*, allowing sources to exchange emission credits or allowances)—did "not meet" that requirement. *Ibid.* EPA therefore barred States from using such measures in their plans. *Ibid.*

D. Proceedings Below

1. Numerous States and private parties petitioned for review of the CPP Repeal and ACE Rules. J.A. 95-96. North American Coal Corp. (NACC) and Westmoreland Mining Holdings LLC challenged the ACE Rule, arguing that EPA cannot regulate CO_2 emissions

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EPA-HQ-2022-2545

from coal-fired power plants under Section 7411(d) at all. See J.A. 96. West Virginia, North Dakota, and other States intervened in support of the CPP Repeal and ACE Rules.

a. The court of appeals vacated both the CPP Repeal Rule and the ACE Rule and remanded to the agency for further proceedings. J.A. 53-255.

The court of appeals stated that "the sole ground on which the EPA defends its abandonment of the [CPP] in favor of the ACE Rule is that the text of Section 7411 is clear and unambiguous in constraining the EPA to use only improvements at and to existing sources in its [BSER]." J.A. 103. The court found "nothing in the text, structure, history, or purpose of Section 7411 that compels the reading the EPA adopted." J.A. 131. The court likewise rejected the view that the CPP's use of generation shifting implicated a "major question" requiring unambiguous authorization by Congress. J.A. 135-153. Having rejected the CPP Repeal Rule's view that Section 7411 unambiguously requires that the BSER be "one that can be applied to and at the individual source," the court also "reject[ed] the ACE Rule's exclusion from Section 7411(d) of compliance measures" that do not meet that requirement. J.A. 132.

The court of appeals concluded that, because EPA had relied on an "erroneous legal premise," both the CPP Repeal Rule and the ACE Rule should be vacated. J.A. 214. The court did not decide, however, "whether the approach of the ACE Rule is a permissible reading of the statute as a matter of agency discretion," J.A. 102-103, and instead "remanded to the EPA so that the Agency may 'consider the question afresh,'" J.A. 214 (citations omitted).

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EPA-HQ-2022-2545

b. Judge Walker concurred in part, concurred in the judgment in part, and dissented in part. J.A. 216-255. He would have upheld the CPP Repeal Rule but would have vacated the ACE Rule on other grounds. J.A. 254.

2. In February 2021, EPA moved to stay the court of appeals' mandate with respect to vacatur of the CPP Repeal Rule while the agency pursued a new rulemaking on remand. J.A. 256-259. An accompanying agency declaration noted that the deadline for States to submit their plans under the CPP had "long since passed" and that, because of "ongoing changes in electricity generation," "the emissions reductions that the CPP was projected to achieve have already been achieved." J.A. 265. EPA urged that, to "promote regulatory certainty and to avoid the possibility of administrative disruption," "no Section 7411(d) rule should go into effect until [the agency's new rulemaking] is completed." J.A. 258.

No party opposed EPA's motion, J.A. 256, and the court of appeals "with[e]ld issuance of the mandate with respect to the vacatur of the [CPP] Repeal Rule until the EPA responds to the court's remand in a new rulemaking action," J.A. 270-271. The court issued its mandate with respect to vacatur of the ACE Rule. J.A. 272. Accordingly, although the court invalidated the CPP Repeal Rule, the court's partial stay of the mandate produces the same practical effect as if that Rule had been *upheld*: No Section 7411(d) rule governing CO_2 emissions from existing power plants is currently in effect, and no regulation will occur until EPA completes a new rulemaking. J.A. 268-269.

SUMMARY OF ARGUMENT

I. Petitioners lack standing to invoke this Court's jurisdiction because they are not injured by the court of

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EPA-HQ-2022-2545

appeals' decision. The court's partial stay of its mandate ensured that the CPP will never have any effect. The court's vacatur of the ACE Rule, and the consequent absence of *any* currently applicable Section 7411(d) regulation of greenhouse-gas emissions from existing power plants, does not harm petitioners. Petitioners' real concern is that EPA might incorporate some features of the CPP into a future Section 7411(d) rule. But the contours of such a rule are uncertain. Petitioners in substance request an advisory opinion about the types of measures a future rule could permissibly contain—but federal courts are not authorized to render advisory opinions.

The Court therefore should dismiss the certiorari petitions based on petitioners' lack of standing. In the alternative, the Court may wish to vacate the D.C. Circuit's holding that Section 7411 does not unambiguously limit EPA, in determining the BSER, to inside-the-fenceline measures—*i.e.*, "measures that apply at and to an individual source and reduce emissions from that source." J.A. 1893. Vacatur would be consistent with this Court's disposition of prior cases where changed circumstances beyond the challenging parties' control rendered further review unavailable.

II. The CPP Repeal and ACE Rules were premised on the view that the only measures States may incorporate into their plans, and the only measures EPA may include in the BSER, are inside-the-fenceline measures. The Rules viewed Section 7411 as unambiguously prohibiting not just generation shifting, but also other outside-the-fenceline measures such as biomass co-firing, averaging, and trading. That reading of the statute is erroneous.

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EPA-HQ-2022-2545

A. As to States, Section 7411(d)(1)(A) does not limit state plans to inside-the-fenceline measures. Petitioners themselves emphasize the need for state flexibility in determining which measures will best achieve compliance with EPA's emission limitations. Such flexibility is consistent with the framework of cooperative federalism that Section 7411(d) establishes, which vests States with substantial discretion. Section 7411(d)(1)(A) thus permits States, when appropriate, to adopt measures like biomass co-firing and trading in formulating "standards of performance for any existing source."

Under Section 7411(a)(1), EPA likewise is not limited to inside-the-fenceline measures in developing the BSER used to determine overall emission limitations. Nothing in the phrase "best system of emission reduction" excludes all outside-the-fenceline measures. Measures like biomass co-firing and trading could naturally be characterized as elements of a "system." Other CAA provisions use the term "system" or similar language to describe outside-the-fenceline measures. And the sequence of amendments to Section 7411 demonstrate that Congress did not intend to constrain the measures that EPA could consider in determining the BSER.

B. Petitioners offer various text-based arguments to support their view that a BSER may include only inside-the-fenceline measures and that generation shifting in particular is impermissible. Those arguments lack merit.

Petitioners rely in part on Section 7411(d)(1)(A)'s reference to "standards of performance for any existing source." That language, however, addresses the contents of States' plans, not of EPA's BSER. Narrowly construing that language to preclude outside-the-

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EPA-HQ-2022-2545

fenceline measures would thus unduly limit state discretion. A state plan that specifies how each source can achieve compliance is naturally characterized as establishing "standards of performance for" each source, even if measures like biomass co-firing and trading are identified as potential compliance measures.

Petitioners are likewise wrong in inferring an inside-the-fenceline limit from the phrase "application of the best system of emission reduction" in Section 7411(a)(1). Although a "system of emission reduction" consists of measures that individual sources apply, those measures need not be utilized by all sources equally. Under a trading program, for example, if one source achieves compliance by reducing its emissions and another by purchasing allowances, the "system" is still being applied to both, and the "best system" is the one that best reduces *aggregate* emissions.

Petitioners' arguments focused on generation shifting are likewise unsound. Even the most conventional emission-reduction measures are likely to have generation-shifting *effects*; most electricity is generated by diversified utilities that can and regularly do shift generation within their own assets; and the interconnected electricity grid ensures that reduced production at one facility will be offset by increased production at another, rather than leading to diminished production overall. Given those unique features of the power sector, Section 7411 does not categorically exclude generation shifting as a component of the BSER for existing power plants.

C. Petitioners' reliance on various interpretive canons is misplaced. Petitioners assert that the CPP addressed a "major question" and thus required specific congressional authorization. But while particular

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EPA-HQ-2022-2545

generation-shifting (or other outside-the-fenceline) measures in a BSER could sometimes have large practical consequences, such measures do not inherently have that effect (or any greater effect than inside-the-fenceline measures) and should not be deemed categorically impermissible. Indeed, hindsight shows that the emission limitations in the CPP would not have produced major consequences, as those limits were readily achieved in the absence of *any* regulation. And other Section 7411 requirements guard against transformative emission guidelines. The constitutional-avoidance and federalism canons likewise are inapplicable.

ARGUMENT

In promulgating the CPP Repeal and ACE Rules, EPA determined that Section 7411 clearly limits both state plans and EPA's BSER to inside-the-fenceline measures—"measures that apply at and to an individual source and reduce emissions from that source." J.A. 1893. The D.C. Circuit initially vacated both Rules, holding that Section 7411 does not unambiguously impose that limitation. At EPA's request, however, the court stayed the vacatur of the CPP Repeal Rule pending a new EPA rulemaking, effectively allowing the CPP to be repealed.

After the change in Administration and those intervening developments, EPA has reconsidered its position and has concluded that the text of Section 7411 does not unambiguously compel the interpretation adopted in the CPP Repeal and ACE Rules. Petitioners disagree with EPA on that abstract legal question. But petitioners lack standing to invoke this Court's jurisdiction because they are not injured by the decision below. The Court therefore should dismiss the certiorari petitions or, in the alternative, vacate the D.C. Circuit's

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EPA-HQ-2022-2545

holding that Section 7411 does not unambiguously preclude use of outside-the-fenceline measures. If the Court reaches the merits, it should affirm.

I. PETITIONERS LACK STANDING TO INVOKE THIS COURT'S APPELLATE JURISDICTION

To ensure that federal courts decide only "'Cases' or 'Controversies,'" a litigant that invokes the court's jurisdiction must demonstrate its "standing" to do so. *Hollingsworth* v. *Perry*, 570 U.S. 693, 704 (2013) (citation omitted). To establish standing, a litigant must show that (1) it has suffered an "'actual or imminent'" injury that is "concrete and particularized"; (2) the injury is "'fairly traceable to the challenged action'"; and (3) the injury is "'likely'" to be "'redressed by a favorable decision.'" *Lujan* v. *Defenders of Wildlife*, 504 U.S. 555, 560-561 (1992) (brackets, citations, and ellipsis omitted).

"Most standing cases consider whether a plaintiff has satisfied the requirement when filing suit, but Article III demands that an 'actual controversy' persist throughout all stages of litigation." *Hollingsworth*, 570 U.S. at 705 (citation omitted). "That means that standing 'must be met by persons seeking appellate review, just as it must be met by persons appearing in courts of first instance.'" *Ibid.* (citation omitted).

At this juncture, the relevant Article III question is whether the petitioners in this Court can establish an actual or imminent injury that is traceable to the D.C. Circuit's judgment and would be redressed by reversal of that judgment. See *Hollingsworth*, 570 U.S. at 705-707; *Arizonans for Official English* v. *Arizona*, 520 U.S. 43, 64-65 (1997); *Diamond* v. *Charles*, 476 U.S. 54, 61-71 (1986). Petitioners might contend that they have standing based on (a) the possibility that the D.C. Circuit's

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EPA-HQ-2022-2545

decision could cause the CPP to take effect; (b) the D.C. Circuit's vacatur of the ACE Rule; or (c) the possibility that an upcoming EPA greenhouse-gas rule might include outside-the-fenceline measures. None of those theories has merit. Gov't Br. in Opp. 17-20.

A. The Court Of Appeals' Decision Will Not Cause The CPP To Take Effect

By vacating the CPP Repeal Rule, the court of appeals' decision initially created a theoretical risk that, when the mandate issued, the CPP would take effect. Subsequent agency and judicial actions, however, eliminated any such possibility.

In February 2021, the government sought a stay of the mandate with respect to "the vacatur of the [CPP] Repeal Rule." J.A. 259. The motion explained that a stay "would remove any doubt about states' and regulated entities' obligations under the CPP during th[e] interim period" while the agency was promulgating a new rule governing power plants' greenhouse-gas emissions. J.A. 258. The motion stated that "EPA strongly believes that no Section 7411(d) rule should go into effect until such action is completed." *Ibid.* EPA's submission further explained that "reinstatement of the CPP would not make sense" because "[t]he deadline for states to submit State Plans under the CPP has already passed and, in any event, ongoing changes in electricity generation mean that the emission reduction goals that the CPP set for 2030 have already been achieved." J.A. 269 (footnote omitted). No party opposed the government's motion. J.A. 256.

The D.C. Circuit granted the government's motion, "withhold[ing] issuance of the mandate with respect to the vacatur of the [CPP] Repeal Rule *until the EPA responds to the court's remand in a new rulemaking*

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EPA-HQ-2022-2545

action." J.A. 270-271 (emphasis added). Because that stay will remain in place until EPA promulgates a new rule, the CPP will not become operative—thus producing the same result as the CPP Repeal Rule, which petitioners supported below. These circumstances have mooted the prior dispute as to the CPP Repeal Rule's legality. Petitioners therefore cannot establish standing to invoke this Court's appellate jurisdiction based on any harm they might suffer if the CPP took effect. Gov't Br. in Opp. 17.

B. Petitioners Are Not Injured By The Court Of Appeals' Vacatur Of The ACE Rule

With respect to the court of appeals' vacatur of the ACE Rule, the government did not seek—and the court did not grant—a stay of the mandate. J.A. 258, 271. That approach ensured that States and regulated entities were not forced to adapt their operations to comply with ACE Rule requirements that might then be superseded by a new EPA rulemaking. The immediate effect of the court's decision is that greenhouse-gas emissions from existing power plants are not subject to *any* regulation under Section 7411(d). Gov't Br. in Opp. 17-18.

A decision of this Court upholding the inside-the-fenceline interpretation that underlay the CPP Repeal and ACE Rules could lead to reinstatement of the ACE Rule during the pendency of EPA's upcoming rulemaking. But petitioners cannot demonstrate injury from the D.C. Circuit's vacatur of the ACE Rule, and they would derive no practical benefit from the Rule's reinstatement.

1. The private petitioners have no concrete interest in bringing about that result. Those petitioners seek to prevent what they view as *over*-regulation of existing coal-fired power plants. Although they preferred the

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EPA-HQ-2022-2545

ACE Rule to the CPP, the current absence of *any* federal greenhouse-gas regulation causes them no tangible harm.

2. The vacatur of the ACE Rule likewise causes no tangible injury to the state petitioners. States sometimes have standing to protect their sovereign or "quasi-sovereign" interests. See *Massachusetts* v. *EPA*, 549 U.S. 497, 518-520 (2007). But here, the D.C. Circuit's vacatur of the ACE Rule, and its decision not to stay that aspect of its mandate, relieved the States of their obligation to develop and enforce plans to implement that Rule, without imposing on them any alternative federal-law duty. The fact that no party opposed the government's motion for a partial stay of the court's mandate, or asked the D.C. Circuit to broaden the stay to encompass the court's vacatur of the ACE Rule, demonstrates that the vacatur did not injure the state petitioners. Absent any tangible effect on the state petitioners' regulatory prerogatives, their abstract disagreement with the D.C. Circuit's legal analysis does not confer standing. Cf. *Diamond*, 476 U.S. at 66 ("Article III requires more than a desire to vindicate value interests.").[1]

C. Petitioners Seek What Would In Substance Be An Impermissible Advisory Opinion Intended To Constrain EPA In Its Future Rulemaking

Petitioners' real concern is not with any extant EPA regulation, but with measures that the agency *might*

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[1] Because greenhouse-gas emissions in one State can contribute to environmental harms in other States, a State may in some circumstances have standing to challenge alleged EPA *under*-regulation of greenhouse-gas emissions. See *Massachusetts* v. *EPA*, 549 U.S. at 521-526. None of the state petitioners, however, has objected on that ground to the vacatur of the ACE Rule.

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EPA-HQ-2022-2545

adopt in its upcoming rulemaking to limit greenhouse-gas emissions from existing power plants. See, *e.g.*, NACC Br. 26 ("If the agency is not limited to source-level and source-achievable systems, the next [CPP] could be the 'Green New Deal.'"); WV Pet. 21 (urging the Court to grant review "to clarify EPA's legal framework from the outset"). In seeking an anticipatory ruling as to the limits of EPA's regulatory authority, petitioners request the sort of advisory opinion that Article III courts are barred from providing. See, *e.g.*, *TransUnion LLC* v. *Ramirez*, 141 S. Ct. 2190, 2203 (2021) (reaffirming that "federal courts do not issue advisory opinions" and "do not possess a roving commission to publicly opine on every legal question"); cf. *In re Murray Energy Corp.*, 788 F.3d 330, 334-336 (D.C. Cir. 2015) (Kavanaugh, J.) (holding that court lacked authority to review the proposed rule that was later finalized as the CPP because the proposed rule was not final agency action).

This Court has "repeatedly reiterated that 'threatened injury must be *certainly impending* to constitute injury in fact,' and that 'allegations of *possible* future injury' are not sufficient." *Clapper* v. *Amnesty Int'l USA*, 568 U.S. 398, 409 (2013) (brackets and citation omitted). EPA is legally obligated to promulgate a rule governing greenhouse-gas emissions from existing power plants, J.A. 258, but it is entirely speculative what specific measures that future rule will contain. Gov't Br. in Opp. 19-20; cf. J.A. 102-103 (D.C. Circuit leaves open the question "whether the approach of the ACE Rule is a permissible reading of the statute as a matter of agency discretion").

In determining anew the BSER, the agency will take into account this Court's decision to stay the CPP, see

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EPA-HQ-2022-2545

West Virginia v. *EPA*, 577 U.S. 1126 (2016); "changed facts and circumstances in the electricity sector that have occurred over the last several years," J.A. 259; and public comments of interested parties, including petitioners here, 42 U.S.C. 7607(d)(5). The need for the agency to consider those intervening developments, and the possibility of further changed circumstances during the pendency of the rulemaking, render it wholly uncertain whether any particular features of the CPP will be incorporated into a new EPA rule. Cf. *Clapper*, 568 U.S. at 410-414 (holding that plaintiffs' allegations were insufficient to establish standing because they depended on speculation as to the steps that both governmental and private actors might take). The Court accordingly should "put aside the natural urge to proceed directly to the merits of an important dispute and to 'settle' it for the sake of convenience and efficiency." *Hollingsworth*, 570 U.S. at 704-705 (brackets and citation omitted).

This Court has indicated that in some circumstances, a "substantial risk" of future harm may be sufficient to establish standing. *Susan B. Anthony List* v. *Driehaus*, 573 U.S. 149, 158 (2014) (citation omitted). This case, however, would be an especially unsuitable occasion to relax the usual requirement that injury be "certainly impending." The plaintiffs in *Susan B. Anthony List* challenged the constitutionality of specific enacted laws, and the only uncertainty concerned the likelihood that the laws would be enforced against them. See *id.* at 154, 161-167. Here, by contrast, petitioners are not currently subject to any federal greenhouse-gas restrictions; there is substantial uncertainty about the contours of the upcoming EPA rule; and petitioners ask the Court to pronounce on the validity of hypothetical regulatory provisions that the agency *might*—but very

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EPA-HQ-2022-2545

well *might not*—adopt. And when EPA ultimately promulgates a new rule governing greenhouse-gas emissions from existing power plants, that rule will be subject to immediate judicial review, see 42 U.S.C. 7607(b)(1), without the current need for speculation about its contents. See *Murray Energy*, 788 F.3d at 335 ("After EPA issues a final rule, parties with standing will be able to challenge that rule in a pre-enforcement suit, as well as to seek a stay of the rule pending judicial review."). In these circumstances, "[l]etting the Executive Branch's decisionmaking process run its course not only brings more manageable proportions to the scope of the parties' dispute, but also ensures that [the Members of this Court] act *as judges*, and do not engage in policymaking properly left to elected representatives." *Trump* v. *New York*, 141 S. Ct. 530, 536 (2020) (per curiam) (citations and internal quotation marks omitted).

D. This Court Should Dismiss The Certiorari Petitions For Lack Of Standing Or, In The Alternative, Vacate The D.C. Circuit's Holding That Section 7411 Does Not Unambiguously Preclude Outside-The-Fenceline Measures

Because petitioners cannot establish an injury that is traceable to the D.C. Circuit's decision and would be redressed by reversal of that court's judgment, the certiorari petitions should be dismissed "for want of jurisdiction." *Diamond*, 476 U.S. at 71 (dismissing because the appellant in this Court had not suffered any cognizable injury from the lower court's judgment).

In the alternative, the Court may wish to vacate the D.C. Circuit's holding that Section 7411 does not unambiguously bar outside-the-fenceline measures when EPA devises a BSER. Petitioners had a concrete stake in that issue at an earlier stage of this litigation, when

ED_006533_00001505-00030

EPA-HQ-2022-2545

vacatur of the CPP Repeal Rule might have caused the CPP to take effect. The changed circumstances that eliminated that possibility—in particular, the industry developments that rendered the specifics of the CPP obsolete, see J.A. 265, 269; EPA's decision to conduct a new rulemaking, see J.A. 258, 265; and the resulting partial stay of the court of appeals' mandate at the government's request, see J.A. 270-271—were outside petitioners' control.

This Court's "equitable tradition of vacatur" reflects the understanding that "[a] party who seeks review of an adverse ruling, but is frustrated by the vagaries of circumstance, ought not in fairness be forced to acquiesce in the judgment." *U.S. Bancorp Mortg. Co.* v. *Bonner Mall P'ship*, 513 U.S. 18, 25 (1994). This Court has most often employed vacatur to prevent that result when cases have become moot on appeal through "happenstance." *Id.* at 23 (citation omitted); see *United States* v. *Munsingwear, Inc.*, 340 U.S. 36, 39-41 (1950). The Court also has "broad power" to vacate "'any judgment, decree, or order'" of a lower court and to remand for proceedings "'as may be just under the circumstances.'" *Lawrence* v. *Chater*, 516 U.S. 163, 166 (1996) (per curiam) (quoting 28 U.S.C. 2106).

Here, the changed circumstances described above have deprived petitioners of their prior stake in the validity of the CPP Repeal Rule. And even if this Court's review on the merits could lead to reinstatement of the ACE Rule, petitioners lack any interest in producing that result. If this Court agrees that resolving the merits would be inappropriate, petitioners' efforts to obtain review of the disputed statutory interpretation will have been "frustrated by the vagaries of circumstance." *Bancorp*, 513 U.S. at 25; see *Biden* v. *Sierra Club*, 142

ED_006533_00001505-00031

EPA-HQ-2022-2545

S. Ct. 46, 46 (2021) (vacating the judgment below in light of "changed circumstances"). Vacatur of the D.C. Circuit's holding that Section 7411 does not unambiguously preclude outside-the-fenceline measures would ensure that judicial review of a future EPA greenhouse-gas rule is unconstrained by the precedential effect of the decision below, without the issuance by this Court of any anticipatory ruling on the merits of the disputed legal issues.[2]

II. THE CPP REPEAL AND ACE RULES RESTED ON AN ERRONEOUS VIEW OF SECTION 7411

The D.C. Circuit in this case did not review the CPP itself, but rather reviewed EPA's subsequent *repeal* of the CPP and its promulgation of the ACE Rule. Those regulatory actions rested on the view that the only measures EPA may consider in developing emission guidelines—and the only measures that States may include in their own plans—are so-called inside-the-fenceline measures. J.A. 1769, 1893. The Rules stated

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[2] The D.C. Circuit relied on substantially the same analysis in vacating the ACE Rule, but vacatur of that analysis should not cause the ACE Rule to become operative given EPA's position that "no Section 7411(d) rule should go into effect until" the future rulemaking concludes. J.A. 258. That issue could be addressed on remand. In addition, this Court should not vacate the D.C. Circuit's holding that EPA has authority under Section 7411 to regulate greenhouse-gas emissions from existing power plants. J.A. 176-198. As to that holding, petitioners were not deprived of further review by "happenstance." Rather, only the petitioner in No. 20-1778 sought review of that holding, and this Court denied review. Cf. *Camreta* v. *Greene*, 563 U.S. 692, 714 & n.11 (2011) (vacating the "part of the Ninth Circuit's opinion" that found the defendant officers' conduct unconstitutional, while leaving "untouched" the holding that the officers had qualified immunity).

ED_006533_00001505-00032

EPA-HQ-2022-2545

that the CAA's text unambiguously imposed that limitation, which would prohibit not just generation shifting, but also other outside-the-fenceline measures such as biomass co-firing, averaging, and trading. J.A. 103.

Neither Section 7411's text nor any applicable canon of construction compels that interpretation. The D.C. Circuit therefore correctly held that the Rules rested on an erroneous view of the law.

A. Section 7411 Does Not Unambiguously Compel The Interpretation In The CPP Repeal And ACE Rules

The CPP Repeal and ACE Rules adopted an interpretation of Section 7411 that applies to both States and EPA. No party here explicitly defends the view that Section 7411 unambiguously limits *States* to inside-the-fenceline measures. The statutory text likewise does not limit EPA to such measures.

1. The CPP Repeal and ACE Rules rest on an interpretation that limits both States and EPA to inside-the-fenceline measures

Under the interpretation adopted in the CPP Repeal Rule, the only measures that EPA may include in its BSER for existing sources are inside-the-fenceline measures—"measures that apply at and to an individual source and reduce emissions from that source." J.A. 1893; see J.A. 1769. In the ACE Rule, EPA determined that state plans "should correspond with the approach used to set the standard in the first place," J.A. 1894, and therefore likewise may include only inside-the-fenceline measures, J.A. 1893.

EPA nevertheless recognized that some off-site conduct might be essential to particular emission-control techniques. For example, the ACE Rule identified carbon capture and sequestration as a permissible inside-

ED_006533_00001505-00033

EPA-HQ-2022-2545

the-fenceline measure. J.A. 1733. But while that technique involves the on-site *capture* of CO_2, the *sequestration* of the captured gas occurs at off-site locations. J.A. 1854.

Under the inside-the-fenceline interpretation, what must occur at an individual source is the *reduction in emissions*. That was the ACE Rule's primary basis for excluding biomass co-firing as a permissible measure. J.A. 1850-1851, 1903-1904. Biomass captures and sequesters CO_2 while it grows off-site, J.A. 1851, and biomass co-firing involves using biomass as a secondary fuel on-site, cf. J.A. 1840. Despite increasing CO_2 emissions at a source's smokestack, biomass co-firing may, in certain circumstances, result in net CO_2 reductions if emissions are considered over the entire life cycle of the fuel. J.A. 1851. Although biomass co-firing occurs on-site, the ACE Rule deemed it an impermissible outside-the-fenceline measure because the CO_2 capture—and thus any attendant emission reduction—occurs elsewhere. J.A. 1904.

In addition, the inside-the-fenceline interpretation requires that a measure reduce emissions at *every* source. The ACE Rule therefore rejected averaging and trading as permissible measures. J.A. 1899-1903. An averaging program, for example, might require a group of facilities to reduce their average emissions to a particular level; so long as some facilities reduced their emissions sufficiently below that level, it would not be necessary for every facility to reduce its emissions. Cf. *Chevron U.S.A. Inc.* v. *Natural Res. Def. Council, Inc.*, 467 U.S. 837, 863 n.37 (1984) (explaining the "'bubble' or 'netting' concept"). Similarly, a trading program might allocate allowances authorizing a particular level

ED_006533_00001505-00034

EPA-HQ-2022-2545

of emissions, J.A. 1103; a facility would not need to reduce its emissions so long as it traded for sufficient allowances. See J.A. 1902 (observing that "some sources would not need to apply any pollution control techniques at all in order to comply with a cap-and-trade scheme"). Although averaging and trading programs give regulated sources flexibility to meet emission-reduction goals at the lowest possible cost, the ACE Rule deemed such programs impermissible because they would not require emission reductions from every source. J.A. 1901.

2. Section 7411(d)(1)(A) should not be construed to limit state plans to inside-the-fenceline measures

a. States have "traditional authority" over "in-state generation" of electricity. *Hughes* v. *Talen Energy Mktg., LLC*, 578 U.S. 150, 165 (2016). "Interstate air pollution," by contrast, is principally a matter of federal rather than state concern. J.A. 156.

Section 7411(d) reflects Congress's effort to strike an appropriate balance between federal and state prerogatives. For existing sources, "the Act adopts a cooperative-federalism approach that leaves the States discretion in determining how their State and industry can best meet quantitative emissions guidelines established by the EPA." J.A. 98. Section 7411(d) "envisions extensive cooperation between federal and state authorities, generally permitting each State to take the first cut at determining how best to achieve EPA emissions standards within its domain." *American Elec. Power Co.* v. *Connecticut*, 564 U.S. 410, 428 (2011) (*AEP*) (citation omitted).

b. Petitioners do not explicitly dispute that States may include outside-the-fenceline measures in the plans they develop to achieve EPA's emission limitations.

ED_006533_00001505-00035

EPA-HQ-2022-2545

Thus, NACC accepts (Br. 48) that state plans may include provisions for "emissions-trading or the like." North Dakota likewise recognizes that "States have 'wide discretion' in formulating their plans." ND Br. 38 (citation omitted); see WV Br. 27 (emphasizing States' "wide discretion").

Petitioners' emphasis on the need for state flexibility is consistent with the framework of cooperative federalism described above. It is inconsistent, however, with the ACE Rule's conclusion that the only measures States may use in their plans are inside-the-fenceline measures. J.A. 1893. It is also inconsistent with some petitioners' suggestion that Section 7411(d)(1)(A)'s reference to "standards of performance for any existing source" precludes reliance on outside-the-fenceline measures as the BSER. See NACC Br. I, 13, 33-34; WV Br. 31, 39. That language identifies the required contents of *state plans*, not of the BSER.

An artificially narrow construction of Section 7411(d)(1)(A) therefore would constrain state discretion and disserve the federalism values that petitioners emphasize, without furthering federal objectives. If particular outside-the-fenceline mechanisms are authorized by state law and would achieve compliance with EPA's emission guidelines, there is no sound basis to read Section 7411(d)(1)(A) as precluding those measures.

c. Nothing in Section 7411(d)(1) bars States from including outside-the-fenceline measures in their plans. Under Section 7411(d)(1), States must "establish[]," "implement[]," and "enforce[]" "standards of performance for any existing source." 42 U.S.C. 7411(d)(1). A state plan that specifies what each existing source must do to satisfy plan requirements is naturally characterized as establishing "standards of performance for

ED_006533_00001505-00036

EPA-HQ-2022-2545

[each] existing source," even if measures like biomass co-firing and trading are identified as potential means of compliance.

For example, assuming the existence of circumstances in which biomass co-firing could reduce CO_2 emissions, a State could allow each coal-fired plant the option of satisfying its standard of performance by co-firing with biomass. Any resulting reductions in emissions would rely on CO_2 capture that occurs during biomass growth, beyond each plant's fenceline. See p. 25, *supra*. But the State could still "implement[]" and "enforce[]" the "standard of performance for [each] existing source" by accounting for those reductions when determining whether a particular source had satisfied the standard. 42 U.S.C. 7411(d)(1).

A State likewise could allow each plant the option of satisfying its standard through trading. Numerous eastern States, for example, have created the Regional Greenhouse Gas Initiative, which allocates tradeable CO_2 emission allowances to regional power plants. See https://rggi.org. If Section 7411(d)(1) limited States to inside-the-fenceline measures, States could not rely on such trading programs to achieve EPA's emission limitations.

Section 7411(d) authorizes each State, "in applying a standard of performance to any particular source," to "take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies." 42 U.S.C. 7411(d)(1). That provision allows a State to "find that the costs" of a particular emission-reduction measure "are not reasonable when consideration is given to the timeframe for the planned retirement of the source." J.A. 1827. Trading programs likewise help to ensure that costs are reasonable by

ED_006533_00001505-00037

EPA-HQ-2022-2545

enabling market forces to identify the facilities whose emissions can be reduced most cost-effectively, J.A. 605-606, and nothing in Section 7411(d) precludes States from considering a source's acquisition of allowances in implementing and enforcing a standard of performance for that particular source.

d. Section 7411(d) requires a "procedure similar to that provided by section 7410." 42 U.S.C. 7411(d)(1). Consideration of the Section 7410 framework reinforces the absence of any inside-the-fenceline limit on the measures States may employ under Section 7411(d). Section 7410 is a provision of the NAAQS program, under which EPA promulgates national standards for certain air pollutants. 42 U.S.C. 7408(a); see 42 U.S.C. 7409(a). Each State then submits a plan that "provides for implementation, maintenance, and enforcement of such" standards, 42 U.S.C. 7410(a)(1), and "include[s] enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights)," 42 U.S.C. 7410(a)(2)(A).

"States have 'wide discretion' in formulating their plans" under Section 7410. *Alaska Dep't of Envtl. Conservation* v. *EPA*, 540 U.S. 461, 470 (2004) (citation omitted); see *Union Elec. Co.* v. *EPA*, 427 U.S. 246, 269 (1976) ("Congress plainly left with the States, so long as the national standards were met, the power to determine which sources would be burdened by regulation and to what extent."); *Train* v. *Natural Res. Def. Council, Inc.*, 421 U.S. 60, 79 (1975) ("[S]o long as the ultimate effect of a State's choice of emission limitations is compliance with the national standards for ambient air, the State is at liberty to adopt whatever mix of emission

ED_006533_00001505-00038

EPA-HQ-2022-2545

limitations it deems best suited to its particular situation."). Exercising that discretion, States have included outside-the-fenceline measures in their Section 7410 plans. See, *e.g.*, J.A. 430-435 (discussing NO_X and SO_2 trading programs in which States may participate to comply with Section 7410(a)(2)(D)(i)(I), the "Good Neighbor Provision"). Section 7410 thus does not distinguish between inside- and outside-the-fenceline measures, and there is no sound reason to read Section 7411's comparably broad language differently. See p. 37, *infra*.

3. Nothing in Section 7411(a)(1) unambiguously limits EPA's BSER to inside-the-fenceline measures

For the reasons stated above, Section 7411(d)(1)(A)'s requirement that each state plan "establish[] standards of performance for any existing source" does not limit state plans to inside-the-fenceline measures. So too nothing in Section 7411 unambiguously limits *EPA* to inside-the-fenceline measures in identifying the BSER used to determine overall emission limitations.

a. The standards of performance that States establish under Section 7411(d) must "reflect[] the degree of emission limitation," 42 U.S.C. 7411(a)(1), determined by EPA.[3] Section 7411(a) specifies that "the degree of

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[3] North Dakota contends (Br. 36) that EPA lacks authority to "determine what emission limitations are 'achievable' by existing sources." That contention, which was not addressed below, lacks merit. Unless EPA specifies "the degree of emission limitation achievable through application of" the BSER, 42 U.S.C. 7411(a)(1), States would lack meaningful guidance on what plans EPA would find "satisfactory," 42 U.S.C. 7411(d)(2)(A). EPA's regulations therefore require the agency to specify the degree of emission limitation achievable, 40 C.F.R. 60.22a(b)(5), and the ACE Rule itself

ED_006533_00001505-00039

EPA-HQ-2022-2545

emission limitation" be that degree "achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." *Ibid.* EPA thus determines the degree of emission limitation achievable based on "application of the best system of emission reduction." *Ibid.*

A "system" is "[a]n aggregation or assemblage of objects united by some form of regular interaction or interdependence," or "a definite or set plan of ordering, operating, or proceeding." *Webster's New International Dictionary of the English Language* 2562 (2d ed. 1959) (emphasis omitted); see J.A. 108. That definition encompasses inside- and outside-the-fenceline measures alike, including biomass co-firing and trading. Cf. *EPA* v. *EME Homer City Generation, L. P.*, 572 U.S. 489, 503 n.10 (2014) (describing a "'cap-and-trade'" program as a "system" that "cuts costs while still reducing pollution to target levels").

Other CAA provisions use "system" and similar words to describe outside-the-fenceline measures. For example, a provision establishing the Acid Rain Program uses the phrase "emission allocation and transfer system" to describe a trading program for reducing sulfur- and nitrogen-oxide emissions from power plants. 42 U.S.C. 7651(b). And Section 7410 specifies that "control measures, means, or techniques" "includ[e] economic incentives such as" "marketable permits" and "auctions of emissions rights." 42 U.S.C. 7410(a)(2)(A).

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recognized that EPA must do so "as part of the BSER determination," J.A. 1811.

ED_006533_00001505-00040

EPA-HQ-2022-2545

b. Some CAA provisions have explicitly limited the permissible components of a particular "system." In 1977, Congress amended Section 7411 to create separate definitions of "standard of performance" for new and existing sources. CAA Amendments of 1977, Pub. L. No. 95-95, § 109(c)(1)(A), 91 Stat. 700. The definition applicable to new sources used the phrase "best *technological* system of *continuous* emission reduction." *Ibid.* (emphases added). And the definition applicable to existing sources used the phrase "best system of *continuous* emission reduction." *Ibid.* (emphasis added). In 1990, Congress amended Section 7411 to return to a single "standard of performance" definition that omitted those qualifiers. CAA Amendments of 1990, Pub. L. No. 101-549, § 403(a), 104 Stat. 2631; see Clean Air Amendments of 1970, Pub. L. No. 91-604, § 4(a), 84 Stat. 1683. But the phrase "technological system of continuous emission reduction" remains in certain Section 7411 provisions that do not apply here. *E.g.*, 42 U.S.C. 7411(a)(7), (g)(4)(B), (h)(1) and (j)(1)(C). That statutory history and context suggest a conscious congressional rejection of any "technological, at-the-source limitation" on the measures that EPA may include in the BSER for existing sources. J.A. 125.

Other CAA provisions similarly underscore the "comparative generality of Section 7411(a)'s reference to the 'best system of emission reduction.'" J.A. 120. In the Nitrogen Oxides Emission Reduction Program, Congress directed EPA to establish emission limitations based on the "degree of reduction achievable through the retrofit application of the best system of continuous emission reduction, taking into account available technology, costs and energy and environmental impacts." 42 U.S.C. 7651f(b)(2). And in a program for preventing

ED_006533_00001505-00041

EPA-HQ-2022-2545

visibility impairment, Congress directed state implementation plans to require use of the "best available retrofit technology." 42 U.S.C. 7491(b)(2)(A) and (g)(2). The absence of similar limiting language here indicates that Congress did not intend such limits.

B. Petitioners' Text-Based Arguments Lack Merit

In challenging the decision below, petitioners rely principally on various non-textual canons of statutory construction. See, *e.g.*, WV Br. 14-31, 44-49; NACC Br. 16-32. Statutory interpretation, however, "always" begins with the text. *Van Buren* v. *United States*, 141 S. Ct. 1648, 1654 (2021).

Petitioners' text-based arguments fall into two categories: (1) arguments that EPA, in determining the BSER, is categorically barred from considering outside-the-fenceline measures; and (2) arguments that EPA specifically may not consider generation shifting. Neither set of arguments has merit.

1. Petitioners' arguments do not support a categorical rule against inclusion of outside-the-fenceline measures in the BSER

a. In defending a categorical rule that EPA cannot include outside-the-fenceline measures as components of its BSER, petitioners make several arguments based on the text of Section 7411(d). See, *e.g.*, WV Br. 39-41; NACC Br. 33-36. But the language on which they principally rely is directed at *States*, not EPA. Under Section 7411(d)(1), "each State" must submit a plan that "establishes standards of performance for any existing source" and "provides for the[ir] implementation and enforcement." 42 U.S.C. 7411(d)(1). Petitioners do not explain how that language could limit EPA to inside-the-fenceline measures without imposing the same limit

ED_006533_00001505-00042

EPA-HQ-2022-2545

on States, in derogation of both petitioners' own arguments and the States' broad discretion under the framework of cooperative federalism that Section 7411(d) establishes. See pp. 26-27, *supra*.

In any event, petitioners' effort to infer an inside-the-fenceline limit from the language of Section 7411(d) fails. Petitioners emphasize that States must establish "standards of performance for any existing *source*" (singular). 42 U.S.C. 7411(d)(1) (emphasis added); see WV Br. 34, 39-41; NACC Br. 33-35. But as explained above, that language simply means that States must hold each source (singular) to a particular "standard for emissions of [the] air pollutant[]." 42 U.S.C. 7411(a)(1); see pp. 27-28, *supra*. Nothing about that requirement distinguishes measures like heat-rate improvements and carbon capture and sequestration, on one hand, from measures like biomass co-firing and trading, on the other. See pp. 27-29, *supra*.

Petitioners also emphasize that the statute defines "stationary source" as a "building, structure, facility, or installation which emits or may emit any air pollutant." 42 U.S.C. 7411(a)(3); see WV Br. 40; NACC Br. 36. Based on that definition, petitioners argue that any standard of performance must apply to the building itself rather than to its "owner or operator," which is a separately defined phrase, 42 U.S.C. 7411(a)(5). But as explained above, inside- and outside-the-fenceline measures alike are compatible with a State's establishment, implementation, and enforcement of standards for each regulated facility. See pp. 27-29, *supra*. That the standards must be "for" a source does not mean that all emission reductions must occur *at* the source.

Section 7411's definition of "stationary source" likewise does not imply that States may rely only on

ED_006533_00001505-00043

EPA-HQ-2022-2545

measures that physically occur within the facility itself. After all, the ACE Rule regarded carbon capture and sequestration as an inside-the-fenceline measure, even though the sequestration occurs off-site. J.A. 1733; see pp. 24-25, *supra*. And Section 7411 itself identifies "pre-combustion cleaning or treatment of fuels" as a type of "system" of "emission reduction," even though such cleaning or treatment may be conducted off-site by third parties. 42 U.S.C. 7411(a)(7)(B); see J.A. 751-752.

b. Petitioners view an inside-the-fenceline limitation as implicit in the phrase "application of the best system of emission reduction." 42 U.S.C. 7411(a)(1). They contend that the unstated indirect object of that phrase is an existing source; that the phrase therefore should be read to refer to the application of the best system of emission reduction *to* or *for* an existing source; and that outside-the-fenceline measures lack the requisite connection to any particular source. WV Br. 37-38; NACC Br. 36-37. That contention lacks merit.

A "system of emission reduction" consists of measures that individual sources apply—whether those measures are heat-rate improvements or trading. But contrary to petitioners' suggestion, those measures need not be utilized by all sources equally. The BSER may reflect the agency's determination that overall emissions can best be reduced by taking account of the ways in which different sources are differently situated. Under a trading program, for example, market forces can identify the facilities whose emissions can be reduced most cost-effectively. J.A. 605-606. If one source achieves compliance by reducing its emissions and another by purchasing allowances, the "system" is still being applied to both, and the "best system" is the one that best reduces *aggregate* emissions.

ED_006533_00001505-00044

EPA-HQ-2022-2545

Notably, when EPA "tak[es] into account" "cost" and "any nonair quality health and environmental impact and energy requirements," it does so by considering the "application of the best system of emission reduction" across the board—*i.e.*, to all existing regulated sources in the aggregate. 42 U.S.C. 7411(a)(1); see, *e.g.*, J.A. 1843-1844. Even in promulgating the ACE Rule, EPA recognized that "energy requirements" could be considered on a "sector-wide, region-wide or nationwide basis." J.A. 1795 n.152. EPA then rejected natural-gas co-firing as a possible component of the BSER in part because co-firing natural gas in coal-fired plants is not the "best" use of the country's natural-gas supply, which would be put to "more efficient use" in "under-utilized" natural-gas combined-cycle plants. J.A. 1843.

Petitioners' reliance on the word "achievable" (*e.g.*, WV Br. 35-36) is likewise misplaced. It is the "degree of emission limitation" that must be "achievable." 42 U.S.C. 7411(a)(1). And the "degree of emission limitation achievable"—like "cost," "nonair quality health and environmental impact," and "energy requirements"—is evaluated based on "application of the best system of emission reduction" across the board. *Ibid.*

c. Petitioners argue (NACC Br. 42) that, if Congress had intended to "grant the EPA power to institute industry-wide 'systems' like cap-and-trade regimes," it would have used more specific language, as it did in the Acid Rain Program. But EPA's authority to determine the BSER does not encompass the power to institute any industry-wide system. Rather, EPA's determination of the BSER is merely an intermediate step in its identification of overall emission limitations, and the ultimate decision whether to use trading programs to

ED_006533_00001505-00045

EPA-HQ-2022-2545

achieve those limitations is made by States in developing their own plans, whether or not EPA includes such programs in its BSER. In that respect, determination of the BSER differs fundamentally from the Acid Rain Program, which directly instituted a federal trading system of nationwide scope. See 42 U.S.C. 7651b(a)(1). For similar reasons, petitioners' reliance (NACC Br. 26-27) on various bills proposed in Congress is misplaced. Because those bills would have directly instituted federal trading or other programs, Congress's failure to enact them does not suggest anything about either States' discretion under Section 7411(d)(1) or EPA's determination of the BSER under Section 7411(a)(1).

Petitioners also contend that, when Congress wished to "approve[] market-based trading options" under Section 7410, it "sa[id] so directly." WV Br. 42. But Section 7410 requires state plans to contain "enforceable emission limitations and other control measures, means, or techniques (*including* economic incentives such as fees, marketable permits, and auctions of emissions rights)." 42 U.S.C. 7410(a)(2)(A) (emphasis added). The "term 'including' * * * connotes simply an illustrative application of the general principle." *Federal Land Bank* v. *Bismarck Lumber Co.*, 314 U.S. 95, 100 (1941). Section 7410(a)(2)(A)'s language thus demonstrates that Congress viewed "economic incentives" as "control measures, means, or techniques" within the meaning of that provision. Section 7410 accordingly provides no sound basis to read the comparably broad term "system of emission reduction" to exclude market-based trading regimes.

d. Petitioners are likewise wrong in asserting (NACC Br. 47-48) that the CPP was the first time EPA had included outside-the-fenceline measures in a BSER

ED_006533_00001505-00046

EPA-HQ-2022-2545

under Section 7411. In the 2005 Clean Air Mercury Rule, EPA determined that a "cap-and-trade program" is a "'system of emission reduction.'" 70 Fed. Reg. 28,606, 28,616 (May 18, 2005). EPA noted that it had previously "authorized emissions trading under [Section 7411(d)]" in emission guidelines for existing municipal waste combustors. *Id.* at 28,617; see 40 C.F.R. 60.33b(d)(2) ("A State plan may establish a program to allow owners or operators of municipal waste combustor plants to engage in trading of nitrogen oxides emission credits."). EPA then determined that "a cap-and-trade program based on control technology * * * is the best system for reducing [mercury] emissions from existing coal-fired Utility Units," 70 Fed. Reg. at 28,617, emphasizing that such a program would ensure that reductions "will be achieved with the least cost," *id.* at 28,619.

Petitioners observe that the "emission cap" in that cap-and-trade program was based on the availability of certain "technologies necessary to achieve" that cap. 70 Fed. Reg. at 28,620; see NACC Br. 47-48. But under the inside-the-fenceline approach adopted in the CPP Repeal Rule, any trading program would be invalid regardless of how EPA calculated the cap. See J.A. 1899-1900 & n.251 (acknowledging a departure from "EPA's interpretation" in the Clean Air Mercury Rule); cf. *New Jersey* v. *EPA*, 517 F.3d 574, 583-584 (D.C. Cir. 2008) (vacating the Rule on other grounds).

2. *Petitioners' arguments focused on generation shifting are unsound*

Petitioners' remaining text-based arguments rest on the understanding that the words "performance" and "existing" in Section 7411(d)(1)(A) presume that an existing source will continue to exist and to perform, and that the words "limitation" and "reduction" in Section

ED_006533_00001505-00047

EPA-HQ-2022-2545

7411(a)(1) imply the lowering, but not the elimination, of emissions from an existing source. See NACC Br. 35, 39-41; WV Br. 34-36. Those arguments have no bearing on whether the BSER may include measures like biomass co-firing, averaging, and trading—each of which can reduce overall emissions even if every existing source continues to produce the same amount of electricity. Those arguments consequently do not support the categorical rule against outside-the-fenceline measures adopted in the CPP Repeal and ACE Rules. Rather, those arguments are specific to whether generation shifting is a permissible component of the BSER—and they are unpersuasive as a basis to bar *all* generation-shifting measures.

a. Given the unique features of the power sector, Section 7411 does not categorically exclude generation shifting as a component of the BSER for existing power plants. That is so for three principal reasons.

First, "[*a*]*ny* regulation of power plants—even the most conventional, at-the-source controls—may cause a relative increase in the cost of doing business for particular plants but not others, with some generation-shifting effect." J.A. 151. "[A]lmost all electricity flows * * * through an interconnected 'grid' of near-nationwide scope." *FERC* v. *Electric Power Supply Ass'n*, 577 U.S. 260, 267 (2016) (*EPSA*). "On the grid, there is no coal-generated electricity or renewable-generated electricity; there is just electricity." J.A. 78. And within the grid's dispatch system, "production from 'generators with the lowest variable costs' will be dispatched 'first, as system operational limits allow, until all demand is satisfied.'" J.A. 87 (citation omitted); see *EPSA*, 577 U.S. at 268-269. Thus, if a given emission-reduction

ED_006533_00001505-00048

EPA-HQ-2022-2545

measure makes one power plant's operations more expensive than those of other sources, that will cause generation to shift, as the grid draws more heavily on those other sources for electricity. J.A. 897.

If EPA were foreclosed from including in its BSER any measure that would predictably cause some facilities to "diminish[] [their] capacity" (NACC Br. 35) or engage in "reduced utilization" (Westmoreland Br. 19), it could not formulate a BSER for power plants at all. Petitioners' argument thus must rest on the premise that Section 7411 unambiguously distinguishes between (a) measures that will predictably cause some generation shifting but that are included in the BSER for other reasons and (b) measures that EPA includes in a BSER *because of* their expected generation-shifting effects. But petitioners identify no statutory language that mandates that distinction. Measures that fall in the latter category can be just as compatible with a State's establishment, implementation, and enforcement of "standards of performance" that specify how each "existing source" can comply. 42 U.S.C. 7411(d)(1). And nothing in the phrase "system of emission reduction" suggests a categorial bar against generation-shifting measures. 42 U.S.C. 7411(a)(1).

Second, even in the absence of regulation, generation shifting is ubiquitous in the power sector because "most electricity is generated by diversified utilities" that can and regularly do shift generation simply by "reassessing the dispatch priority of their own assets." J.A. 87; see J.A. 937-939. For example, many natural-gas combined-cycle plants "are owned by the same companies or affiliates that also own steam units." J.A. 898. In such circumstances, the steam units can shift generation to the lower-emitting natural-gas combined-cycle

ED_006533_00001505-00049

EPA-HQ-2022-2545

plants "without the need to engage in separate market transactions with outside parties." *Ibid.* Nothing in the statutory language requires EPA to ignore that such generation-shifting measures are routinely undertaken by diversified utilities to "ensur[e] delivery of a reliable source of power at least cost to consumers." Power Company Respondents Br. in Opp. 21.

Third, based on the unique features of the interconnected electricity grid, a categorical bar on generation shifting is not necessary to avoid reducing overall production of electricity. In promulgating the CPP, EPA recognized that in prior Section 7411 rulemakings, "the focus for the BSER has been on how to most cleanly produce a good, not on limiting how much of the good can be produced." J.A. 809; see J.A. 813-814 (explaining that EPA has interpreted Section 7411 to "target[] supply-side activities," rather than "consumer-oriented behavior," and rejecting demand-side energy-efficiency measures as part of the BSER). With respect to many source categories, requirements that are intended to reduce some sources' production might have the predictable effect of reducing *overall* production. With respect to the particular source category at issue here, however, "[t]he physical properties of electricity and the highly integrated nature of the electricity system," J.A. 805, ensure that decreased production at some sources will be offset by increased production at others, thereby reducing overall emissions "without reducing overall electricity generation," J.A. 812.

b. Petitioners contend (NACC Br. 24) that the logical implication of allowing generation shifting to be a component of the BSER is that EPA could determine that the BSER is to "cancel coal entirely" or to "reduce the[] operations" of "gas-fired plants" to "two hours per

ED_006533_00001505-00050

EPA-HQ-2022-2545

day." Although petitioners are correct that those hypothetical BSERs would be impermissible, it is not because they would contravene any inside-the-fenceline limit; instead, it is because they would contravene the express constraints Congress wrote into the statute.

Section 7411(d) does not require the maximum degree of pollution control. See *Sierra Club* v. *Costle*, 657 F.2d 298, 330 (D.C. Cir. 1981). It instead requires EPA to balance "the environmental benefit potentially achievable" against "our Nation's energy needs and the possibility of economic disruption." *AEP*, 564 U.S. at 427. Accordingly, a "system of emission reduction" must be "adequately demonstrated," 42 U.S.C. 7411(a)(1)—that is, "reasonably reliable," "reasonably efficient," and "reasonably" "expected to serve the interests of pollution control without becoming exorbitantly costly in an economic or environmental way." *Essex Chem. Corp.* v. *Ruckelshaus*, 486 F.2d 427, 433 (D.C. Cir. 1973), cert. denied, 416 U.S. 969 (1974). And in determining which among "adequately demonstrated" systems is "best," EPA must weigh "cost" and "energy requirements." 42 U.S.C. 7411(a)(1); see J.A. 1795 n.152, 1826. The cost of the system must not be "unreasonable" or "greater than the industry could bear and survive." J.A. 1826 (citations omitted).

Those statutory criteria would rule out petitioners' hypothetical BSERs. Petitioners' imagined BSERs would not be "adequately demonstrated" or "best" because, among other things, they would be exorbitantly costly for ratepayers, J.A. 311-312; would threaten the reliability of the grid, J.A. 1260; and would violate EPA's longstanding view that closures cannot be the basis for pollution-control requirements, J.A. 819-820.

ED_006533_00001505-00051

EPA-HQ-2022-2545

In any event, to the extent petitioners' concern is that some levels of generation shifting could be unduly stringent, that concern provides no sound basis for categorically excluding *all* generation shifting as a permissible component of the BSER. There is no inherent connection between including generation shifting in the BSER and any particular "level of stringency." J.A. 590. Rather, the level of stringency will depend on the amount of generation shifting that EPA determines to be "adequately demonstrated" and part of the "best" system. 42 U.S.C. 7411(a)(1). Thus, a rulemaking could include generation-shifting measures in the BSER, yet conclude that the statutory criteria justified overall emission limitations that were relatively undemanding—creating no risk of the consequences that petitioners imagine.

c. Petitioners also contend (NACC Br. 25) that, unless this Court rejects generation shifting as a permissible component of the BSER, EPA could adopt generation-shifting measures for "*other* parts of the economy." For example, petitioners hypothesize (*ibid.*) emission guidelines for existing "homes" based on a BSER involving the replacement of gas furnaces with solar-powered units. But petitioners' imagined BSER operates entirely within a home's fenceline, involving the substitution of one technology for another. Thus, petitioners' own inside-the-fenceline interpretation would not preclude their hypothetical rule.

Petitioners' hypothetical rule is problematic not because it contravenes any supposed inside-the-fenceline limit, but rather because it violates the constraints in the statutory text. EPA could not issue emission guidelines for "homes" under Section 7411 in the first place. Cf. *Utility Air Regulatory Group* v. *EPA*, 573 U.S. 302,

ED_006533_00001505-00052

EPA-HQ-2022-2545

324 (2014) (*UARG*) (declining to interpret the CAA in a manner that would require permits for the operation of millions of previously unregulated "small sources nationwide"); J.A. 815. But even if homes could be regulated, the constraints in Section 7411(a)(1)—namely, the requirements that a system be "adequately demonstrated" and of reasonable "cost"—would preclude a BSER involving the installation of solar panels on tens of millions of homes. Petitioners' hypotheticals accordingly provide no support for their interpretation of the statute.

C. Petitioners' Reliance On Various Interpretive Canons Is Misplaced

In defending the CPP Repeal Rule, petitioners also rely on several canons of construction. None of those canons can justify reading "additional, extratextual, and inflexibly categorical limitations into [the] statute." J.A. 146.

1. Petitioners cannot support their interpretation by characterizing the CPP as involving a "major question"

Petitioners contend that what measures EPA may consider in determining the BSER raises a major question of economic and political significance, and that Congress must specifically authorize the agency to consider outside-the-fenceline measures for EPA to do so. See, *e.g.*, WV Br. 14-26. For six principal reasons, that argument lacks merit.

First, the assertion that the CPP involved a major question could not justify a narrowing construction of Section 7411(d)(1)(A)'s reference to "standards of performance for any existing source." That language is not

ED_006533_00001505-00053

EPA-HQ-2022-2545

directed at EPA, but instead specifies the required contents of *state* plans. This Court has never constrained the *States'* discretion based on the economic and political consequences of a federal regulation. And given petitioners' (appropriate) emphasis on Congress's intent that States have flexibility in implementing EPA's Section 7411 emission guidelines, it would be perverse to resolve any ambiguities in Section 7411(d)(1)(A) in a way that *restricts* state discretion. See pp. 26-30, *supra*.

Second, EPA's task of determining the BSER is an interstitial one that involves fact-finding of a type well suited to EPA. Congress has enacted a definition of "air pollutant" that unambiguously encompasses CO_2. See *Massachusetts* v. *EPA*, 549 U.S. at 528-529. Congress has spoken "'directly' to emissions of carbon dioxide from [existing power] plants." *AEP*, 564 U.S. at 424. And Congress has established the framework through which such emissions shall be regulated, requiring EPA to announce overall emission limitations based on "scientific, economic, and technological" judgments that EPA is well equipped to make, *id.* at 428, while giving States broad flexibility to decide how compliance can best be achieved. 42 U.S.C. 7411(a)(1) and (d)(1).

As an intermediate step in EPA's identification of the overall emission limitations, determining the BSER involves no direct regulation of private conduct. EPA's identification of the BSER is not a "mandate" (NACC Br. 1) to use the particular measures identified therein. The BSER "assures that there is at least one pathway" that States and affected sources can take to "achieve[] the requisite level of emission reductions." J.A. 560. But States need only adopt standards of performance that "*reflect*[] *the degree of emission limitation achievable* through the application of the [BSER]." 42 U.S.C.

ED_006533_00001505-00054

EPA-HQ-2022-2545

7411(a)(1) (emphasis added). States need not adopt, or compel regulated sources to adopt, the particular measures that the BSER describes. J.A. 144. Because determining the BSER involves no direct regulation of private conduct, it is unlike the power to issue an emergency temporary standard in *National Federation of Independent Business* v. *Department of Labor*, No. 21A244, 2022 WL 120952, at *1-*3 (U.S. Jan. 13, 2022) (*NFIB*) (per curiam), the power to impose an eviction moratorium in *Alabama Ass'n of Realtors* v. *Department of Health & Human Services*, 141 S. Ct. 2485, 2488 (2021) (per curiam), or the power to regulate assisted suicide in *Gonzales* v. *Oregon*, 546 U.S. 243, 267-268 (2006).

Third, EPA's inclusion or exclusion of outside-the-fenceline measures in determining the BSER bears no necessary connection to the stringency of the BSER and thus how impactful the emission guidelines will be. See p. 43, *supra*. The line that the ACE Rule drew between heat-rate improvements and carbon capture and sequestration, on one hand, and biomass co-firing, averaging, and trading, on the other, does not represent the line between ordinary and major consequences. A BSER that includes turbine upgrades as a heat-rate improvement, for instance, might well entail more costly emission limitations than a BSER that includes biomass co-firing. See J.A. 1820 (discussing the "economic[] feasib[ility]" of "turbine blade path upgrades" in light of the need for "capital investments"); cf. J.A. 1864 (rejecting carbon capture and sequestration as the BSER because of its "high costs"). And for any given level of overall emission reduction, implementation of a market-based trading scheme would help to reduce the cost of achieving compliance.

ED_006533_00001505-00055

EPA-HQ-2022-2545

Fourth, to the extent petitioners expected the CPP to have significant effects on the power sector, that expectation arose from the specific emission limitations that the CPP established, which petitioners viewed as achievable only through major changes to the industry. In fact, even without the CPP in effect, by 2019 the power industry had *already* achieved the supposedly impossible emission reductions the CPP sought to produce by 2030. J.A. 265, 1785. Those reductions were achieved in a short period of time as a result of "significant generation shifting" due to "[m]arket-based forces." J.A. 1785; see J.A. 1672-1673, 1678-1680.

But even putting to one side that petitioners' predictions turned out to be wholly inaccurate, significant effects are not an inherent consequence of outside-the-fenceline measures generally, or of generation-shifting mechanisms in particular. See pp. 43, 46, *supra*. In that respect, this case is fundamentally different from *FDA* v. *Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 135-143 (2000), where the logical implication of the FDA's findings was that the governing statute would require the agency to ban tobacco products entirely, and *UARG*, 573 U.S. at 324, where the consequence of EPA's findings was that the CAA would "require permits for the construction and modification of tens of thousands, and the operation of millions, of small sources nationwide."

Here, by contrast, recognizing EPA's *authority* to include some generation-shifting mechanisms (or outside-the-fenceline measures more generally) in its BSER would not *compel* the agency to utilize such measures at all, let alone to utilize the most impactful versions of them. Petitioners' argument is in essence that, because EPA's claimed power to include generation-shifting

ED_006533_00001505-00056

EPA-HQ-2022-2545

mechanisms in a BSER was previously used in the CPP in a way that was expected (incorrectly) to have significant consequences, whether EPA has that power *at all* should be viewed as a major question. But the fact that *some* exercises of an agency's statutory power might be so consequential as to require specific authorization from Congress does not mean that *all* exercises of that authority are categorically impermissible. In *NFIB*, for example, the Court held that Congress had not clearly authorized the Occupational Health and Safety Administration (OSHA) to adopt measures applicable to all employers with at least 100 employees to prevent the workplace spread of COVID-19. 2022 WL 120952, at *3. But the Court "d[id] not doubt" that OSHA had authority to adopt such requirements "[w]here the virus poses a special danger because of particular features of an employee's job or workplace." *Id.* at *4. Petitioners accordingly err in urging this Court to hold that all outside-the-fenceline measures are impermissible, regardless of the practical significance or insignificance of the particular measures EPA will eventually adopt in the future rulemaking.

If regulated entities or States believe that the emission guidelines that are eventually adopted are too stringent in light of statutory criteria, they can challenge the guidelines on that ground. In such a challenge (unlike in petitioners' current request for an anticipatory ruling, see pp. 18-21, *supra*), the court could evaluate the likely practical consequences of EPA's choice of a BSER. Thus, even if petitioners' characterizations of the CPP are viewed as apt criticisms of the CPP itself, they provide no sound basis for categorically excluding *any* outside-the-fenceline measures as a permissible component of the BSER.

ED_006533_00001505-00057

EPA-HQ-2022-2545

Fifth, the "numerous substantial and explicit constraints" that Section 7411 imposes already guard against the possibility of emission guidelines that have transformative consequences. J.A. 146. As noted, a "system of emission reduction" must be "adequately demonstrated," and EPA must consider, among other things, "cost" and "energy requirements" in determining which system is "best." 42 U.S.C. 7411(a)(1); see p. 42, *supra*.

Far from being "illusory," NACC Br. 29, those constraints have led EPA in prior rulemakings to exclude from the BSER several measures, including natural-gas repowering and refueling, J.A. 1795 n.152; natural-gas co-firing, J.A. 578, 1843-1844; carbon capture and sequestration, J.A. 578, 1864; and biomass co-firing, J.A. 708-709, 1852-1853. In the CPP, for instance, EPA declined to identify natural-gas co-firing or carbon capture and sequestration as part of the BSER because those measures were "more expensive than other available measures for existing sources." J.A. 578. Recent history thus refutes petitioners' assertion (WV Br. 48) that, without a categorical bar on outside-the-fenceline measures (or generation-shifting measures in particular), EPA's authority to define the BSER would be subject to no meaningful limit.

Sixth, the inclusion of outside-the-fenceline measures in the BSER is supported by historical precedent. Both Congress and States have relied on outside-the-fenceline measures to address air pollution from power plants. See p. 28, *supra* (discussing Regional Greenhouse Gas Initiative); p. 31, *supra* (discussing Acid Rain Program's trading system for power plants). And in the Clean Air Mercury Rule—the only Section 7411(d) emission guideline besides the CPP and the ACE Rule

ED_006533_00001505-00058

EPA-HQ-2022-2545

ever issued for existing power plants—EPA likewise included an outside-the-fenceline measure (a trading program) in the BSER. See pp. 37-38, *supra*.

2. The constitutional-avoidance canon is inapplicable here

Petitioners also invoke the canon that statutes should be construed to avoid difficult constitutional issues. They argue that Section 7411 would raise serious nondelegation concerns if it were construed to allow outside-the-fenceline measures to be included in a BSER. WV Br. 47. This Court has long held, however, that "a delegation is constitutional so long as Congress has set out an 'intelligible principle' to guide the delegee's exercise of authority." *Gundy* v. *United States*, 139 S. Ct. 2116, 2129 (2019) (plurality opinion) (citation omitted). In *Whitman* v. *American Trucking Ass'ns*, 531 U.S. 457 (2001), this Court held that a neighboring CAA provision—42 U.S.C. 7409(b)(1)—had provided such a principle by "requiring the EPA to set air quality standards at the level that is 'requisite' * * * to protect the public health with an adequate margin of safety." 531 U.S. at 475-476.

The principle set out in Section 7411(a)(1) is no less intelligible. That provision requires EPA to determine the BSER, and ultimately the degree of emission limitation achievable by the BSER, by taking various enumerated factors into account. 42 U.S.C. 7411(a)(1). If Section 7409(b)(1) falls "well within the outer limits of [this Court's] nondelegation precedents," *Whitman*, 531 U.S. at 474, then so too does Section 7411(a)(1).

ED_006533_00001505-00059

EPA-HQ-2022-2545

3. The federalism canon undermines, rather than supports, the interpretation adopted in the CPP Repeal and ACE Rules

Petitioners argue (WV Br. 29) that the CPP "upend[ed] the federal-state balance of power" by requiring "stringent, region-wide emission reductions that state plans could meet only by restructuring" the power sector. But petitioners' concerns about the perceived stringency of the CPP's emission limitations do not support a categorical rule excluding outside-the-fenceline measures from any BSER. See pp. 47-48, *supra*. The language in Section 7411(d)(1)(A) on which some petitioners rely, moreover, is directed at States, not EPA. Construing that language to foreclose inclusion of outside-the-fenceline measures in state plans would disserve federalism values and increase the burden on regulated entities. See pp. 26-30, *supra*.

ED_006533_00001505-00060

EPA-HQ-2022-2545

CONCLUSION

The Court should dismiss the petitions for writs of certiorari or, in the alternative, vacate the D.C. Circuit's holding that Section 7411 does not unambiguously bar the use of outside-the-fenceline measures. If the Court reaches the merits, it should affirm the judgment below.

Respectfully submitted.

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ED_006533_00001505-00061

APPENDIX

42 U.S.C. 7411 provides:

Standards of performance for new stationary sources

(a) Definitions

For purposes of this section:

(1) The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

(2) The term "new source" means any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source.

(3) The term "stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant. Nothing in subchapter II of this chapter relating to nonroad engines shall be construed to apply to stationary internal combustion engines.

(4) The term "modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results

EPA-HQ-2022-2545

in the emission of any air pollutant not previously emitted.

(5) The term "owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

(6) The term "existing source" means any stationary source other than a new source.

(7) The term "technological system of continuous emission reduction" means—

(A) a technological process for production or operation by any source which is inherently low-polluting or nonpolluting, or

(B) a technological system for continuous reduction of the pollution generated by a source before such pollution is emitted into the ambient air, including precombustion cleaning or treatment of fuels.

(8) A conversion to coal (A) by reason of an order under section 2(a) of the Energy Supply and Environmental Coordination Act of 1974 [15 U.S.C. 792(a)] or any amendment thereto, or any subsequent enactment which supersedes such Act [15 U.S.C. 791 et seq.], or (B) which qualifies under section 7413(d)(5)(A)(ii)[1] of this title, shall not be deemed to be a modification for purposes of paragraphs (2) and (4) of this subsection.

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[1] See References in text note below.

ED_006533_00001505-00063

EPA-HQ-2022-2545

(b) List of categories of stationary sources; standards of performance; information on pollution control techniques; sources owned or operated by United States; particular systems; revised standards

(1)(A) The Administrator shall, within 90 days after December 31, 1970, publish (and from time to time thereafter shall revise) a list of categories of stationary sources. He shall include a category of sources in such list if in his judgment it causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.

(B) Within one year after the inclusion of a category of stationary sources in a list under subparagraph (A), the Administrator shall publish proposed regulations, establishing Federal standards of performance for new sources within such category. The Administrator shall afford interested persons an opportunity for written comment on such proposed regulations. After considering such comments, he shall promulgate, within one year after such publication, such standards with such modifications as he deems appropriate. The Administrator shall, at least every 8 years, review and, if appropriate, revise such standards following the procedure required by this subsection for promulgation of such standards. Notwithstanding the requirements of the previous sentence, the Administrator need not review any such standard if the Administrator determines that such review is not appropriate in light of readily available information on the efficacy of such standard. Standards of performance or revisions thereof shall become effective upon promulgation. When implementation and enforcement of any requirement of this chapter indicate that emission limitations and percent reductions

ED_006533_00001505-00064

EPA-HQ-2022-2545

beyond those required by the standards promulgated under this section are achieved in practice, the Administrator shall, when revising standards promulgated under this section, consider the emission limitations and percent reductions achieved in practice.

(2) The Administrator may distinguish among classes, types, and sizes within categories of new sources for the purpose of establishing such standards.

(3) The Administrator shall, from time to time, issue information on pollution control techniques for categories of new sources and air pollutants subject to the provisions of this section.

(4) The provisions of this section shall apply to any new source owned or operated by the United States.

(5) Except as otherwise authorized under subsection (h), nothing in this section shall be construed to require, or to authorize the Administrator to require, any new or modified source to install and operate any particular technological system of continuous emission reduction to comply with any new source standard of performance.

(6) The revised standards of performance required by enactment of subsection (a)(1)(A)(i) and (ii) 1 shall be promulgated not later than one year after August 7, 1977. Any new or modified fossil fuel fired stationary source which commences construction prior to the date of publication of the proposed revised standards shall not be required to comply with such revised standards.

ED_006533_00001505-00065

EPA-HQ-2022-2545

(c) State implementation and enforcement of standards of performance

(1) Each State may develop and submit to the Administrator a procedure for implementing and enforcing standards of performance for new sources located in such State. If the Administrator finds the State procedure is adequate, he shall delegate to such State any authority he has under this chapter to implement and enforce such standards.

(2) Nothing in this subsection shall prohibit the Administrator from enforcing any applicable standard of performance under this section.

(d) Standards of performance for existing sources; remaining useful life of source

(1) The Administrator shall prescribe regulations which shall establish a procedure similar to that provided by section 7410 of this title under which each State shall submit to the Administrator a plan which (A) establishes standards of performance for any existing source for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under section 7408(a) of this title or emitted from a source category which is regulated under section 7412 of this title but (ii) to which a standard of performance under this section would apply if such existing source were a new source, and (B) provides for the implementation and enforcement of such standards of performance. Regulations of the Administrator under this paragraph shall permit the State in applying a standard of performance to any particular source under a plan submitted under this paragraph to take into consideration, among other factors, the remaining useful

ED_006533_00001505-00066

EPA-HQ-2022-2545

life of the existing source to which such standard applies.

(2) The Administrator shall have the same authority—

(A) to prescribe a plan for a State in cases where the State fails to submit a satisfactory plan as he would have under section 7410(c) of this title in the case of failure to submit an implementation plan, and

(B) to enforce the provisions of such plan in cases where the State fails to enforce them as he would have under sections 7413 and 7414 of this title with respect to an implementation plan.

In promulgating a standard of performance under a plan prescribed under this paragraph, the Administrator shall take into consideration, among other factors, remaining useful lives of the sources in the category of sources to which such standard applies.

(e) Prohibited acts

After the effective date of standards of performance promulgated under this section, it shall be unlawful for any owner or operator of any new source to operate such source in violation of any standard of performance applicable to such source.

(f) New source standards of performance

(1) For those categories of major stationary sources that the Administrator listed under subsection (b)(1)(A) before November 15, 1990, and for which regulations had not been proposed by the Administrator by November 15, 1990, the Administrator shall—

ED_006533_00001505-00067

EPA-HQ-2022-2545

(A) propose regulations establishing standards of performance for at least 25 percent of such categories of sources within 2 years after November 15, 1990;

(B) propose regulations establishing standards of performance for at least 50 percent of such categories of sources within 4 years after November 15, 1990; and

(C) propose regulations for the remaining categories of sources within 6 years after November 15, 1990.

(2) In determining priorities for promulgating standards for categories of major stationary sources for the purpose of paragraph (1), the Administrator shall consider—

(A) the quantity of air pollutant emissions which each such category will emit, or will be designed to emit;

(B) the extent to which each such pollutant may reasonably be anticipated to endanger public health or welfare; and

(C) the mobility and competitive nature of each such category of sources and the consequent need for nationally applicable new source standards of performance.

(3) Before promulgating any regulations under this subsection or listing any category of major stationary sources as required under this subsection, the Administrator shall consult with appropriate representatives of the Governors and of State air pollution control agencies.

ED_006533_00001505-00068

EPA-HQ-2022-2545

(g) Revision of regulations

(1) Upon application by the Governor of a State showing that the Administrator has failed to specify in regulations under subsection (f)(1) any category of major stationary sources required to be specified under such regulations, the Administrator shall revise such regulations to specify any such category.

(2) Upon application of the Governor of a State, showing that any category of stationary sources which is not included in the list under subsection (b)(1)(A) contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare (notwithstanding that such category is not a category of major stationary sources), the Administrator shall revise such regulations to specify such category of stationary sources.

(3) Upon application of the Governor of a State showing that the Administrator has failed to apply properly the criteria required to be considered under subsection (f)(2), the Administrator shall revise the list under subsection (b)(1)(A) to apply properly such criteria.

(4) Upon application of the Governor of a State showing that—

(A) a new, innovative, or improved technology or process which achieves greater continuous emission reduction has been adequately demonstrated for any category of stationary sources, and

(B) as a result of such technology or process, the new source standard of performance in effect under this section for such category no longer reflects the

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EPA-HQ-2022-2545

greatest degree of emission limitation achievable through application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impact and energy requirements) has been adequately demonstrated,

the Administrator shall revise such standard of performance for such category accordingly.

(5) Unless later deadlines for action of the Administrator are otherwise prescribed under this section, the Administrator shall, not later than three months following the date of receipt of any application by a Governor of a State, either—

(A) find that such application does not contain the requisite showing and deny such application, or

(B) grant such application and take the action required under this subsection.

(6) Before taking any action required by subsection (f) or by this subsection, the Administrator shall provide notice and opportunity for public hearing.

(h) Design, equipment, work practice, or operational standard; alternative emission limitation

(1) For purposes of this section, if in the judgment of the Administrator, it is not feasible to prescribe or enforce a standard of performance, he may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof, which reflects the best technological system of continuous emission reduction which (taking into consideration the cost of

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EPA-HQ-2022-2545

achieving such emission reduction, and any non-air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated. In the event the Administrator promulgates a design or equipment standard under this subsection, he shall include as part of such standard such requirements as will assure the proper operation and maintenance of any such element of design or equipment.

(2) For the purpose of this subsection, the phrase "not feasible to prescribe or enforce a standard of performance" means any situation in which the Administrator determines that (A) a pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant, or that any requirement for, or use of, such a conveyance would be inconsistent with any Federal, State, or local law, or (B) the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations.

(3) If after notice and opportunity for public hearing, any person establishes to the satisfaction of the Administrator that an alternative means of emission limitation will achieve a reduction in emissions of any air pollutant at least equivalent to the reduction in emissions of such air pollutant achieved under the requirements of paragraph (1), the Administrator shall permit the use of such alternative by the source for purposes of compliance with this section with respect to such pollutant.

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EPA-HQ-2022-2545

(4) Any standard promulgated under paragraph (1) shall be promulgated in terms of standard of performance whenever it becomes feasible to promulgate and enforce such standard in such terms.

(5) Any design, equipment, work practice, or operational standard, or any combination thereof, described in this subsection shall be treated as a standard of performance for purposes of the provisions of this chapter (other than the provisions of subsection (a) and this subsection).

(i) Country elevators

Any regulations promulgated by the Administrator under this section applicable to grain elevators shall not apply to country elevators (as defined by the Administrator) which have a storage capacity of less than two million five hundred thousand bushels.

(j) Innovative technological systems of continuous emission reduction

(1)(A) Any person proposing to own or operate a new source may request the Administrator for one or more waivers from the requirements of this section for such source or any portion thereof with respect to any air pollutant to encourage the use of an innovative technological system or systems of continuous emission reduction. The Administrator may, with the consent of the Governor of the State in which the source is to be located, grant a waiver under this paragraph, if the Administrator determines after notice and opportunity for public hearing, that—

(i) the proposed system or systems have not been adequately demonstrated,

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EPA-HQ-2022-2545

(ii) the proposed system or systems will operate effectively and there is a substantial likelihood that such system or systems will achieve greater continuous emission reduction than that required to be achieved under the standards of performance which would otherwise apply, or achieve at least an equivalent reduction at lower cost in terms of energy, economic, or nonair quality environmental impact,

(iii) the owner or operator of the proposed source has demonstrated to the satisfaction of the Administrator that the proposed system will not cause or contribute to an unreasonable risk to public health, welfare, or safety in its operation, function, or malfunction, and

(iv) the granting of such waiver is consistent with the requirements of subparagraph (C).

In making any determination under clause (ii), the Administrator shall take into account any previous failure of such system or systems to operate effectively or to meet any requirement of the new source performance standards. In determining whether an unreasonable risk exists under clause (iii), the Administrator shall consider, among other factors, whether and to what extent the use of the proposed technological system will cause, increase, reduce, or eliminate emissions of any unregulated pollutants; available methods for reducing or eliminating any risk to public health, welfare, or safety which may be associated with the use of such system; and the availability of other technological systems which may be used to conform to standards under this section without causing or contributing to such unreasonable risk. The Administrator may conduct such

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EPA-HQ-2022-2545

tests and may require the owner or operator of the proposed source to conduct such tests and provide such information as is necessary to carry out clause (iii) of this subparagraph. Such requirements shall include a requirement for prompt reporting of the emission of any unregulated pollutant from a system if such pollutant was not emitted, or was emitted in significantly lesser amounts without use of such system.

(B) A waiver under this paragraph shall be granted on such terms and conditions as the Administrator determines to be necessary to assure—

(i) emissions from the source will not prevent attainment and maintenance of any national ambient air quality standards, and

(ii) proper functioning of the technological system or systems authorized.

Any such term or condition shall be treated as a standard of performance for the purposes of subsection (e) of this section and section 7413 of this title.

(C) The number of waivers granted under this paragraph with respect to a proposed technological system of continuous emission reduction shall not exceed such number as the Administrator finds necessary to ascertain whether or not such system will achieve the conditions specified in clauses (ii) and (iii) of subparagraph (A).

(D) A waiver under this paragraph shall extend to the sooner of—

(i) the date determined by the Administrator, after consultation with the owner or operator of the

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EPA-HQ-2022-2545

source, taking into consideration the design, installation, and capital cost of the technological system or systems being used, or

(ii) the date on which the Administrator determines that such system has failed to—

(I) achieve at least an equivalent continuous emission reduction to that required to be achieved under the standards of performance which would otherwise apply, or

(II) comply with the condition specified in paragraph (1)(A)(iii),

and that such failure cannot be corrected.

(E) In carrying out subparagraph (D)(i), the Administrator shall not permit any waiver for a source or portion thereof to extend beyond the date—

(i) seven years after the date on which any waiver is granted to such source or portion thereof, or

(ii) four years after the date on which such source or portion thereof commences operation,

whichever is earlier.

(F) No waiver under this subsection shall apply to any portion of a source other than the portion on which the innovative technological system or systems of continuous emission reduction is used.

(2)(A) If a waiver under paragraph (1) is terminated under clause (ii) of paragraph (1)(D), the Administrator shall grant an extension of the requirements of this section for such source for such minimum period as

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EPA-HQ-2022-2545

may be necessary to comply with the applicable standard of performance under this section. Such period shall not extend beyond the date three years from the time such waiver is terminated.

(B) An extension granted under this paragraph shall set forth emission limits and a compliance schedule containing increments of progress which require compliance with the applicable standards of performance as expeditiously as practicable and include such measures as are necessary and practicable in the interim to minimize emissions. Such schedule shall be treated as a standard of performance for purposes of subsection (e) of this section and section 7413 of this title.

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Message

From: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Sent: 1/19/2022 2:51:05 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]; Millett, John [Millett.John@epa.gov]; DeLuca, Isabel [DeLuca.Isabel@epa.gov]
Subject: RE: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

I was tempted to do that as well, Joe. These responses look good to me too – I did suggest a minor addition to the response on NESHAP reviews below. Best,

Tomás

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Wednesday, January 19, 2022 9:45 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Wednesday, January 19, 2022 9:29 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Bumping this to the top. Thanks!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Campbell, Ann
Sent: Tuesday, January 18, 2022 5:09 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; Isabel DeLuca <DeLuca.Isabel@epa.gov>
Subject: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Joe, Tomas – the WashPo had a few follow-up questions. Below are those questions and the proposed responses for your review. OP/OPA is hoping to receive this by noon tomorrow.

Thank you,

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Davis, Alison <Davis.Alison@epa.gov>
Sent: Tuesday, January 18, 2022 4:45 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Millett, John <Millett.John@epa.gov>; Noonan, Jenny <Noonan.Jenny@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

They made it! Here you go:

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 18, 2022 3:42 PM
To: Davis, Alison <Davis.Alison@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

All at once would be preferred but if you have the bulk of it and there's just a straggler, please feel free to send me the bulk of the response.

Thanks for asking!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Davis, Alison <Davis.Alison@epa.gov>
Sent: Tuesday, January 18, 2022 3:28 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Would you like these piecemeal, or all at once?

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 18, 2022 12:58 PM
To: Davis, Alison <Davis.Alison@epa.gov>
Cc: Noonan, Jenny <Noonan.Jenny@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Ok, I've let them know we needed more time, which we have, but will let them know what we're targeting. Thanks!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Davis, Alison <Davis.Alison@epa.gov>
Sent: Tuesday, January 18, 2022 12:54 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>

Cc: Noonan, Jenny <Noonan.Jenny@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Thanks Ann. I've sent it to the relevant divisions, but I haven't heard back yet. If we could aim for noon tomorrow, that would probably help.

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 18, 2022 12:51 PM
To: Davis, Alison <Davis.Alison@epa.gov>
Cc: Noonan, Jenny <Noonan.Jenny@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Thanks Alison. Please let me know when you have a better idea of the timing of your response. Thanks!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Davis, Alison <Davis.Alison@epa.gov>
Sent: Tuesday, January 18, 2022 11:51 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Noonan, Jenny <Noonan.Jenny@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: FW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Hi Ann,
I'm going to pick this up for OAQPS, but please ask for more time. Since I can't physically track folks down, I can't guarantee we'll make this list by COB.

Changing New Source Review guidance
When was the draft guidance removed from EPA's website?
Denying Clean Air Act Section 126 petitions
Can you tell us when the EPA started reviewing Y the New York and Maryland CAA section 126(b) petitions?
Setting emissions standards for major industries
Can you tell us when EPA started reviewing these emission standards, since they're coming out at different times?
Reducing power plant mercury and air toxics standards
Can you tell us when EPA first targeted this rule?
Creating new power plant emissions accounting
When did EPA start reviewing this action?

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 18, 2022 11:16 AM
To: Iglesias, Amber <Iglesias.Amber@epa.gov>; Chang, Alice <Chang.Alice@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>; Noonan, Jenny <Noonan.Jenny@epa.gov>
Cc: Koerber, Mike <Koerber.Mike@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

OAQPS, the WashPo had some follow-up questions to the exercise we completed last week. Please send your responses to me by COB today. If this is not doable, please let me know and I will see if I can get more time. Thanks!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Lewis, Josh <Lewis.Josh@epa.gov>
Sent: Tuesday, January 18, 2022 10:49 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Brooks, Becky <Brooks.Becky@epa.gov>; Hilosky, Nick <Hilosky.Nick@epa.gov>; Colip, Matthew <colip.matthew@epa.gov>; Aguirre, Janita <Aguirre.Janita@epa.gov>; Tyler, Tom <Tyler.Tom@epa.gov>; Richmond, Jonah <Richmond.Jonah@epa.gov>; Hanley, Mary <Hanley.Mary@epa.gov>
Cc: Carroll, Timothy <Carroll.Timothy@epa.gov>; Conger, Nick <Conger.Nick@epa.gov>; Peace, Michelle <Peace.Michelle@epa.gov>
Subject: WaPo Follow up Questions (re: regulatory tracker)

Hi everyone,

Not surprisingly, the Post came back w/ some follow up questions....see Juliet's email below. Can you all please provide responses to these follow up questions by noon Wednesday? Note the highlighted portion in her email, so please take this into consideration and use your judgment on whether we can provide specific dates/timeframes or if there's a fair reason not to.

(And Michelle, when we send the responses back to the Post, I'll include your response to the R6 action immediately below. Note I made some minor edits to what you sent me on Friday)

Ex. 5 Deliberative Process (DP)

From: Eilperin, Juliet <Juliet.Eilperin@washpost.com>
Sent: Tuesday, January 18, 2022 8:26 AM
To: Conger, Nick <Conger.Nick@epa.gov>; Dennis Brady <brady.dennis@washpost.com>
Cc: Lewis, Josh <Lewis.Josh@epa.gov>; Carroll, Timothy <Carroll.Timothy@epa.gov>
Subject: RE: Responses to your tracker questions

Dear Nick and Josh,
Thanks for all of this. Most of the remaining questions we've got are about the timing of when these actions were initiated. For each of these changes, we put a specific date on when these policies were first targeted, and

then we mark down the latest action. For example, the president targeted a slew of rollbacks on his first day in office, or in an executive order, and then others were targeted later, or there's been a subsequent development. So here's a list of policies where we can't find a specific initiation date. If you can't find the dates, it is ok. We've tried to capture the pace of the administration's policymaking. Also, there are still a couple of unanswered questions about a couple of the chemical policies.
Thanks for looking this over,
Juliet

OLEM
Rolling back coal ash standards, Phase 2
I found the reference to the extension of the comment period for the Notice of Data Availability, but couldn't find out what date that happened. Can you just provide that?
Granting federal coal waste permits
What day did EPA start looking at this policy?.
Weakening industry cleanup requirements
When did EPA start reviewing his rule?

OW:
Changing the Clean Water Act's criminal negligence standard

When did EPA start assessing comments and potential updates to this regulation?

OAR:
Changing New Source Review guidance
When was the draft guidance removed from EPA's website?
Denying Clean Air Act Section 126 petitions
Can you tell us when the EPA started reviewing Y the New York and Maryland CAA section 126(b) petitions?
Setting emissions standards for major industries
Can you tell us when EPA started reviewing these emission standards, since they're coming out at different times?
Reducing power plant mercury and air toxics standards
Can you tell us when EPA first targeted this rule?
Creating new power plant emissions accounting
When did EPA start reviewing this action?

OCSPP (OCSPP notes that their items didn't quite fit into the "yes/no/decision pending" paradigm so what follows are the explanations for each of their items)
Changing pyrethroid pesticide approval process
Is it fair to say that EPA is reviewing this action, and if so, when did it start reviewing it? It was unclear from this response.
Implementing the pesticide applicators rule
EPA is clearly reviewing this action – should we put Jan. 20, 2021 as the start date, or a different date?
Banning N-methylpyrrolidone (NMP)
EPA is clearly reviewing this action – should we put Jan. 20, 2021 as the start date, or a different date?

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/19/2022 2:42:41 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]
Subject: FOR INFORMAL REVIEW - Implementing Regulations (Subpart Ba)
Attachments: 6_a_ RLSO_ FRN EO12866_Subpart Ba Implementing Regulations_review cycle 2_dc mb.docx; 6_a_ FRN EO12866_Subpart Ba Implementing Regulations_clean 1.12.2022.docx

All – as discussed this morning, please find attached the clean and RLSO versions of this package, addressing your earlier

Ex. 5 Deliberative Process (DP)

ready for your informal review.

Please let me know if you have any questions. Thank you.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Moeller, Njeri <Moeller.Njeri@epa.gov>
Sent: Friday, January 14, 2022 3:27 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Koerber, Mike <Koerber.Mike@epa.gov>
Subject: For Informal Review - Implementing Regulations (Subpart Ba)

Ann/Dan,

As requested, attached are the revisions in response to OAR-IO comments made back in December. Just wanted to note that OGC will be meeting to OSG later next week to discussion concerns as it relates to the ACE litigation. We don't want to move the package beyond OAR until the OGC/OSG meeting occurs.

Thanks,

Njeri Moeller (she/her)
U.S. Environmental Protection Agency
OAR/OAQPS IO Special Assistant – Detail
109 TW Alexander Drive
Research Triangle Park, NC 27711
Phone: 919-541-1380 |Email: Moeller.njeri@epa.gov

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/19/2022 2:15:58 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]
Subject: FOR YOUR REVIEW: OMB Package - Proposed Rule: FIP Addressing Regional Ozone Transport for the 2015 Ozone NAAQS (SAN 8670)
Attachments: FIP Addressing Regional Ozone Transport for 2015 Ozone NAAQS - OMB Transmittal (002).docx; EO12866_Transport FIP_2060-AV5_Proposal_Preamble_20220113_RLSO.docx; EO12866_Transport FIP_2060-AV5_Proposal_Preamble_20220118.docx

Tomas, Joe – as discussed, please find attached the clean and RLSO versions of the proposal addressing your comments. Also attached is the OMB transmittal memo, prepared at your request.

Please let me know if you have any questions.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Chang, Alice <Chang.Alice@epa.gov>
Sent: Tuesday, January 18, 2022 2:27 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Koerber, Mike <Koerber.Mike@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
Subject: RE: For Your Review and Concurrence: OMB Package - Proposed Rule: FIP Addressing Regional Ozone Transport for the 2015 Ozone NAAQS (SAN 8670)

Ann –

Please see attached draft OMB memo attached, as well as a RLSO and clean version addressing Tomas' edits. We'll pass along the RIA when we receive it (likely tomorrow). Thanks!

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 18, 2022 9:36 AM
To: Iglesias, Amber <Iglesias.Amber@epa.gov>; Chang, Alice <Chang.Alice@epa.gov>; Koerber, Mike <Koerber.Mike@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>
Subject: FW: For Your Review and Concurrence: OMB Package - Proposed Rule: FIP Addressing Regional Ozone Transport for the 2015 Ozone NAAQS (SAN 8670)

Ex. 5 Deliberative Process (DP)

Please let me know if you have any questions. Thanks!

Ann (Campbell) Ferrio

Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Campbell, Ann
Sent: Tuesday, January 18, 2022 8:06 AM
To: Iglesias, Amber <Iglesias.Amber@epa.gov>; Chang, Alice <Chang.Alice@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>
Subject: FW: For Your Review and Concurrence: OMB Package - Proposed Rule: FIP Addressing Regional Ozone Transport for the 2015 Ozone NAAQS (SAN 8670)

Good morning ladies. Please see attached, edits from Tomas. He has also asked when the RIA and updated pieces of the preamble will be ready for review?

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Monday, January 17, 2022 2:40 PM
To: Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Goffman, Joseph <Goffman.Joseph@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: For Your Review and Concurrence: OMB Package - Proposed Rule: FIP Addressing Regional Ozone Transport for the 2015 Ozone NAAQS (SAN 8670)

Hi Dan, thanks and hope you're having a good long weekend – I'm attaching a few very minor edits and comments on the preamble here. The first version we reviewed back in November was in very good shape, and the latest draft has only improved on that already impressive starting point.

That said, I really would like to have a chance to at least skim the RIA, and review the forthcoming preamble text describing costs and benefits, energy and air quality impacts, and our analysis of environmental justice considerations, before this goes over to OMB. I understand that we are on a strict timetable to submit this package to interagency review, but these are really vital elements of the rule and I don't feel that I'm in a position to give an informed concurrence without having reviewed them. When will we have a chance to see these updated pieces of the preamble?

Best,

Tomás

From: Hooper, Daniel <hooper.daniel@epa.gov>
Sent: Friday, January 14, 2022 2:50 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Goffman, Joseph <Goffman.Joseph@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Subject: For Your Review and Concurrence: OMB Package - Proposed Rule: FIP Addressing Regional Ozone Transport for the 2015 Ozone NAAQS (SAN 8670)

Hello Tomas and Joe,

Please see the attached materials and email below regarding your review and concurrence on the 2015 ozone transport package (to OMB).

The program would like to provide final materials to OP by Wednesday, January 19 for transmittal to OMB by Friday, January 21. Therefore, comments from the OAR-IO should be submitted to the program by Tuesday, January 18, and concurrence from the OAR-IO to transmit to OMB by early afternoon on January 19.

Joe, Tomas plans to review this package – if you wish to review as well, doing so in parallel may be the best option due to the limited timeframe.

Please let me know if you have any questions.

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Olson, Heather <Olson.Heather@epa.gov>
Sent: Friday, January 14, 2022 2:30 PM
To: Hooper, Daniel <hooper.daniel@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Chang, Alice <Chang.Alice@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>; OAQPSREGPROCESSING <OAQPSREGPROCESSING@epa.gov>
Subject: For OAR Review: OMB Package - Proposed Rule: FIP Addressing Regional Ozone Transport for the 2015 Ozone NAAQS (SAN 8670)

SAN 8671

To: The Immediate Office for review for OMB submittal

Attached for OAR concurrence and transmittal to OMB via OP is the proposed rule package for the 2015 Ozone transport FIP (SAN 8671).

This package incorporates feedback received at the Final Agency Review (FAR) meeting on January 5, 2022. OAR will provide additional documents to OP including the Regulatory Impact Analysis (RIA) and an update to preamble sections reflecting RIA inputs by January 19. OMB has requested, and we have scheduled, pre-briefings on January 18 and 20. OMB expects to receive the full package by January 21. This is a Tier 1 rule with a court-ordered Administrator signature date of February 28, 2022.

The attachments include:
- Post it note
- Draft Action memo
- Proposed rule preamble
- Proposed regulatory text
- Technical supporting documents (TSD) and data:
  - 2016v2 Emissions Modeling Platform TSD
  - 2019 National Emissions Inventory Point Source Data TSD
  - Air Quality Modeling TSD
  - Allowance Allocation Under the Proposed Rule TSD
  - EGU NOx Mitigation Strategies Proposed Rule TSD
  - Non-EGU Emissions Reductions PPB Impacts for the 2015 Ozone Transport FIP – Draft Memorandum

- Non-EGU Sectors TSD
- Ozone Transport Policy Analysis Proposed Rule TSD
  - Appendix A – Proposed Rule State Emissions Budget Calculations
- Status of 2015 NAAQS 110(a)(2)(D)(i)(1) SIPs Proposed Rule TSD

Also included (with plans to send to OP only, not to OMB):

- List of changes incorporating feedback from FAR ("list of preamble changes")

POC: Alice Chang
202-564-2429

Thank you,

Heather Olson
U.S. Environmental Protection Agency
Office of Air and Radiation | Office of Air Policy and Program Support
(202) 564-9806

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/19/2022 2:55:29 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]; Millett, John [Millett.John@epa.gov]; DeLuca, Isabel [DeLuca.Isabel@epa.gov]
Subject: RE: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Will do.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Wednesday, January 19, 2022 9:53 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Let's do it. It's already in the public domain via the OIRA dashboard. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Wednesday, January 19, 2022 9:52 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

I have to say the same thought crossed my mind – the response seemed incomplete. Happy to add language if you like.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Wednesday, January 19, 2022 9:45 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

I don't have any comments aside from voicing my temptation to include in the MATS answer when we sent the package to OMB for review. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Wednesday, January 19, 2022 9:29 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Bumping this to the top. Thanks!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Campbell, Ann
Sent: Tuesday, January 18, 2022 5:09 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; Isabel DeLuca <DeLuca.Isabel@epa.gov>
Subject: FOR YOUR REVIEW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Joe, Tomas – the WashPo had a few follow-up questions. Below are those questions and the proposed responses for your review. OP/OPA is hoping to receive this by noon tomorrow.

Thank you,

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Davis, Alison <Davis.Alison@epa.gov>
Sent: Tuesday, January 18, 2022 4:45 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Millett, John <Millett.John@epa.gov>; Noonan, Jenny <Noonan.Jenny@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

They made it! Here you go:

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 18, 2022 3:42 PM
To: Davis, Alison <Davis.Alison@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

All at once would be preferred but if you have the bulk of it and there's just a straggler, please feel free to send me the bulk of the response.

Thanks for asking!

Ann (Campbell) Ferrio

Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Davis, Alison <Davis.Alison@epa.gov>
Sent: Tuesday, January 18, 2022 3:28 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Would you like these piecemeal, or all at once?

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 18, 2022 12:58 PM
To: Davis, Alison <Davis.Alison@epa.gov>
Cc: Noonan, Jenny <Noonan.Jenny@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Ok, I've let them know we needed more time, which we have, but will let them know what we're targeting. Thanks!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Davis, Alison <Davis.Alison@epa.gov>
Sent: Tuesday, January 18, 2022 12:54 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Noonan, Jenny <Noonan.Jenny@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Thanks Ann. I've sent it to the relevant divisions, but I haven't heard back yet. If we could aim for noon tomorrow, that would probably help.

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 18, 2022 12:51 PM
To: Davis, Alison <Davis.Alison@epa.gov>
Cc: Noonan, Jenny <Noonan.Jenny@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: RE: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Thanks Alison. Please let me know when you have a better idea of the timing of your response. Thanks!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Davis, Alison <Davis.Alison@epa.gov>
Sent: Tuesday, January 18, 2022 11:51 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Noonan, Jenny <Noonan.Jenny@epa.gov>; Millett, John <Millett.John@epa.gov>
Subject: FW: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

Hi Ann,
I'm going to pick this up for OAQPS, but please ask for more time. Since I can't physically track folks down, I can't guarantee we'll make this list by COB.

Changing New Source Review guidance
When was the draft guidance removed from EPA's website?
Denying Clean Air Act Section 126 petitions
Can you tell us when the EPA started reviewing Y the New York and Maryland CAA section 126(b) petitions?
Setting emissions standards for major industries
Can you tell us when EPA started reviewing these emission standards, since they're coming out at different times?
Reducing power plant mercury and air toxics standards
Can you tell us when EPA first targeted this rule?
Creating new power plant emissions accounting
When did EPA start reviewing this action?

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 18, 2022 11:16 AM
To: Iglesias, Amber <Iglesias.Amber@epa.gov>; Chang, Alice <Chang.Alice@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>; Noonan, Jenny <Noonan.Jenny@epa.gov>
Cc: Koerber, Mike <Koerber.Mike@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: ACTION: WaPo Follow up Questions (re: regulatory tracker) - due COB today

OAQPS, the WashPo had some follow-up questions to the exercise we completed last week. Please send your responses to me by COB today. If this is not doable, please let me know and I will see if I can get more time. Thanks!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Lewis, Josh <Lewis.Josh@epa.gov>
Sent: Tuesday, January 18, 2022 10:49 AM
To: Campbell, Ann <Campbell.Ann@epa.gov>; Brooks, Becky <Brooks.Becky@epa.gov>; Hilosky, Nick <Hilosky.Nick@epa.gov>; Colip, Matthew <colip.matthew@epa.gov>; Aguirre, Janita <Aguirre.Janita@epa.gov>; Tyler, Tom <Tyler.Tom@epa.gov>; Richmond, Jonah <Richmond.Jonah@epa.gov>; Hanley, Mary <Hanley.Mary@epa.gov>
Cc: Carroll, Timothy <Carroll.Timothy@epa.gov>; Conger, Nick <Conger.Nick@epa.gov>; Peace, Michelle <Peace.Michelle@epa.gov>
Subject: WaPo Follow up Questions (re: regulatory tracker)

Hi everyone,

Not surprisingly, the Post came back w/ some follow up questions....see Juliet's email below. Can you all please provide responses to these follow up questions by noon Wednesday? Note the highlighted portion in her email, so please take this into consideration and use your judgment on whether we can provide specific dates/timeframes or if there's a fair reason not to.

(And Michelle, when we send the responses back to the Post, I'll include your response to the R6 action immediately below. Note I made some minor edits to what you sent me on Friday)

Ex. 5 Deliberative Process (DP)

From: Eilperin, Juliet <Juliet.Eilperin@washpost.com>
Sent: Tuesday, January 18, 2022 8:26 AM
To: Conger, Nick <Conger.Nick@epa.gov>; Dennis Brady <brady.dennis@washpost.com>
Cc: Lewis, Josh <Lewis.Josh@epa.gov>; Carroll, Timothy <Carroll.Timothy@epa.gov>
Subject: RE: Responses to your tracker questions

Dear Nick and Josh,
Thanks for all of this. Most of the remaining questions we've got are about the timing of when these actions were initiated. For each of these changes, we put a specific date on when these policies were first targeted, and then we mark down the latest action. For example, the president targeted a slew of rollbacks on his first day in office, or in an executive order, and then others were targeted later, or there's been a subsequent development. So here's a list of policies where we can't find a specific initiation date. If you can't find the dates, it is ok. We've tried to capture the pace of the administration's policymaking. Also, there are still a couple of unanswered questions about a couple of the chemical policies.
Thanks for looking this over,
Juliet

OLEM
Rolling back coal ash standards, Phase 2
I found the reference to the extension of the comment period for the Notice of Data Availability, but couldn't find out what date that happened. Can you just provide that?
Granting federal coal waste permits
What day did EPA start looking at this policy?.
Weakening industry cleanup requirements
When did EPA start reviewing his rule?

OW:
Changing the Clean Water Act's criminal negligence standard

When did EPA start assessing comments and potential updates to this regulation?

OAR:
Changing New Source Review guidance

When was the draft guidance removed from EPA's website?

Denying Clean Air Act Section 126 petitions

Can you tell us when the EPA started reviewing Y the New York and Maryland CAA section 126(b) petitions?

Setting emissions standards for major industries

Can you tell us when EPA started reviewing these emission standards, since they're coming out at different times?

Reducing power plant mercury and air toxics standards

Can you tell us when EPA first targeted this rule?

Creating new power plant emissions accounting

When did EPA start reviewing this action?

OCSPP (OCSPP notes that their items didn't quite fit into the "yes/no/decision pending" paradigm so what follows are the explanations for each of their items)

Changing pyrethroid pesticide approval process

Is it fair to say that EPA is reviewing this action, and if so, when did it start reviewing it? It was unclear from this response.

Implementing the pesticide applicators rule

EPA is clearly reviewing this action – should we put Jan. 20, 2021 as the start date, or a different date?

Banning N-methylpyrrolidone (NMP)

EPA is clearly reviewing this action – should we put Jan. 20, 2021 as the start date, or a different date?

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/20/2022 3:00:22 AM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]
Subject: Agenda for OAR/OP Monthly
Attachments: in preparation for a meeting with OMB in early February

Team, please find below the agenda for tomorrow monthly with OP. I will draw up the lineup from now through Mid-February for the first agenda item and see if John can pull together a few points for the last item. As far as prep for the quarterly goes, we're working on the request and I plan to have something for you Friday, ahead of the OP deadline of next week. Our agenda really drives this time period so I would recommend discussing a preference to break off and have our meeting stand alone from the other AAships. Please let me know if you need anything else.

Ex. 5 Deliberative Process (DP)

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/20/2022 3:15:24 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]
Subject: Agenda for OAR/OP Monthly
Attachments: in preparation for a meeting with OMB in early February

Resending.....

Team, please find below the agenda for tomorrow monthly with OP. Please let me know if you need anything else.

Ex. 5 Deliberative Process (DP)

(2) Prep for OMB Quarterly

in preparation for a meeting with OM...

Ex. 5 Deliberative Process (DP)

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

Message

From: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Sent: 1/20/2022 3:50:41 AM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]
Subject: RE: For OAR Review to OMB: RIA and Revised Preamble for 2015 Ozone Transport Proposal
Attachments: EO12866_Transport FIP_2060-AV5_Proposal_Preamble_20220119 (002) TC.docx

Hi all, please find my comments in the attached – thanks,

Tomás

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Wednesday, January 19, 2022 10:47 PM
To: Hooper, Daniel <hooper.daniel@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: For OAR Review to OMB: RIA and Revised Preamble for 2015 Ozone Transport Proposal

Having done a speed-read of the RLSO version and trusting that Tomas' comments in the file he sent Monday afternoon, I concur with sending this forward. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Hooper, Daniel <hooper.daniel@epa.gov>
Sent: Wednesday, January 19, 2022 4:14 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: FW: For OAR Review to OMB: RIA and Revised Preamble for 2015 Ozone Transport Proposal

Hi Joe and Tomas,

Please see the attached RIA for the Ozone Transport proposal, along with the revised preamble, clean and RLSO.

To help keep the OP/OMB schedule, please provide any feedback **by 9 am tomorrow (Thursday)**.

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Chang, Alice <Chang.Alice@epa.gov>
Sent: Wednesday, January 19, 2022 4:03 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: For OAR Review to OMB: RIA and Revised Preamble for 2015 Ozone Transport Proposal

Ann –

Please see attached RIA for the Ozone Transport proposal, along with the revised preamble, clean and RLSO.

Let us know if you have any questions/edits or need anything else before this goes to OP. Thank you!

Alice

Alice Chang
U.S. Environmental Protection Agency
Office of Air and Radiation, Office of Air Quality Planning and Standards
1200 Pennsylvania Avenue NW, Washington D.C. 20004
202-564-2429

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/20/2022 4:44:43 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]
Subject: USE THIS! Annotated Agenda for OAR/OP Monthly
Attachments: USPS NGDV Final EIS - Briefing Paper to Administrator CLEAN 1-13-2022 v2.docx; USPS NGDVTime Extension Request LtrDRAFT 1-13-2022 clean v2.docx; in preparation for a meeting with OMB in early February

Resending.....

Team, please find below the agenda for tomorrow monthly with OP. Please let me know if you need anything else.

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

USPS NGDVTime Extension Reque...

USPS NGDV Final EIS - Briefing Pa...

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/20/2022 10:49:38 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]
Subject: FOR YOUR REVIEW: Edits and comments from Tomas ---- For OAR Review to OMB: RIA and Revised Preamble for 2015 Ozone Transport Proposal
Attachments: EO12866_Transport FIP_2060-AV5_Proposal_Preamble_20220120.docx; EO12866_Transport FIP_2060-AV5_Proposal_Preamble_20220119_RLSO.docx

Importance: High

Please find attached the revised package for your review. Please let me know if you need anything additional.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Chang, Alice <Chang.Alice@epa.gov>
Sent: Thursday, January 20, 2022 3:54 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: FW: Edits and comments from Tomas ---- For OAR Review to OMB: RIA and Revised Preamble for 2015 Ozone Transport Proposal
Importance: High

Ann,

See attached revisions from OAQPS.

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Thursday, January 20, 2022 7:06 AM
To: Chang, Alice <Chang.Alice@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: For OAR Review to OMB: RIA and Revised Preamble for 2015 Ozone Transport Proposal

Good morning OAQPS. Please find attached comments from Tomas on the revised preamble. Thank you.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Chang, Alice <Chang.Alice@epa.gov>
Sent: Wednesday, January 19, 2022 4:03 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: For OAR Review to OMB: RIA and Revised Preamble for 2015 Ozone Transport Proposal

Ann –

Please see attached RIA for the Ozone Transport proposal, along with the revised preamble, clean and RLSO.

Let us know if you have any questions/edits or need anything else before this goes to OP. Thank you!

Alice

Alice Chang
U.S. Environmental Protection Agency
Office of Air and Radiation, Office of Air Quality Planning and Standards
1200 Pennsylvania Avenue NW, Washington D.C. 20004
202-564-2429

Message

From: DeLuca, Isabel [DeLuca.Isabel@epa.gov]
Sent: 1/21/2022 3:03:04 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Subject: FW: DDL: 9 a.m. ET, 1/21: Regional haze/coal-fired power plants

Joe and Tomás – we have some questions from Sean Reilley on regional haze issues, and we'd like your blessing on the responses before they go out. The ddl is asap.

Thanks,
Isabel

*****

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Jan Cortelyou-Lee
she/her
919-368-5734 (cell)
919-541-5393 (desk)

Message

From: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Sent: 1/21/2022 6:54:05 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: Biden preps full-court press to curb coal as emissions spike

Biden preps full-court press to curb coal as emissions spike

BY:
JEAN CHEMNICK

,
HANNAH NORTHEY

,
SEAN REILLY
| 01/21/2022 01:34 PM EST

Emissions from a coal-fired power plant in Missouri are silhouetted against the setting sun. AP Photo/Charlie Riedel

GREENWIRE | EPA is preparing to Supreme Court-proof President Biden's ambitions for a carbon-free power grid by looking beyond direct greenhouse gas regulation and relying on the knock-on effect of stricter air, waste and water rules.

It's a "comprehensive approach" to decarbonize the power grid that's been in the works since the beginning of the Biden administration (*Climatewire*, Oct. 27, 2021).

But now that the Supreme Court has agreed to take up a case that could limit how EPA regulates carbon from the power sector, it has become even more important for the agency to find alternative

ways to show it can deliver on the president's promise of a power grid that is 80 percent clean by the end of this decade — and carbon neutral five years later.

The solution EPA is preparing to offer in the coming weeks is a sectorwide road map of the greenhouse gas, conventional air pollutant and water rules it plans to promulgate in the next few years. The strategy could push the ball forward on Biden's climate commitments by making it less economic to run coal-fired power plants in this country.

"It's just a question of how hard EPA feels like squeezing, or legally how hard it can squeeze and politically how hard it can squeeze," said David Bookbinder, chief counsel for the Niskanen Center, a Washington-based think tank. "Coal plants could find themselves even in a steeper slide than they are now."

EPA began floating the idea of a power sector "initiative" or "strategy" in private discussions last year before international climate talks began in Glasgow, Scotland. And acting EPA air chief Joe Goffman previewed the approach in public comments, as well as in the EPA chapter of the influential Climate 21 Project transition-period memo he co-wrote with Brenda Mallory, who became Biden's White House Council on Environmental Quality chair, and Jennifer Macedonia, who is now also a senior EPA official.

"Where regulation is justified to address critical environmental damage caused by coal production and combustion, regulation can create climate co-benefits by rectifying the economics of fossil-based generation and competition with clean energy sources," the chapter states.

Goffman, who played a leading role in carbon regulation under President Obama and now leads the EPA team that will write climate and air pollutant rules, said last year that EPA Administrator Michael Regan had asked the agency to "think broadly across the different pollutants in the different media that are affected by the power sector" when charting a course on power plant carbon.

Then in October, the Supreme Court — in a surprise move — agreed to review a case that could severely limit EPA's options for regulating power plant carbon, confining the agency to efficiency measures inside the fence line at power stations (*E&E News PM*, Oct. 29, 2021). Such a rule would do far less to move the needle on Biden's carbon goals than a systemwide standard that encourages fuel switching — as the Obama-era Clean Power Plan did.

The high court had long been viewed as a possible barrier to this more expansive reading of EPA's Clean Air Act authority after it stayed the Obama-era rule in 2016. But its conservative majority has since grown, and last year it broke with usual practice in agreeing to review the challenge to the Clean Power Plan even though that rule is no longer in effect. This was seen to signal the court's conservative majority's eagerness to rein in EPA's regulatory authority. Oral arguments in the case begin on Feb. 28.

The possible components of the EPA comprehensive strategy all have the potential to change the economics of running and operating coal-fired power plants in such a way as to encourage early retirements.

These could include actions related to EPA's rules for power plant mercury and air toxics and pollution that crosses state lines or contributes to regional haze. EPA's existing effluent guidelines and coal waste rules could also play a role.

The Unified Agenda the administration released late last year shows EPA completing greenhouse gas rules for fossil fuels power plants, too.

But if they stick to heat-rate improvements at power plants, Bookbinder estimated, they may only shave off 5 or 10 percent of their greenhouse gases. That makes it important for EPA to show it can meet Biden's commitments through other channels.

"EPA will continue to move forward to set and implement environmental standards that ensure that all Americans are protected from power plant pollution that harms public health and our economy while they continue to enjoy an affordable and reliable supply of electricity," the agency said in a

statement to E&E News. "With climate change impacts becoming more severe, public support for action growing, and the clean energy transition continuing, EPA will not waver from lawfully meeting its obligation to protect people from climate and air pollution."

Jeff Holmstead, who served as EPA air chief under President George W. Bush, saw value in EPA providing a road map and schedule for all of the rules that could apply to the power sector in the coming years.

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Message

From: Profeta, Timothy [Profeta.Timothy@epa.gov]
Sent: 1/21/2022 8:30:10 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: RE: Biden preps full-court press to curb coal as emissions spike

Still laughing…!

Feel like if Jean writes it, C21 will find a mention….

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Friday, January 21, 2022 2:32 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>
Subject: RE: Biden preps full-court press to curb coal as emissions spike

Climate 21!!

https://www.youtube.com/watch?v=0VkrUG3OrPc

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Friday, January 21, 2022 2:03 PM
To: Cassady, Alison <Cassady.Alison@epa.gov>; Enobakhare, Rosemary <Enobakhare.Rosemary@epa.gov>; Utech, Dan <Utech.Dan@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hamilton, Lindsay <Hamilton.Lindsay@epa.gov>; Conger, Nick <Conger.Nick@epa.gov>
Subject: RE: Biden preps full-court press to curb coal as emissions spike

I was just about to forward the same… Only new comment is the desk statement, as far as I can assess.

From: Cassady, Alison <Cassady.Alison@epa.gov>
Sent: Friday, January 21, 2022 2:00 PM
To: Enobakhare, Rosemary <Enobakhare.Rosemary@epa.gov>; Utech, Dan <Utech.Dan@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hamilton, Lindsay <Hamilton.Lindsay@epa.gov>; Conger, Nick <Conger.Nick@epa.gov>
Subject: Biden preps full-court press to curb coal as emissions spike

E&E discusses the multi-sector strategy, not based on any new comment by us, I don't think.

Biden preps full-court press to curb coal as emissions spike

BY:
JEAN CHEMNICK

,
HANNAH NORTHEY

,
SEAN REILLY

| 01/21/2022 01:34 PM EST

Emissions from a coal-fired power plant in Missouri are silhouetted against the setting sun. AP Photo/Charlie Riedel

GREENWIRE | EPA is preparing to Supreme Court-proof President Biden's ambitions for a carbon-free power grid by looking beyond direct greenhouse gas regulation and relying on the knock-on effect of stricter air, waste and water rules.

It's a "comprehensive approach" to decarbonize the power grid that's been in the works since the beginning of the Biden administration (*Climatewire*, Oct. 27, 2021).

But now that the Supreme Court has agreed to take up a case that could limit how EPA regulates carbon from the power sector, it has become even more important for the agency to find alternative ways to show it can deliver on the president's promise of a power grid that is 80 percent clean by the end of this decade — and carbon neutral five years later.

The solution EPA is preparing to offer in the coming weeks is a sectorwide road map of the greenhouse gas, conventional air pollutant and water rules it plans to promulgate in the next few years. The strategy could push the ball forward on Biden's climate commitments by making it less economic to run coal-fired power plants in this country.

"It's just a question of how hard EPA feels like squeezing, or legally how hard it can squeeze and politically how hard it can squeeze," said David Bookbinder, chief counsel for the Niskanen Center, a Washington-based think tank. "Coal plants could find themselves even in a steeper slide than they are now."

EPA began floating the idea of a power sector "initiative" or "strategy" in private discussions last year before international climate talks began in Glasgow, Scotland. And acting EPA air chief Joe Goffman previewed the approach in public comments, as well as in the EPA chapter of the influential Climate 21 Project transition-period memo he co-wrote with Brenda Mallory, who became Biden's White House Council on Environmental Quality chair, and Jennifer Macedonia, who is now also a senior EPA official.

"Where regulation is justified to address critical environmental damage caused by coal production and combustion, regulation can create climate co-benefits by rectifying the economics of fossil-based generation and competition with clean energy sources," the chapter states.

Goffman, who played a leading role in carbon regulation under President Obama and now leads the EPA team that will write climate and air pollutant rules, said last year that EPA Administrator Michael Regan had asked the agency to "think broadly across the different pollutants in the different media that are affected by the power sector" when charting a course on power plant carbon.

Then in October, the Supreme Court — in a surprise move — agreed to review a case that could severely limit EPA's options for regulating power plant carbon, confining the agency to efficiency measures inside the fence line at power stations (*E&E News PM*, Oct. 29, 2021). Such a rule would do far less to move the needle on Biden's carbon goals than a systemwide standard that encourages fuel switching — as the Obama-era Clean Power Plan did.

The high court had long been viewed as a possible barrier to this more expansive reading of EPA's Clean Air Act authority after it stayed the Obama-era rule in 2016. But its conservative majority has since grown, and last year it broke with usual practice in agreeing to review the challenge to the Clean Power Plan even though that rule is no longer in effect. This was seen to signal the court's conservative majority's eagerness to rein in EPA's regulatory authority. Oral arguments in the case begin on Feb. 28.

The possible components of the EPA comprehensive strategy all have the potential to change the economics of running and operating coal-fired power plants in such a way as to encourage early retirements.

These could include actions related to EPA's rules for power plant mercury and air toxics and pollution that crosses state lines or contributes to regional haze. EPA's existing effluent guidelines and coal waste rules could also play a role.

The Unified Agenda the administration released late last year shows EPA completing greenhouse gas rules for fossil fuels power plants, too.

But if they stick to heat-rate improvements at power plants, Bookbinder estimated, they may only shave off 5 or 10 percent of their greenhouse gases. That makes it important for EPA to show it can meet Biden's commitments through other channels.

"EPA will continue to move forward to set and implement environmental standards that ensure that all Americans are protected from power plant pollution that harms public health and our economy while they continue to enjoy an affordable and reliable supply of electricity," the agency said in a statement to E&E News. "With climate change impacts becoming more severe, public support for action growing, and the clean energy transition continuing, EPA will not waver from lawfully meeting its obligation to protect people from climate and air pollution."

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Alison L. Cassady
Deputy Chief of Staff for Policy
U.S. Environmental Protection Agency
Cell: (202) 941-6036

SIERRA CLUB

NATIONAL PARKS CONSERVATION ASSOCIATION 100YEARS

EARTHJUSTICE

January 21, 2022

Joseph M. Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
Environmental Protection Agency
1200 Pennsylvania Ave NW
Washington, DC 20460
Goffman.Joseph@epa.gov

Dear Principal Deputy Assistant Administrator Goffman:

National Parks Conservation Association, Sierra Club and Earthjustice write regarding several issues in need of EPA's immediate attention and direction to states for the second regional haze planning period. While implementation of the regional haze program has resulted in significant progress to date, our nation's treasured Class I areas from Great Smoky Mountains to Yosemite National Park continue to be marred by air pollution. Indeed, **not a single Class I area has achieved the Clean Air Act's goal of natural visibility conditions**. And the same sources of pollution that harm our public lands are the very sources responsible for tragic health impacts and the climate crisis; therefore, we see timely emissions reductions through state regional haze implementation plans as being of paramount importance.

This letter highlights instances where numerous state air quality agencies have failed to abide by federal requirements to reduce haze causing emissions in their regional haze plans. Consequently, the haze SIPs submitted to EPA to date widely miss the mark of satisfying the obligation to make reasonable progress towards restoring natural conditions. Accountability to cut continued, avoidable emissions from hundreds of fossil fuel-fired power plants, oil refineries, cement kilns, and other sources is on the line. Also at risk are fenceline communities downwind of pollution, along with the vistas and ecosystems of our public lands set aside for posterity. Our organizations demand that EPA prioritize acting on state

haze plans immediately to deliver on this 45 year-old Congressional mandate without delay.[1]

Collectively, our organizations and others ("Conservation Organizations") have reviewed and commented on nearly every regional haze state implementation plan ("RH SIPs," "SIPs") proposed thus far—covering 38% of the states—including the following:[2]

Colorado[i]	Louisiana[ii]	New York[iii]	Tennessee[iv]
Connecticut[v]	Massachusetts[vi]	North Carolina[vii]	Texas[viii]
Delaware[ix]	Michigan[x]	Ohio[xi]	Washington[xii]
Florida[xiii]	New Hampshire[xiv]	Oregon[xv]	West Virginia[xvi]
Indiana[xvii]	New Jersey[xviii]	South Carolina[xix]	

In addition to commenting in formal public comment periods, Conservation Organizations also provided early analyses to states, identifying sources of visibility impairing pollution, articulating problems with state reliance on regional organizations' work products,[3, xx] requesting states to factor in environmental justice;[4] and putting forth expert analysis regarding control technologies and related developments applicable to many regional haze SIPs.[5] We have identified

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[1] EPA's immediate attention is also required to ensure SIP consistency across states. 40 C.F.R. part 56.

[2] The links provided here and below are to the comment letters sent to each states. In some instances several comment letters have been submitted to a state. For the complete citations for the Conservation Organizations' comment letters and expert reports submitted to the states identified here and below please see the Endnotes starting on page 63.

[3] *See e.g.*, Letter from Stephanie Kodish, NPCA, Leslie Griffith, SELC, and David Rogers, Sierra Club to VISTAS State Air Directors, "Significant Flaws in VISTAS Regional Haze CAMx Modeling and Methods; Recommendations to Develop Compliant State Implementation Plans" (May 12, 2021), https://drive.google.com/file/d/1e0KAljsvNm3Wmj3HRVeyKvafaI-dza0c/view?usp=sharing; *see also* D. Howard Gebhart, "Technical Review of VISTAS Visibility Modeling for the Second Round of Regional Haze State Implementation Plans" (May 2021) ("Gebhart VISTAS Review Report"), including Attachment "Gebhart Resume Final 2020," https://drive.google.com/file/d/1aMKbgtFxJqvrEVxeSOy96CNvoQ0xhUUv/view?usp=sharing; *see also* D. Howard Gebhart, "Technical Review of North Carolina Regional Haze State Implementation Plan Second Round of Regional Haze State Implementation Plans Supplemental Report" (Oct. 2021), https://drive.google.com/file/d/1UYHgQQAx5xKhItnEuQ3fkFpOk4EtMZ_E/view?usp=sharing.

[4] *See infra* Section 5.a.

[5] Vicki Stamper, Megan Williams, " OIL AND GAS SECTOR REASONABLE PROGRESS FOUR-FACTOR ANALYSIS OF CONTROLS FOR FIVE SOURCE CATEGORIES: NATURAL GAS-FIRED ENGINES, NATURAL GAS-FIRED TURBINES, DIESEL-FIRED ENGINES, NATURAL GAS-FIRED HEATERS AND BOILERS, FLARING AND INCINERATION, (March 6, 2020), https://drive.google.com/file/d/1RGWYqXKcfyWzBgxuRXzSiSaCZ9PWDH3y/view?usp=sharing; *see*

numerous common "approvability" issues based on our reviews and detailed in our comment letters, which for most SIPs were supported by reports prepared by expert engineers and modelers.

The seven states where we provided preliminary comments include:

Arizona[xxi]	New Mexico[xxii]	Utah[xxiii]	Pennsylvania[xxiv]
Nebraska[xxv]	North Dakota[xxvi]	Virginia[xxvii]	

We support a continuation of the Obama Administration's successful efforts to implement the haze program, which has thus far resulted in: emission reductions from over 150 coal plants units, including more than 58 retirements; elimination of more than 132 million metric tons of climate pollution; and a reduction of 303,950 tons reduced NOx and SO_2 combined. In order to continue on this path, EPA must direct states to issue SIPs that are compliant with legal requirements and match the agency's expectations as specified in its "Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period"[6] ("July 2021 Clarification Memo"). EPA must ensure consistency across SIPs. Where states fail to fulfill such obligations, EPA must be at the ready to issue Regional Haze Federal Implementation Plans ("FIPs") for much of the country.

As discussed in this letter, nearly all the SIPs reviewed thus far ignore EPA's July 2021 Clarification Memo while either cherry-picking from off-ramps in "Guidance on Regional Haze State Implementation Plans for the Second

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also Klafka, Steven, P.E. BCEE, Environmental Engineer, Wingra Engineering, S.C., "The Four-Factor Reasonable Progress Analysis for Ardagh Glass," (Jan. 27, 2021), https://drive.google.com/file/d/1xXsx07y4z4K6BIgeJH0rLP7L0Ha_Iuwn/view?usp=sharing; *see also* Klafka, Steve, Wingra Engineering, Holcim – Florence Cement Plant Florence, Colorado Four-Factor Reasonable Progress Analysis (Sept. 30, 2021), https://drive.google.com/file/d/1C0DHVM84YoM-a-xn3LILDB5nK8J4rKDq/view?usp=sharing; *see also* Klafka, Steve, Wingra Engineering, GCC Rio Grande – Pueblo Cement Plant, Four-Factor Reasonable Progress Analysis (Sept. 23, 2021), https://drive.google.com/file/d/1W-EAjYr_zL9Ucj6t2PAtCEuqAVP7flc9/view?usp=sharing.

[6] Memorandum from Peter Tsirigotis, Director, Office of Air Quality Planning and Standards, to Regional Air Division Directors Regions 1-10, "Clarifications Regarding Regional Haze State Implementation Plans for the Second Implementation Period," (July 9, 2019), https://www.epa.gov/visibility/clarifications-regarding-regional-haze-state-implementation-plans-second-implementation. ("July 2021 Clarification Memo").

Implementation Period"[7] ("2019 Guidance") or lack a reasoned basis and support for SIP determinations.

The five major areas where issues arise in the RH SIPs are as follows:

Five Major Areas Where Issues Arise in State RH SIPs

1. Source selection precludes significant emissions and sources from consideration in a Four Factor Analysis .
2. Unjustifiable dismissal of emission reduction measures that satisfy the Four-Factor Analyses.
3. Reasonable progress determinations do not comport with the legal requirements.
4. Application of *unique* approaches not provided for under the Act and RHR.
5. Failure to take into consideration the Administration's priorities.

We strongly support the direction articulated in the July 2021 Clarification Memo and are committed to ensuring it results in state plans that deliver meaningful reductions. The following discussion highlights the myriad of issues we've identified in these five major areas – and commented on – in the state RH SIPs reviewed to date.

Note: This letter cites numerous examples from our comment letters where these issues arise. The examples cited are from representative SIPs and are not intended to provide a comprehensive list of the issues raised in all our comment letters. The first time a referenced document is mentioned we provide a link to download the document. Additionally, referenced documents are available to download here: https://drive.google.com/drive/folders/1aE2Yz7-Tl6M1ZNasaYKsBDgsJa22de3S?usp=sharing.

[7] Memorandum from Peter Tsirigotis, Director at EPA Office of Air Quality Planning and Standards, to EPA Air Division Directors Regions 1-10, "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period," EPA-457/B-19-003 (Aug. 2019), https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf. ("2019 Guidance").

Table of Contents

1. Source screening excludes significant emissions from sources of visibility impairing pollution. 7

a. Source retirements must be enforceable in the SIP. *7*

b. A prior BART determination (or its equivalent) must not excuse a source from reasonable progress analysis. *9*

c. States must not ignore pollutants by focusing on only the dominant pollutant. *10*

d. States must analyze area and mobile sources, and not solely focus on major sources. *11*

e. Sources with permits are not exempt from the Act's reasonable progress requirements. *13*

f. States must not set thresholds that do not capture sufficient sources and emissions. *13*

2. States must not unjustifiably dismiss emission reduction measures that, if appropriately assessed, would satisfy the Four-Factor Analysis. ... 16

a. States must not assert visibility benefits are too small. *16*

b. States must independently review industry Four-Factor Analysis instead of assuming their correctness and adopting them without question. *18*

c. States must not rely on arguments that a source is "effectively controlled." *22*

d. States must establish cost-effectiveness thresholds that are higher than the first round. *25*

3. Reasonable progress determinations must comport with the legal requirements. 27

a. The Uniform Rate of Progress glidepath is not a safe harbor. *27*

b. States cannot satisfy interstate consultations where they are flawed, incomplete and have no effect. *28*

c. States must not disregard FLM consultations. *32*

d. States must not delay control requirements and/or determinations to the next planning period. *35*

e. States must not exempt emissions from new and modified sources from the Act's RH RP requirements. *35*

f. States must not assert that that reasonable progress goals determine reasonable progress. *37*

4. States must not use unique approaches that conflict with Act and Regional Haze Rule **38**

a. Oregon. *38*

b. Washington. *38*

c. Texas. *39*

d. Indiana. *40*

e. Use of Plantwide Applicability Limits (PALs). *40*

f. Ohio. *41*

5. States must ensure that SIPs are consistent with the Administration's priorities **41**

a. Consideration of Environmental Justice. *41*

b. For EGUs, transition from coal to natural gas should not be a solution for regional haze. *46*

c. Retired or under-utilized EGUs are now being used to supply energy for onsite bitcoin mining – EPA must address this head on. *46*

d. Requiring States to Incorporate Planned Retirements as Enforceable SIP Provisions, as Required by the Clean Air Act, Would Result In Significant Reductions of Greenhouse Gas Emissions. *46*

Conclusion **47**

List of Documents Referenced **50**

Endnotes **63**

The Five Major Areas in Need of EPA's Immediate Attention

1. Source screening excludes significant emissions from sources of visibility impairing pollution.

States must identify sources for the Four-Factor Analysis and the screening threshold a state applies must ensure that the threshold is low enough to bring in most sources harming a Class I area; a state must not simply eliminate evaluations of all or most sources for measures to reduce visibility impairing pollution. EPA's July 2021 Clarification Memo emphasizes this requirement explaining that:

> [W]hile states have discretion to reasonably select sources, this analysis should be designed and conducted to ensure that source selection results in a set of pollutants and sources the evaluation of which has the potential to meaningfully reduce their contributions to visibility impairment.[8]

Contrary to the requirement to meaningfully reduce, which requires that states *comprehensively* identify sources of human-caused visibility-impairing emissions across source categories, as discussed below, the proposed SIPs use various methods to circumvent this requirement.

a. *Source retirements must be enforceable in the SIP.*

The Act, the RHR, and EPA guidance and memorandum all make clear that if a state opts to exempt sources from further control analysis based on a planned retirement schedule, the source must "have an enforceable commitment to be retired or replaced by 2028."[9] The Act requires that "[e]ach state implementation plan . . . shall" include "enforceable limitations and other control measures" as

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[8] July 2021 Clarification Memo at 3.

[9] 2019 Guidance at 22; The Clean Air Act does not define the phrase "remaining useful life." However, EPA, in regulations and guidance, has clarified the meaning of the phrase. EPA has consistently stated that the potential retirement of a facility can be used to shorten a source's remaining useful life only if the retirement is federally enforceable. Thus, in order to affect the remaining useful life, a retirement commitment must be included in a pre-existing document that can be enforced in federal court, such as a consent decree entered by a federal court, or a state must incorporate the retirement date into its SIP. If a potential retirement is not federally enforceable, it cannot be relied upon to shorten the remaining useful life of a source; *see e.g.*, 83 Fed. Reg. 62,204, 62,232 (Nov. 30, 2018) ("We are proposing to agree with Arkansas' cost analysis for dry scrubbers and switching to low sulfur coal for Independence Units 1 and 2, and with the state's decision to assume a 30-year capital cost recovery period in the cost analysis. It is appropriate to assume a 30-year capital cost recovery period in the cost analysis since Entergy's plans to cease coal combustion at the Independence facility are not state or federally-enforceable."); *see also* 83 Fed. Reg. 43,586, 43,604 (Aug. 27, 2018) (Considering the retirement of certain units where there was evidence that the units had actually been retired at the time of the rulemaking and that the plant had requested cancellation of its air permit).

necessary to "meet the applicable requirements" of the Act.[10] The RHR similarly requires each state to include "enforceable emission limitations" as necessary to ensure reasonable progress toward the national visibility goal.[11] Indeed, remaining useful life is only one of the four statutory factors that a state must consider when selecting the sources for which it will determine what control measures are necessary to make reasonable progress.[12] Allowing states to avoid a four-factor analysis based on alleged intent to retire would render the other statutory factors meaningless and violate the requirements of the Regional Haze Rule.[13] Therefore, where the state relies on a source's plans to permanently cease operations or projects that future operating parameters (*e.g.*, limited hours of operation or capacity utilization) will differ from past practice, or if this projection exempts additional pollution controls as unnecessary to ensure reasonable progress, then the state "must" make those parameters or assumptions into enforceable limitations.[14]

Despite these requirements, states exempt electric generating units ("EGUs") and other sources from Four-Factor Analyses based on *any* announcement of retirement. For the EGUs in Indiana, North Carolina and Michigan, the SIPs exempt EGUs and other sources from Four-Factor Analyses based on any announcement of retirement.[15] Additionally, in Tennessee, the State revised its 2028 projected SO2 emissions for Kingston from 1,886 to 424 tons and its 2028 projected NOx emissions from 1,687 to 380 tons based solely on TVA's Strategic Power Supply Plan projections, without including enforceable emission limitations in the SIP.[16] Furthermore, the Centralia power plant, which was required to cease coal-firing for BART and for which no emissions were assumed in the 2028 RPGs,

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[10] 42 U.S.C. § 7410(a)(2)(A).
[11] *See* 40 C.F.R. § 51.308(f)(2) ("The long-term strategy must include the enforceable emissions limitations, compliance schedules, and other measures that are necessary to make reasonable progress, as determined pursuant to (f)(2)(i) through (iv).").
[12] *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) ("[A]n agency rule would be arbitrary and capricious if the agency has . . . entirely failed to consider an important aspect of the problem."); *Pub. Citizen v. Fed. Motor Carrier Safety Admin.*, 374 F.3d 1209, 1216 (D.C. Cir. 2004) ("A statutorily mandated factor, by definition, is an important aspect of any issue before an administrative agency, as it is for Congress in the first instance to define the appropriate scope of an agency's mission.").
[13] The United States Court of Appeals for the Fifth Circuit found that EPA must consider statutory factors listed in a similar provision of the Clean Water Act when revising best available technology ("BAT") limits. *See Southwestern Elec. Power Co. v. EPA*, 920 F.3d 999, 1026-27 (5th Cir. 2019).
[14] 40 C.F.R. § 51.308(f)(2); *see also* 2019 Guidance at 34.
[15] *See e.g.,* Comment Letter to Indiana at 11, 14-17; Comment Letter to North Carolina at 14-26 (*i.e.*, Duke Energy Carolinas, LLC, Marshall Steam Station; Duke Energy Carolinas, LLC, Belews Creek Steam Station; Duke Energy Progress, Roxboro Steam Electric Plant; Duke Energy Carolinas, LLC, Cliffside Steam Station Facility); Comment Letter to Michigan at 9-10 (EGLE Erroneously Relied on Remaining Useful Life Without Enforceable Retirement Dates for the following facilities: St. Clair; Belle River; Trenton Channel; Erickson; JH Campbell; and Karn Units 3 & 4).
[16] Comment Letter to Tennessee at 21-22.

recently got a BART order amendment that provides the ability to repower to gas,[17] again without including enforceable emission limitations in the SIP.

EPA must ensure enforceable retirements are locked into the haze SIP for any EGU or other source where a state relies on reductions for reasonable progress or its Long-Term Strategy. Only enforceable retirements may alter the remaining useful life. EPA must require that states subject sources that intend to retire to a Four-Factor Analysis if a state selects the source for analysis of emission control measures.

b. ***A prior BART determination (or its equivalent) must not excuse a source from reasonable progress analysis.***

As EPA's 2019 Guidance explains, the RHR "anticipates the re-assessment of BART-eligible sources under the reasonable progress Rule provisions,"[18] and further instructs state SIP development by explaining that:

> [S]tates may not categorically exclude all BART-eligible sources, or all sources that installed BART controls, as candidates for selection for analysis of control measures.[19]

In SIPs, several states assert that where EGUs (and primary copper smelters in Arizona)[20] are BART sources they need *not* be reviewed for reasonable progress. For example, the following states have exempted BART sources: Indiana; South Carolina; Michigan; West Virginia, Texas.[21] Similarly, sources subject to the Clean Air Interstate Rule (CAIR) and its successor, the Cross-State Air Pollution Rule

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[17] Comment Letter to Washington - November 2021 at 25-26.
[18] 2019 Guidance at 25, citing 40 C.F.R. § 51.308(e)(5) ("After a State has met the requirements for BART or implemented an emissions trading program or other alternative measure that achieves more reasonable progress than ... BART, BART-eligible sources will be subject to the requirements of paragraphs (d) and (f) of this section.").
[19] 2019 Guidance at 25.
[20] Preliminary Comment Letter to Arizona at 6-7 (*i.e.*, ASARCO LLC - Hayden Smelter and the Freeport Mcmoran Miami Smelter).
[21] *See e.g.*, Comment Letter to Indiana 16-19 (R.S. Nelson); *see also* Comment Letter to South Carolina at 30-32 (It appears the State may have exempted a sources from RP that completed BART demonstrations despite the fact that the State did not require any BART controls: Dominion Energy Wateree Generating Station); *see also* Comment Letter to Michigan at 15 (Tilden Mine), 16 (St. Mary's Cement Kiln); *see also* West Virginia Comment Letter at 87, FN 386 (commenting on Proposed SIP at 114).

(CSAPR) are not exempt from reasonable progress review.[22] EPA must reemphasize that BART does not excuse source from a reasonable progress evaluation. [23]

c. ***States must not ignore pollutants by focusing on only the dominant pollutant.***

EPA's expectation regarding the pollutants considered for source selection and control strategy analysis for the second planning period is that "each state will analyze sulfur dioxide (SO_2) and nitrogen oxide (NOx) in selecting sources and determining control measures."[24] Moreover, "[a] state that chooses not to consider at least these two pollutants in the second planning period should show why such consideration would be unreasonable, especially if the state considered both these pollutants in the first planning period."[25]

Examples of states that are focusing on the dominant pollutant and ignoring the others include VISTAS states (*e.g.*, Tennessee,[26] West Virginia,[27] North Carolina,[28] Florida,[29] South Carolina[30]), which disregarded NOx emissions because they asserted SO_2 is the dominant visibility impairing pollutant. As a consequence, VISTAS states routinely ignored cost-effective opportunities for reducing NOx from EGUs with underperforming SCR and SNCR systems, including from EGUs like Marshall Steam Stations units 1, 2 and 4[31] and pulp and paper plants like Blue

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[22] Comment Letter to Indiana at 39 (Gibson and Indiana Michigan Power); Comment Letter to West Virginia at 34-35 (Participation in CSAPR, MATS, and/or installation of BART is not a shield against reasonable progress or Four-Factor Analyses for the following EGU sources: Harrison, Fort Martin, Mitchell, and Amos.); *id.* at 39 (Grant Town Power Plant); *id.* at 87 FN386 (commenting that reasonable progress requirements apply to all sources, despite the State SIP that allow an unnamed BART-eligible source that received a permit during the first RH planning period, to also avoid an RP analysis).

[23] Although many states addressed the Clean Air Act's BART requirements in their initial regional haze plans, EPA's 2017 revisions to the Regional Haze Rule make clear that BART was not a once-and-done requirement. Indeed, states "will need" to reassess "BART-eligible sources that installed only moderately effective controls (or no controls at all)" for any additional technically-achievable controls in the second planning period. 82 Fed. Reg. at 3,083; *see also id.* at 3,096 ("states must evaluate and reassess all elements required by 40 CFR 51.308(d)").

[24] July 2021 Clarification Memo at 4, citing 2019 Guidance at 12.

[25] July 2021 Clarification Memo at 4-5.

[26] Comment Letter to Tennessee at 19-20, 28 (TDEC Impermissibly Exempts Eastman's NOx Emissions from the Required Four-Factor Analysis), 62 (TDEC Ignores and the SIP Lacks Controls for Nitrate Contributions from Point Sources at Class I Areas).

[27] Comment Letter to West Virginia at 19, 22-23, 25, 29-30, 42, 84-85.

[28] Comment Letter to North Carolina at 38.

[29] Comment Letter to Florida at 31.

[30] Comment Letter to South Carolina at 22, 24, 35-36 (DHEC Must Subject South Carolina EGUs to NOx Four-Factor Analyses), 74-75.

[31] Comment Letter to North Carolina at 14-15.

Ridge.[32] States also attempt to disregard pollutants, sources and other requirements based on a purported lack of resources.[33]

EPA must ensure that regional haze plans include an analysis of both SO_2 and NOx emissions.

d. ***States must analyze area and mobile sources, and not solely focus on major sources.***

The RHR requires that states consider "major and minor stationary sources or groups of sources, mobile sources, and area sources."[34] Indeed, "regional haze" is defined in the RHR to explicitly include these sources:

> Visibility impairment that is caused by the emission of air pollutants from numerous anthropogenic sources located over a wide geographic area. Such sources include, but are not limited to, major and *minor stationary sources, mobile sources, and area sources.*[35]

Several states consider only major point sources and ignore area and mobile sources. This approach is particularly problematic where the area and mobile source categories make up most if not all the visibility impairment. For example, in many states, emissions from oil and gas development are a significant threat to visibility

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[32] Comment Letter to North Carolina at 24-25.

[33] Comment Letter to South Carolina at 75 (DHEC's apparent assertion that it lacks the time, personnel, and funding resources to develop a complete regional haze SIP does not excuse it from the Act's requirements. The Act and implementing regulations require that states have adequate resources and authority, indeed states are required to certify to EPA in each SIP submission and periodically for infrastructure SIPs that they have such resources and authorities. 42 U.S.C. §§ 7410(a)(2)(J), 7410(a)(2)(D)(i), 7410(a)(2)(D)(ii), 7410(a)(2)(E)(i); 40 C.F.R. part 51, Appendix V; *see also,* EPA's application of Act's requirements when Wyoming asserted it lacked of authority to impose RP requirements, 79 Fed. Reg. 5032 (Jan. 30, 2014). Alternatively, if DHEC finalizes its proposed determination that it lacks the resources necessary to develop a complete [and potentially approvable] SIP, then it must follow in the footsteps of Montana and notify EPA that South Carolina will defer to EPA's development and implementation a regional haze FIP on their behalf. 77 Fed. Reg. 23,988 (Apr. 20, 2012) (EPA's proposed FIP, explained that "[o]n June 19, 2006, Montana submitted a letter to us signifying that the State would be discontinuing its efforts to revise the visibility control plan that would have incorporated provisions of the Regional Haze Rule. The State acknowledged with this letter that EPA would make a finding of failure to submit and thus promulgate additional federal rules to address the requirements of the Regional Haze Rule, including BART. In response to the State's decision EPA made a finding of SIP inadequacy on January 15, 2009 (74 FR 2392), determining that Montana failed to submit a SIP that addressed any of the required regional haze SIP elements of 40 CFR 51.308."); 77 Fed. Reg. 57,864 (Sept. 18, 2012) (EPA's final FIP).); *see also* Comment Letter to Tennessee at 63; *see also* Comment Letter to West Virginia at 86.

[34] 40 C.F.R. § 51.308(f)(2)(i) ("The State should consider evaluating major and minor stationary sources or groups of sources, mobile sources, and area sources.").

[35] 40 C.F.R. § 51.301 (emphasis added).

and air quality in Class I areas.[36] Such development often occurs on federal lands that are near to or abut Class I areas. For example, oil and gas development contributes to visibility impairment in public lands in Utah and Colorado where the NPS found that oil and gas development and leasing in the two states would "cause visibility impairment" at Dinosaur National Monument.[37] Additionally, NPS recently found impacts from oil and gas emissions at Carlsbad Caverns and San Pedro Parks Wilderness Class I areas, among others, based on 2008 emissions inventories—which do not capture more recent growth—and include only a portion of emissions from the production process.[38] States that have ignored these important source categories include: Texas, which outright ignored oil and gas sources;[39] Utah, which is also ignoring oil and gas sources suggesting it will address emissions later via an ozone SIP;[40] and Florida, which despite high cost-effective green harvesting techniques that could reduce emissions on environmental justice communities and Class I areas, did not evaluate emissions from burning sugar cane fields.[41] On a positive note, California is the one state that is assessing emissions from heavy duty trucks through a Four-Factor Analysis.

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[36] Examples of Class I areas currently or potentially impacted by oil and gas emissions include: Theodore Roosevelt and Lostwoods (Bakken Shale in eastern Montana and North Dakota); Wind Cave and Badlands (Powder River Basin in northeast Wyoming); Bridger and Fitzpatrick Wilderness Areas (Pinedale Anticline and Jonah Fields in western Wyoming); Mesa Verde (North and South San Juan Basin); Carlsbad Caverns and Guadalupe Mountains (Permian Basin in southeastern New Mexico and western Texas); and Canyonlands and Arches (Uintah, Paradox, and Piceance Basins in Utah and Colorado).

[37] *See* e.g., Memorandum from Mark A. Foust, Superintendent, Dinosaur National Monument, National Park Service, to Ester McCullough, Field Office Manager, BLM Vernal Field Office, "NPS Comments on the Environmental Assessment for the December 2017 Oil and Gas Sale (DOI-BLM-UT-GO10-2017-0028-EA)," at 2-3 (Aug. 22, 2017), https://eplanning.blm.gov/public_projects/nepa/80165/119058/145306/Dinosaur_National_Monument_Comment_Letter.pdf (last visited Jan. 21, 2022); Krish Vijayaraghavan *et al.*, Ramboll Environ US Corporation, "Colorado Air Resources Management Modeling Study (CARMMS): 2025 CAMx Modeling Results for the High, Low and Medium Oil and Gas Development Scenarios," 05-35899 (Aug. 2017) (prepared for BLM), https://www.blm.gov/documents/colorado/public-room/data (last visited Jan. 21, 2022).

[38] Thompson *et al.*, Modeling to Evaluate Contribution of Oil and Gas Emissions to Air Pollution, 67 Journal of the Air & Waste Management Association Vol. 4, at 455 (March 10, 2017. 2016), https://doi.org/10.1080/10962247.2016.1251508 (last visited Jan. 21, 2022); *see also id.* Figures and data, https://www.tandfonline.com/doi/suppl/10.1080/10962247.2016.1251508?scroll=top .

[39] Comment Letter to Texas at 24-29 ("Texas Ignores All Area Sources in its Four-Factor Analyses," the emissions from the oil and gas sector not considered by Texas include 17,293 of NOx and 8,322 SO_2.).

[40] NPCA raised its concern regarding the need for Four-Factor Analyses and control of emissions from oil and gas to Utah and EPA on several occasions, nevertheless, Utah Division of Air Quality (DAQ) indicates that it does not plan to address emissions from the oil and gas sector in its Regional Haze SIP, instead deferring to a future ozone SIP. NPCA and Utah DAQ Meetings (February 18, 2020 and May 28, 2020); NPCA and EPA Region 8 Meeting (July 7, 2021).

[41] Comment Letter to Florida at 23, 24, 25.

In states where area and mobile source sectors contribute to much of the visibility impairing pollutions, we urge EPA to direct that those states ensure emissions from those source sectors are included in the Four-Factor Analyses and that the SIP contain enforceable emission limitations.

e. ***Sources with permits are not exempt from the Act's reasonable progress requirements.***

The reasonable progress requirements apply to all sources and a permit to construct does not exempt a source from the regional haze program. If a source is found subject to the required reasonable progress Four-Factor Analysis as a result of a state's reasonable progress screening process, the state must ensure the Analysis is conducted. Neither the Act nor EPA's rules provide an "off-ramp" for a source in this situation. Several states have exempted sources because of recently issued permits.[42]

f. ***States must not set thresholds that do not capture sufficient sources and emissions.***

The RHR requires each state to submit a long-term strategy that addresses the regional haze visibility impairment resulting from emissions from within that state and for each mandatory Class I Federal area located outside the State that may be affected by emissions from the State.[43] Regarding a state's source selection methodology EPA's Guidance explained:

> Whatever threshold is used, the state must justify why the use of that threshold is a reasonable approach, *i.e.*, why it captures a reasonable set of sources of emissions to assess for determining what measures are necessary to make reasonable progress.[44]

As EPA has further explained:

- [I]t may be difficult to show reasonableness of a threshold set so high that an uncontrolled or lightly controlled source that is one of the largest contributors to anthropogenic light extinction at a Class I area is excluded;[45]

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[42] *See e.g.*, Comment Letter to Washington - November 2021 at 14 (exempting Cardinal FG Winlock Glass Plant from Four-Factor Analysis).
[43] 40 C.F.R. § 51.308(f)(2).
[44] 2019 Guidance at 19, citing 40 C.F.R. § 51.308(f)(2)(i)("The State must include in its implementation plan a description of the criteria it used to determine which sources or groups of sources it evaluated and how the four factors were taken into consideration in selecting the measures for inclusion in its long-term strategy.").
[45] 2019 Guidance at 19.

- [A] threshold that captures only a small portion of a state's contribution to visibility impairment in Class I areas is more likely to be unreasonable;[46] and
- [A] threshold that excludes a state's largest visibility impairing sources from selection is more likely to be unreasonable.[47]

There are a variety of ways states use high thresholds to screen out sources and emissions. First are the VISTAS states, which used an overly restrictive Area of Influence (AOI) analysis to identify which sources should be Particulate Matter Source Apportionment Technology ("PSAT") tagged, which failed to properly identify all sources contributing to adverse visibility conditions at VISTAS Class I areas.[48] "Most VISTAS states selected an AOI threshold in the range of 2-5% of the overall sulfate and/or nitrate impacts to identify emission sources contributing to visibility impairment. As a result, most states identified six or fewer contributing emission sources through the AOI analysis."[49]

Second, the VISTAS II CAMx modeling relied on a flawed PSAT modeling analysis that applied an outdated 2028 emissions inventory, provided incomplete information on source-specific contributions to visibility impairment, and carried forward known deficiencies in the modeled sulfate projections.[50] VISTAS coupled the flawed PSAT modeling analysis with a recommendation that only those sources which contribute 1% or greater to either the modeled sulfate or nitrate concentrations would be recommended for the Four-Factor Analysis.[51] As a result, VISTAS concluded that only a relatively small group of emission sources would be considered for the Four-Factor Analysis.[52]

Both screening methods used arbitrary, high thresholds that substantially restricted the total number of sources analyzed. NPCA's independent analysis identified 342 sources and NPS identified 256 sources – but VISTAS identified only 33 sources for all 14 states.[53] Many VISTAS states used a 3% AOI threshold for PSAT tagging and a 3% PSAT impact threshold[54] (some like North Carolina used 3% sulfate-only)[55] for the Four-Factor Analyses. These thresholds are arbitrary and unsupported in the SIPs. Lower thresholds would have resulted in many more AOI

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[46] July 2021 Clarification Memo at 3.
[47] July 2021 Clarification Memo at 3.
[48] Gebhart VISTAS Review Report at 2; *see also id.* at 9-14.
[49] Gebhart VISTAS Review Report at 2.
[50] Gebhart VISTAS Review Report at 2; *see also id.* at 9-14.
[51] Gebhart VISTAS Review Report at 2.
[52] Gebhart VISTAS Review Report at 2.
[53] Letter from Stephanie Kodish, NPCA, Leslie Griffith, SELC, and David Rogers, Sierra Club to VISTAS State Air Directors, "Significant Flaws in VISTAS Regional Haze CAMx Modeling and Methods; Recommendations to Develop Compliant State Implementation Plans" (May 12, 2021), at
[54] *See e.g.*, Comment Letter to Tennessee at 8; *see also* Comment Letter to Florida at 12; *see also* Comment Letter to North Carolina at 14; *see also* West Virginia at 23, 25.
[55] Comment Letter to North Carolina at 6.

sources being PSAT tagged and many more PSAT-tagged sources being selected for Four-Factor Analyses.

Another example is MANE-VU, which used a 3.0 Mm^{-1} (inverse megameters) single source impact threshold for defining sources to evaluate with a Four-Factor Analysis, which results in an extremely high threshold that omits most sources from evaluation. Many states in the region have relied on this threshold.[56] Connecticut's reliance on the MANE-VU threshold resulted in a threshold that excluded every source in the State from the Four-Factor Analysis requirement,[57] demonstrating the need for states to evaluate and adjust the RPO-created thresholds for each Class I area. Similarly, Massachusetts, relying on MANE-VU's threshold, selected only two sources for Four-Factor Analyses, one of which ceased operation in the first planning period, 2017.[58]

EPA must ensure that screening thresholds are set to capture a significant degree of visibility impairing emissions. The 2016 Proposed Guidance set 80% of

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[56] *See e.g.*, Comment Letter to New Hampshire at ; *see also* Comment Letter to Connecticut at 7, 8; *see also* Comment Letter to Massachusetts at 7, 8; *see also* Comment Letter to New Jersey at 10, 11, 12, 13 (MANE-VU identified only one source in New Jersey state that exceeded its recommended 3.0 Mm-1 extinction threshold: the BL England coal and oil-fired power plant and NJDEP did not conduct a four-factor control analysis for the units at BL England because the units have essentially shut down.); *see also* Comment Letter to New York at 11, 12, 13, 14 (MANE-VU identified two sources in New York state that exceeded its recommended 3.0 Mm-1 extinction threshold: LaFarge Building Materials and Finch Paper. However, NYSDEC did not conduct a four-factor analysis of controls for these sources. Instead, NYSDEC seemed to rely on other programs and/or decisions made to reduce emissions and "their potential max extinction to below the 3.0 Mm-1 threshold." NYSDEC provided no details on these programs or whether such requirements were enforceable, did not quantify emissions reductions, and did not provide any new modeling to verify visibility impacts of these two sources with the reduced emissions.)

[57] Comment Letter to Connecticut at 8-9; *see also id.* at 9 (Based on the Q/d values, it's clear that Connecticut needs to conduct a Four-Factor Analysis for four municipal waste combustion sources to inform its reasonable progress determination, specifically: Wheelabrator Bridgeport LP; CRRA/Mid-Connecticut; Covanta Southeastern CT; and Wheelabrator Lisbon LP.

[58] Comment Letter to Massachusetts at 6 (By relying on the emission sources modeled by MANE-VU, MassDEP identified and selected only two point sources (EGUs) affecting Class I sites (Brayton Point unit 4 and Canal Station unit 1) out of which, Brayton Point, already ceased operations in 2017.); *see also id.* at FN28 ("The Federal Land Managers explained during their consultation with the State that this closure was during the first planning period and not the planning period for the SIP proposed for the second planning period – thus emissions cannot be used to offset emission for the second planning period. Email from Don Shepard, NPS, to Mark Wert (Nov. 23, 2020) ("Since Brayton Point was retired in 2017, i [sic] do not think its closure can be used to offset other emissions during this planning period.").

emissions,[59] and the FLMs rely on this figure,[60] as have some states (*e.g.*, Oregon[61]). Our organizations submit that 80% is an appropriate metric. EPA should apply the 80% threshold, including in future guidance.

2. States must not unjustifiably dismiss emission reduction measures that, if appropriately assessed, would satisfy the Four-Factor Analysis.

a. States must not assert visibility benefits are too small.

While visibility is the goal of the regional haze program,[62] the reasonable progress Four-Factor Analysis evaluation does not itself incorporate visibility.[63] Because visibility is not one of the four statutory factors, a state cannot rely on visibility impacts to exclude emission reducing measures from sources that otherwise satisfy the four statutory factors. The plain language of the Act clearly bounds the information for each of the factors. Therefore, it is inconsistent with the Act's Four-Factor analysis for a state's existing and future RP analyses to consider information outside the bounds of these factors (*e.g.*, air quality impacts, modeling results, and emission inventories).[64] Additionally, where a state includes visibility as additional weight-of-evidence in its decision-making to reject controls, this too is inconsistent with the Act.

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[59] EPA, "Draft Guidance on Progress Tracking Metrics, Long-term Strategies, Reasonable Progress Goals and Other Requirements for Regional Haze State Implementation Plans for the Second Implementation Period," EPA-457/P-16-001 (July 2016), at 72 ("The EPA considers 80 percent to be a reasonably large fraction for this purpose in the second planning period. If an approach does not reach this 80 percent inclusion level, the threshold for major stationary sources, minor stationary sources and/or categories of area stationary sources should be reassessed for reasonableness.[103]"); *see also id.* FN103 ("This recommendation based on 80 percent of the aggregate light extinction impacts may not be fully applicable when Q/d is used as a surrogate for visibility impacts. Mechanically, it is possible to compare the sum of the individual Q/d values for the "above threshold sources" to the sum of the Q/d values for all in-state sources, but this may not give a good indicator of what fraction of in-state light extinction impacts are attributable to the first set of sources. A state planning on relying on Q/d, or another surrogate, for screening purposes should consult with its EPA regional office about the specifics of its planned screening approach."), https://www.epa.gov/sites/default/files/2016-07/documents/draft_regional_haze_guidance_july_2016.pdf.

[60] *See, e.g.*, South Carolina Regional Haze Plan, App'x H-1 at pdf page 7.

[61] *See e.g.*, Oregon Department of Environmental Quality, "Regional Haze: 2018-2028 State Implementation Plan, Public Notice Draft" (Aug. 27, 2021), https://www.oregon.gov/deq/Regulations/rulemaking/RuleDocuments/RHSIP2021plan.pdf (last visited Jan. 21, 2022).

[62] 42 U.S.C. § 7491(a)(1).

[63] The Act provides that "in determining reasonable progress there shall be taken into consideration the costs of compliance, the time necessary for compliance, and the energy and nonair quality environmental impacts of compliance, and the remaining useful life of any existing source subject to such requirements." 42 U.S.C. § 7491(g)(1).

[64] The regional haze program takes air quality impacts into consideration in selecting which sources are evaluated for the RP Four-Factor Analysis, and to apply that same metric twice is not consistent with how Congress designed the program.

Many states assert that visibility benefits are too small as an excuse to avoid controlling sources, including when cost-effective controls are identified via a Four-Factor Analysis. Visibility is not a fifth factor RP consideration under the Act.[65] For example, Texas identified at least 18 facilities for which there were cost-effective controls available, but the State refused to impose control measures at any of those sources because the visibility benefits would purportedly be too small and the annualized, aggregate cost of controls would be too large.[66] Other states that required no controls based on small visibility benefits, despite Four-Factor Analyses with cost-effective controls include: Tennessee;[67] Nebraska;[68] North Carolina;[69] and Washington.[70]

This approach is inconsistent with the Act, and EPA must ensure that states remove consideration of visibility (or the purported lack of perceptible visibility improvements) in selecting emission controls. While visibility is the goal of the regional haze program, *id.* at 7491(a)(1), the four-factor reasonable progress evaluation does not itself incorporate visibility, and states may not give it the same weight as the four statutory factors. Regional haze is "visibility impairment that is caused by the emission of air pollutants from numerous sources located over a wide geographic area."[71] At any given Class I area, hundreds or even thousands of individual sources may contribute to regional haze. Thus, it is *not* appropriate to reject a control measure for a single emission unit, a single source, or even a group of sources on the basis of the associated visibility benefits being imperceptible to the human eye.

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[65] *See e.g.*, Comment Letter to South Carolina at 68-69 ("Because DHEC has used visibility impacts (or supposedly minimal or insufficient visibility improvements) to reject emission controls at a number of large air pollution sources, the Proposed SIP is at odds with the plain language of the CAA. South Carolina cannot rely on visibility impacts to exclude emission reducing measures from sources that otherwise satisfy the four statutory factors.").

[66] Comment Letter to Texas at 20-22 ("Texas' Approach to Weighing Cost-Effectiveness to Visibility Impact is Flawed"); *see also* Texas Commission on Environmental Quality, 2021 Regional Haze State Implementation Plan at 7-14 to 7-15 (June 20, 2021).

[67] Comment Letter to Tennessee at 57.

[68] Comment Letter to Nebraska at 2.

[69] Comment Letter to North Carolina at 3.

[70] Comment Letter to Washington - November 2021 at 16, 44 (deferring all sources in the pulp and paper mill sector from conducting the required Four-Factor Analyses, despite the McKinley Paper Company having the second highest Q/d value (83.1) of any facility for which Ecology requested four-factor analyses; and the three other pulp and paper mills being in the top ten highest Q/d values as calculated by Ecology – the WestRock Tacoma facility, the Nippon Dynawave Packaging Company in Longview, and the Pt Townshend Paper Corporation); *see also* Comment Letter to Indiana at 13, citing 40 C.F.R. § 51.308(f)(2)(i); *see also id.* (explaining that "the state has an obligation to explain 'the criteria it used to determine which sources or groups of sources it evaluated and how the four factors were taken into consideration in selecting the measures for inclusion in its long-term strategy'" citing at FN53 *Motor Vehicle Mfrs. Assn. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) ("[T]he agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'").

[71] 40 C.F.R. § 51.301.

As a fundamental matter, EPA must affirm the fundamental principle that the degree of visibility improvement may not be used as screening metric to avoid a four-factor control analysis. Nor may states use the lack of visibility improvement as a factor that overrides controls that otherwise satisfy a four factor reasonable progress analysis. In other words, at the control analysis stage, states should consider *only* the four statutory factors to determine whether control measures are necessary to achieve reasonable progress. The Regional Haze Rule and EPA's 2019 Guidance make clear that states cannot weigh the visibility benefit of controls against the four statutory factors to identify appropriate control measures. Rather, for each source or source category that is selected for further analysis during the screening process, states would require whatever control measures are determined upon considering the four statutory factors alone.

b. States must independently review industry Four-Factor Analysis instead of assuming their correctness and adopting them without question.

The duty to ensure reasonable progress requirements are met for purposes of submitting a SIP to EPA rests with the state, not the source. Therefore, if a source is unwilling to prepare the analysis, the state must conduct the analyses to inform its reasonable progress determination. As discussed below in section 2.b, we ask that EPA support states' use of EPA's tools (*e.g.*, Control Cost Manual) to create their own Four-Factor Analyses). Moreover, it is the state's responsibility to independently review, evaluate and verify a draft Four-Factor Analysis submitted by a source and submit a SIP that complies with the Act.[72] A state must not "rubber stamp" a source's analysis. Despite the requirement for states to conduct an independent emission control analyses for any sources many states did not,

[72] 40 C.F.R. § 51.308(f)(2)(i)(" *The State* must evaluate and determine the emission reduction measures that are necessary to make reasonable progress by considering the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected anthropogenic source of visibility impairment. The State should consider evaluating major and minor stationary sources or groups of sources, mobile sources, and area sources. *The State* must include in its implementation plan a description of the criteria it used to determine which sources or groups of sources it evaluated and how the four factors were taken into consideration in selecting the measures for inclusion in its long-term strategy. In considering the time necessary for compliance, if the State concludes that a control measure cannot reasonably be installed and become operational until after the end of the implementation period, the State may not consider this fact in determining whether the measure is necessary to make reasonable progress." (emphasis added); *see also* 42 U.S.C. § 7491(g)(1); *see also* 40 C.F.R. §§ 51.308(d)(3), (f)(2)(i); *see also* 42 U.S.C. §§ 7410(a)(2)(A); 7491(b)(2) (SIP must include among other things, requiring enforceable emission limitations necessary to ensure reasonable progress).

including, Indiana,[73] Florida,[74] Louisiana,[75] Ohio,[76] South Carolina,[77] Tennessee,[78] Texas.[79] The lack of independent review by states arose in other areas as well, for example, states: relied on flawed RPO source screening analyses and did not evaluate an adequate number of sources and emissions;[80] neglected to consider and respond to FLM comments;[81] and did not review information provided during interstate consultation.[82] Indeed, as the Regional Haze Rule makes clear, the *state* has a duty to conduct a "robust" analysis of potential reasonable progress controls, and must "document the technical basis, including modeling, monitoring, cost, engineering, and emissions information, on which the State is relying to determine the emission reduction measures that are necessary to make reasonable progress in each mandatory Class I Federal area it affects."[83] If a source prepares a flawed, incomplete or undocumented Four-Factor Analysis, the state must either require the source to make the necessary corrections or make the corrections itself and ensure that the Four-Factor Analyses is accurately and completely documented *before* the start of the public notice and comment period.[84] This lack of basic documentation not only precludes the state and any independent reviewer from

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[73] Comment Letter to Indiana at 4, 12-15.
[74] Comment Letter to Florida at 14, 15, 16, 18, 19, 20, 21, 22.
[75] Comment Letter to Louisiana at 2, 9-12.
[76] Comment Letter to Ohio at 13 (General James M. Gavin Power Plant, Kyger Creek Power Plant).
[77] Comment Letter to South Carolina at 18.
[78] Comment Letter to Tennessee at 21.
[79] Comment Letter to Texas at 11 ("This lack of documentation for the basic data that prevents an independent reviewer from replicating most of Texas' control cost analyses violates multiple portions of section 51.308..." *citing* 40 C.F.R. §§ 51.308(f), (f)(2)(iii), (f)(3)(ii)(B).).
[80] Similarly, where a Regional Planning Organization's reasonable progress analyses are flawed, the state must conduct must conduct independent analyses to inform its reasonable progress determination. *See e.g.*, Comment Letter to Connecticut at 5-12 (reliance on MANE-VU's assessments); *see also* Comment Letter to Florida at 10-13 (reliance on VISTAS flawed methodology for source selection); *see also* Comment Letter to Massachusetts at 5-12 (reliance on MANE-VU's assessments); *see also* Comment Letter to North Carolina at 11-14, (reliance on VISTAS flawed methodology for source selection); *see also* Comment Letter to South Carolina at 19-23 (reliance on VISTAS flawed methodology for source selection); *see also* Comment Letter to Tennessee at 17-21 (reliance on VISTAS flawed methodology for source selection).
[81] States also do not respond to the FLMs' comments on Four-Factor Analyses prepared by the sources, which indicates a state, fully supports the company's assertions. *See e.g.*, Comment Letter to Ohio at 20.
[82] *See e.g.*, Comment Letter to South Carolina at 52 ("... there is nothing in South Carolina's SIP that demonstrates DHEC conducted an independent evaluation of what it received from Pennsylvania and Ohio.); *see also* Comment Letter to Tennessee at 38 ("For the states TDEC did hear from and what information we found for the states that did not respond, there is nothing in the Draft SIP that demonstrates TDEC conducted an independent evaluation of what it received and found from the other states. Instead, TDEC sums up its state-to-state consultations by saying it "agrees with all of the decisions made by other state agencies concerning the emission sources ..."*citing* Draft SIP at 218.); *see e.g.* Comment Letter to West Virginia at 64-65.
[83] 40 C.F.R. § 51.308(f)(2)(iii).
[84] *See e.g.*, Comment Letter to Indiana at 12-15 (IDEM Failed to Conduct Any Independent Emission Control Analyses for Any Sources).

verifying the respective utility modeling or control cost analyses, but it is contrary to the Act and the RHR.[85]

In nearly all SIPs reviewed, the states accept source claims regarding costs with little to no documentation (specifically capital costs). Additionally, despite EPA final actions during the first planning period disapproving the use of flawed information, the states continue to use: improper interest rates;[86] equipment life;[87] and disallowed costs such as escalation during construction;[88] Allowance for Funds Used During Construction ("AFUDC");[89] contingency factor;[90] and owners costs.[91, 92] Moreover, states routinely only consider controls if they are in the RACT, BACT, LAER Clearinghouse ("RBLC").[93] While EPA created the RBLC to be used as a data

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[85] 2019 Guidance at 22.

[86] *See e.g.*, Comment Letter to Florida at 21, 22, 34; *see also* Comment Letter to Indiana at 24, 27, 29, 32, 35, 41; *see also* Comment Letter to Louisiana at 15, 16, 26, 27; *see also* Comment Letter to North Carolina at 21; *see also* Comment Letter to Ohio at 12, 14, 20, 39-42, 44; *see also* Comment Letter to South Carolina at 44-48; *see also* Comment Letter to Tennessee at 21, 30-32; *see also* Comment Letter to Texas at 8, 9, 12, 13, 14, 16; *see also* Preliminary Comment Letter to Virginia at 5, 6; *see also* Letter to Washington at 33, 36, 38, 40-42, 45, 46-50.

[87] *See e.g.*, Comment Letter to Florida at 21, 33; *see also* Comment Letter to Indiana at 29, 32, 35, 41; *see also* Comment Letter to Louisiana at 15, 27; *see also* Comment Letter to North Carolina at 21; ; *see also* Comment Letter to Ohio at 12, 15, 20, 39, 41, 42, 47, 48; *see also* Comment Letter to Tennessee at 21, 30, 31, 32; *see also* Comment Letter to Texas at 8, 11 (FN 35), 12-14, 16; *see also* Preliminary Comment Letter to Virginia at 5; *see also* Comment Letter to Washington - November 2021 at 50.

[88] *See e.g.*, Comment Letter to Louisiana at 16; *see also* Comment Letter to Tennessee at 29, 30, 31, 32; *see also* Comment Letter to Washington - November 2021 at 34.

[89] *See e.g.*, Comment Letter to Florida at 22, 35; *see also* Comment Letter to Ohio at 14; Comment Letter to South Carolina at 44, 45; *see also* Comment Letter to Tennessee at 28; *see also* Comment Letter to Texas at 16.

[90] *See e.g.*, Comment Letter to Louisiana at 16; *see also* Kordzi Report for Tennessee at 29-30, 31, 32.

[91] *See e.g.*, Comment Letter to Florida at 35; *see also* Comment Letter to Louisiana at 16.

[92] *Oklahoma v. U.S. E.P.A.*, 723 F.3d 1201, 1212 (10th Cir. 2013) (holding EPA has a reasonable basis for rejecting cost estimates where the agency explained the estimates "contain[ed] ... fundamental methodological flaws, such as including escalation and Allowance for Funds Used During Construction (AFUDC)..." and that "[t]he cost of scrubbers would not be substantially higher than those reported for other similar projects if OG & E had used the costing method and basis, i.e., overnight costs in current dollars, prescribed by the Control Cost Manual...") (internal citations omitted).

[93] EPA, RBLC, https://www.epa.gov/catc/ractbactlaer-clearinghouse-rblc-basic-information#:~:text=EPA%20established%20the%20RACT%2FBACT%2FLAER%20Clearinghouse%2C%20or%20RBLC%2C%20to,agencies%20and%20to%20aid%20in%20future%20case-by-case%20determinations (The terms "RACT," "BACT," and "LAER" are acronyms for different program requirements under the NSR program. **RACT, or Reasonably Available Control Technology**, is required on existing sources in areas that are not meeting national ambient air quality standards (*i.e.*, non-attainment areas). **BACT, or Best Available Control Technology**, is required on major new or modified sources in clean areas (*i.e.*, attainment areas). **LAER, or Lowest Achievable Emission Rate**, is required on major new or modified sources in non-attainment areas.")

base of air pollution technology information it is not a comprehensive compilation.[94] There is also a general lack of documentation for all issues relating to the Four-Factor Analyses, including: capital, operational and maintenance costs;[95] unit-specific emissions;[96] retrofit factors;[97] and the other information necessary for an analysis.[98] In many instances, states use inaccurate information, which inflates the cost-effectiveness calculations. As discussed below, these errors appear despite early and detailed comments from the FLMs pointing out the need for corrections.

Additionally, most of the proposed SIPs do not include any information on unit-specific emissions, making it impossible for the public to review, comment and determine if correct units in a facility are being analyzed, and the historical emissions of the units being analyzed. The public cannot meaningfully comment on the proposed SIPs. Moreover, commenters are forced to submit state freedom of information requests for the unit-specific emission information, which are generally ignored, untimely and/or incomplete. In short, the states' reasonable progress analyses and long-term strategies that lack this information are arbitrary, unlawful, and unapprovable because the agencies fail to consider the relevant statutory and regulatory factors, and fail to articulate a rational connection between the facts in the record and the agencies' final decision.[99]

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[94] *See e.g.*, Comment Letter to Florida at 18, 19; *see also* Kordzi Report on Florida at 14, 15, 25; *see also* Comment Letter to Texas at 17, 18; *see also* Klafka Report on Ardagh Glass at 8 ("There have been additional emission control projects in the U.S. which have not been subject to the PSD regulations so are not documented in the BACT Clearinghouse. These also provide insight into demonstrated emission control methods.").

[95] *See e.g.*, Kordzi Report on Florida at 20, 21, 23, 25, 32, 34; *see also* Comment Letter to Indiana at 21, 26, 32, 33, 36, 37, 38, 40, 41, 53; *see also* Kordzi Report on North Carolina at 45; *see also* Comment Letter to Ohio at 14 FN 42; *see also* Comment Letter to South Carolina at 40, 43, 46; *see also* Comment Letter to Tennessee at 33.

[96] Comment Letter to Michigan at 16-17 ("...EGLE has not presented adequate emissions inventory information, it is not possible for an independent reviewer to validate EGLE's source selection methodology, nevertheless, a number of sources have been identified that were not covered by EGLE in its SIP, including LaFarge Midwest Inc., EES Coke Battery LLC, and U.S. Steel Great Lakes Works –these are sources of visibility impairing pollution identified through NPCA analysis of emissions and distance to Class I areas. EGLE should therefore either discuss why it has not considered the above listed facilities or conduct four-factor analysis on these facilities.").

[97] *See e.g.*, Comment Letter to Florida at 34; Comment Letter to Indiana at 31-32, 41; Kordzi Report on North Carolina at 43-46; Comment Letter to Ohio at 14, 15, 20 (Comment from the FLMs); Comment Letter to South Carolina at 44, 45; Kordzi Report on Tennessee at 34-35; Comment Letter to Washington - November 2021 at 33, 38, 41, 46, 48, 49.

[98] Specific details regarding the states' reliance on the industry-prepared flawed Four-Factor Analyses information is discussed in the expert reports included with the Conservation Organizations' comment letters.

[99] *State Farm*, 463 U.S. at 43; *see also North Dakota v. EPA*, 730 F.3d at 761 (A state's regional haze plan must be "reasonably moored to the Act's provisions" and based on "reasoned analysis" of the facts); *see also Motor Vehicle Mfrs. Assn. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) ("[T]he agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'"); *see also State Farm*, 463 U.S. at 43 (agency action is arbitrary and capricious if, among other things, "the agency

In addition to ensuring that SIPs include complete and documented Four-Factor Analyses, we ask that EPA provide additional support for using its EGU cost calculation spreadsheets for other source types when there is a lack of documentation (*e.g.*, Washington used EPA's spreadsheets when companies submitted costs without documentation, but then said the State needed to conduct further analysis before a finding of cost effectiveness could be made).[100]

EPA must insist that SIPs provide for meaningful public review and comment, and that proposed SIPs be accurate, complete and fully documented *prior* to the start of public comment.

c. *States must not rely on arguments that a source is "effectively controlled."*[101]

States are misinterpreting EPA's 2019 Guidance on "effectively controlled" sources and/or failing to provide analysis to support their determinations.[102] EPA's 2019 Guidance states that it may be reasonable for a state not to select an

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has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise"); *see also North Dakota v. EPA*, 730 F.3d 750, 761 (8th Cir. 2013) (citing *Alaska Dep't of Envtl. Conservation v. EPA*, 540 U.S. 461, 485, 490 (2004) (EPA must ensure that the state's regional haze plan is "reasonably moored to the Act's provisions" and based on "reasoned analysis" of the facts)).

[100] Comment Letter to Washington - November 2021 at 30-31, 34, 37, 41; *see also* Kordzi Report on Ohio at 32 (explaining that the "Sargent and Lundy (S&L) wet and dry scrubber cost algorithms commissioned by EPA for use in its IPM modeling" are discussed in the Control Cost Manual and allows their use, but cautions that they must be modified to remove AFUDC and owner's' costs,[50]" FN50 citing Control Cost Manual, Chapter 1 Wet and Dry Scrubbers for Acid Gas Control, April 2021, page 1-49); *id.* (The Kordzi Report further explains that "[t]hese cost algorithms, along with the described adjustments have been made and utilized by EPA in the past, including its Texas BART FIP,[51]" (citation omitted)).

[101] July 2021 Clarification Memo at 5. Our comment letters also present this issue as a state relying on what it asserts are the "best performing controls" without providing a technical justification and analyses.

[102] *See e.g.*, Comment Letter to Florida at 13, 14, 17, 18, 19, 20; *see also* Comment Letter to North Carolina at 24 FN128, 41; *see also* Comment Letter to New Jersey at 16-17; *see also* Comment Letter to New York at 23-24, 26; *see also* Comment Letter to Ohio at 12, 13, 20 FN69; *see also* Comment Letter to South Carolina at 3, 25-26, 34, 44, 52 (regarding Pennsylvania's assertions that Units 1 and 3 at Genon NE Mgmt Co /Keystone Generating Station), 53-54 (regarding Ohio's assertions that Boilers B003 and B004 at the Gavin Power Plant), 58 (NPS consultation comments); *see also* Comment Letter to South Carolina at 29; *see also* Comment Letter to Tennessee at 43 (FLMs consultation comments); *see also* Kordzi Report on Tennessee at 19-20; *see also* Comment Letter to West Virginia at 26, 34, 35, 59, 61 (NPS consultation comment), 67 (regarding Kentucky's assertions for Units 1 and 4 at the Tennessee Valley Authority - Shawnee Fossil Plant), at 67-69 (regarding Ohio's assertions at Cardinal Operating Company - Cardinal Power Plant, Lightstone Generation LLC - General James M. Gavin Power Plant, Ohio Valley Electric Corp. - Kyger Creek Generating Station).

"effectively controlled source" for controls in its regional haze plan, but EPA was referring to sources which had pollution controls installed recently to meet a Clean Air Act requirement for which there is a low likelihood of technological advancement in controls that could provide further reasonable progress.[103] Even for sources with recent pollution controls installed or that are otherwise effectively controlled, EPA's 2019 Guidance still requires that a state that does not select such a source for evaluation of controls to meet reasonable progress to "explain why the decision is consistent with the requirement to make reasonable progress, i.e., why it is reasonable to assume for the purposes of efficiency and prioritization that a full four-factor analysis would likely result in the conclusion that no further controls are necessary."[104] Moreover, SIPs that rely on the "effectively controlled" argument, must show that a Four-Factor Analysis would likely result in the conclusion that no further controls are necessary.[105]

Indeed, EPA has previously indicated that scrubber and SCR systems should be assessed for upgrades and that these upgrades are likely very cost-effective.[106] EPA's July 2021 Clarification Memo underscores this point making clear that in evaluating reasonable progress for all sources, states should consider the "full range of potentially reasonable options for reducing emissions . . . [and] may be able to achieve greater control efficiencies, and, therefore, lower emission rates, using their

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[103] 2019 Guidance at 22.
[104] 2019 Guidance at 22.
[105] 2019 Guidance at 19; *see also* July 2021 Clarification Memo at 5.
[106] *See, e.g.*, 40 C.F.R. § 51.308(f)(2)(i) (The State must evaluate and determine the emission reduction measures that are necessary to make reasonable progress by considering the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected anthropogenic source of visibility impairment."); *see also* 82 Fed. Reg. at 3088 ("Consistent with CAA section 169A(g)(1) and our action on the Texas SIP, a state's reasonable progress analysis must consider a meaningful set of sources and controls that impact visibility. If a state's analysis fails to do so, for example, by . . . failing to include cost-effective controls at sources with significant visibility impacts, then the EPA has the authority to disapprove the state's unreasoned analysis and promulgate a FIP.").

Even if a source has a limited remaining useful life, EPA's Guidance contemplates that states consider cost-effective operational upgrades. Regional Haze Rule Guidance § II.B.3(f) ("If a control measure involves only operational changes, there typically will be only small capital costs, if any, and the useful life of the source or control equipment will not materially affect the annualized cost of the measure."); *see also* 70 Fed. Reg. 39,103, 39,171 (July 6, 2005) (where EPA has made it a point in past actions to ensure that existing controls are examined to determine if they can be cost-effectively upgraded. For instance, the 2005 BART revision to the Regional Haze Rule devotes several paragraphs to specific potential scrubber upgrades it recommends be examined.); *see also* 81 Fed. Reg. 295, 305 (Jan. 5, 2016) (EPA also demonstrated that scrubber upgrades to a number of coal-fired power plants utilizing outdated and inefficient scrubber systems were highly cost-effective, and could achieve removal efficiencies of ninety-five percent which is near the ninety-eight to ninety-nine percent removal efficiencies of newly-installed scrubber systems.); *see also* 82 Fed. Reg. 3078, 3088 (Jan. 10, 2017) (EPA noted in its 2017 Regional Haze Rule revision, EPA disapproved Texas' four-factor analysis in part because "it did not include scrubber upgrades that would achieve highly cost-effective emission reductions that would lead to significant visibility improvements.").

existing measures."[107] Therefore, a state must first subject a source to a Four-Factor Analysis under section 51.308(f)(2)(i) before it is able to determine whether there are no emission reducing options available (including upgrades to existing controls).

Contrary to these requirements, many states suggest that where a (non-regional haze) standard is good enough for another program it's good enough for reasonable progress (*e.g.*, RACT in Washington, MATS and other existing programs/requirements for the VISTAS states[108]). Nearly all states do not consider upgrades/optimizations to existing controls or operating SCRs[109] and requiring controls all year.[110]

Contrary to the state's determinations regarding "effectively controlled"—every state we assessed thus far has EGUs with scrubber and/or SCR systems that are easily determined by our experts to be underperforming (*e.g.*, Indiana,[111]

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[107] July 2021 Clarification Memo at 7.

[108] *See e.g.*, Comment Letter to Florida at 13, 14, 15, 16, 21, 26, 27 FN129; see also Comment Letter to New York at 24 (NPS consultation comment); *see also* Comment Letter to South Carolina at 25-27, 34, 52-53 (Pennsylvania erroneously relied on the MATS rule for its analysis of the Genon NE Mgmt Co / Keystone Generating Station), 58 (NPS consultation comments), 66; *see also* Comment Letter to Michigan at 15-16; *see also* Comment Letter to Tennessee at 51; *see also* Comment Letter to West Virginia at 26-27, 34, 35, 67 (Kentucky's assertions regarding Units 1 and 2 at the Tennessee Valley Authority - Shawnee Fossil Plant), 71-72 (Pennsylvania erroneously relied on the MATS rule for its analysis of the Genon NE Mgmt Co / Keystone Generating Station), 75; additionally states also erroneously excuse sources from a Four-Factor Analyses if they are meeting NAAQS (current and future), NSPS, MACT, NESHAP, BACT, BART, CAIR, CSAPR, have a Title V permit, or LAER requirements).

[109] *See e.g.*, Comment Letter to Florida at 16, 17, 20, 21, 31, 32, 33, 34, 39; *see also* Comment Letter to Indiana at 15, 20, 21, 25, 26, 35, 42, 43, 44; *see also* Comment Letter to Louisiana at 13, 18; *see also* Comment Letter to North Carolina at 3, 8, 15, 23 (North Carolina did not consult with Ohio regarding the Cardinal Power Plant and Kyger Creek Power Plant, where upgrades must be considered), 23-24 (North Carolina did not consult with Pennsylvania regarding upgrades at the Seward Power Plant), 24-25; *see also* Comment Letter New Jersey at 17-19; *see also* Comment Letter to New York at 27, 29; *see also* Comment Letter to Ohio at 21, 22; *see also* Comment Letter to South Carolina at 27, 28, 29, 33, 34, 35, 36, 46, 48, 52-53, 58 (NPS consultation comment), 73, 74; *see also* Comment Letter to Michigan at 16; *see also* Comment Letter to Tennessee at 29, 40, 41, 61, 62; *see also* Comment Letter to Texas at 9, 10, 11, 12, 13, 18 FN51, 37.

[110] *See e.g.*, Comment Letter to Indiana at 24; *see also* Comment Letter to New Jersey at 15, 16, 17; *see also* Comment Letter to New York at 23, 24, 25, 26; *see also* Comment Letter to Ohio at 13, 21; *see also* Comment Letter to Washington - November 2021 at 29; *see also* Comment Letter to South Carolina at 36; *see also* Comment Letter to Tennessee at 44-45.

[111] Kordzi Report on Indiana at 11 (Duke Gibson Unit 1), 14 ("The [AEP] Rockport SCR systems have been underperforming since they came online."), 21 (Petersburg), 24 (Cayuga).

Ohio,[112] North Carolina,[113] Louisiana,[114] South Carolina,[115]). As explained in several of the Kordzi Reports, the fact that an EGU is equipped with the most effective control *technology* (e.g., scrubbers and/or Selective Catalytic Reduction ("SCRs")) does not mean those controls are operating at their most effective levels.[116] "In Ohio, the State did not consider its EGUs because they have scrubbers installed—notably, the scrubbers were installed in the mid-1990s and have poor emission control rates.[117] Furthermore, emissions from units with SIP enforceable retirements dates five or more years away could still be reduced by using low sulfur coal, upgrading existing controls, or installing cost effective controls such as Dry Sorbent Injection ("DSI"), Selective Non-Catalytic Reduction ("SNCR"), and other controls.

EPA must give effect to its July 2021 Clarification Memo, and not approve SIPs that that erroneously rely on the "effectively controlled" argument to avoid the Four-Factor Analyses.

d. States must establish cost-effectiveness thresholds that are higher than the first round.

Cost-effectiveness thresholds for the second planning period should be higher than the first round, which at a minimum supports requirements that result in controls already required at similar sources. As we've expressed in our comments, we are concerned with some states using the same $5,000 per ton threshold as last round for cost analysis[118] or dismissing any cost of control. For example, Ohio,

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[112] *See generally* Kordzi Report on Ohio at 5-7; *id.* at 10 (Cardinal); *id.* at 13 (Bayshore); *id.* at 14 (Gavin); *id.* at 21 (Kyger Creek only utilizes its SCR systems at their full capabilities during ozone season); *id.* at 23-25 (W H Sammis).

[113] Kordzi Report on North Carolina at 15-18 (Marshall Power Plant); *id.* at 18-21 (Duke Energy Belews Creek Power Plant); *id.* at 21-24 (Duke Energy Roxboro Power Plant); *id.* at 24-26 (Duke Energy Cliffside Power Plant).

[114] Stamper Report on Louisiana at 35 (R.S. Nelson); *id.* at 46 Big Cajun II; *id.* at 58 (Brame Energy Center); *id.* at 66 (Ninemile).

[115] *See generally* Kordzi Report on South Carolina at 16 ("As is demonstrated elsewhere in this report, there are a number of sources with likely cost-effective NOx controls that SC DHEC should have required to be assessed for four-factor analyses. For instance, examples are cited of EGUs that already have installed the best NOx control available—SCR systems. In every case, these EGU SCR systems have demonstrated an ability to control NOx to a much higher level than they are currently achieving. The only apparent reason for this lax performance is that SC DHEC's permits do not require them to perform better. Thus, the "control" that would be evaluated would likely involve little to no capital expense, since the infrastructure is already present. Instead, the costs that would be evaluated may well be confined to additional reagent and perhaps better catalyst management.")

[116] *See e.g.*, Kordzi Report on Ohio at 13.

[117] Comment Letter to Ohio at 12-16.

[118] This is despite First Round SIPs that resulted in a wide range of cost-effectiveness values that states and EPA found acceptable, including values over $5,000/ton. *See, e.g.*, Comment Letter to Texas at 19 ("On page 7-12, and in on page B-14 of Appendix B, Texas discusses its rationale for establishing a cost-effectiveness threshold of $5,000, over which it does not consider any control,

North Carolina and Michigan are examples of states that did not identify a cost-effectiveness control threshold and instead created their own concoction of why they need not consider or require emission reduction measures. In contrast, several states are using a cost-effectiveness threshold of $10,000 per ton (*e.g.*, Oregon[119] and Colorado),[120] which demonstrates the reasonable approach of ratcheting up of costs from one planning period to the next. In its Regional Haze Guidance and consistent with its regulations, EPA advises states to exercise caution in establishing the cost-effectiveness threshold:

> As the Ninth Circuit explained in *NPCA v. EPA*, 788 F.3d at 1142, the Regional Haze Rule does not prevent states from implementing "bright line" rules, such as thresholds, when considering costs and visibility benefits. However, the state must explain the basis for any thresholds or other rules (see 40 CFR 51.308(f)(2)). If a state applies a threshold for any particular metric to remove control measures from further consideration before all other relevant factors are considered, it should explain why its selected threshold is appropriate for that purpose, i.e., why its application is consistent with the requirement to make reasonable progress.[121]

We request that EPA presume a control is cost-effective if it is operating or required at similar sources (including voluntary installations used to avoid PSD or

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regardless of visibility impact. Texas describes how it considered $2,700/ton and $10,000/ton thresholds, but concluded that $5,000 represented a "reasonable mid-point." This choice by Texas is completely arbitrary. No information was presented that would discriminate $5,000/ton from $7,500/ton or some other value.").; *see also*, Comment Letter to Indiana at 17-18 (Texas is using $5,000/ton as a cost effectiveness threshold. *see* https://www.tceq.texas.gov/assets/public/implementation/air/sip/haze/2021RHSIP_pro.pdf (last visited Jan. 21, 2022); Arizona is using $4,000 to $6,500/ton. *see*, e.g., Arizona Department of Environmental Quality, 2021 Regional Haze Four-Factor Initial Control Determination, Tucson Electric Power Springerville Generating Station, at 15, https://www.azdeq.gov/2021-regional-haze-sip-planning (last visited Jan. 21, 2022); New Mexico is using a floor of $7,000 per ton. *see* NMED and City of Albuquerque, Regional Haze Stakeholder Outreach Webinar #2, at 12, https://www.env.nm.gov/air-quality/wpcontent/uploads/sites/2/2017/01/NMED_EHD-RH2_8_25_2020.pdf.

[119] Oregon is using $10,000/ton or possibly even higher. *See, e.g.*, September 9, 2020 letter from Oregon Department of Environmental Quality to Collins Forest Products, at 1-2, https://www.oregon.gov/deq/aq/Documents/18-0013CollinsDEQletter.pdf (last visited Jan. 21, 2022).

[120] "Prehearing Statement of the Colorado Department of Public Health and Environmental, Air Pollution Control Division," *In the Matter of Proposed Revisions to Regulation No 23* (Oct. 7, 2021) at 7, (further explaining that "[t]his threshold is applied to the individual pollutants in the control strategy analyses, specifically NOx, PM, and SO_2. This threshold value is an increase from Round 1 and reflects the fact that with each successive round of planning, less costly and easier to implement strategies have already been adopted. Colorado has maintained this threshold throughout the planning process despite the fact that each of the Class I areas in Colorado is below the URP for 2028."), https://drive.google.com/file/d/1e0Qy1qFQERRcGcvHUHihLZGOzjRvqUW4/view?usp=sharing (last visited Jan. 21, 2022).

[121] 2019 Guidance at 38.

other requirements). Generally, controls should be considered cost effective for the source in question unless there are documented unique circumstances. Further, the cost threshold should not be maintained at last round levels, but each round should come with the presumption that cost thresholds must be higher. Moreover, as the Clean Air Act is a technology-forcing statute, it is fitting for states to consider newer applications of control technologies or practices used at an industry or that could be applied across industries to limit emissions to the extent practicable.

3. Reasonable progress determinations must comport with the legal requirements.

Many of the issues discussed above are incorporated into the reasonable progress determination, including costs too high and/or visibility benefits too small to justify controls, and reliance on announced retirements to justify a "no control" decision. Other approvability issues include the following.

a. The Uniform Rate of Progress glidepath is not a safe harbor.

As EPA's 2021 July 2021 Clarification Memo reiterated, SIPs "that conclude that additional controls, including potentially cost-effective and otherwise reasonable controls, are not needed because all of the Class I areas in the state (and those out-of-state areas affected by emissions from the state) are below their uniform rates of progress (URPs)" have not "answer[ed] the question of whether the amount of progress made in any particular implementation period is 'reasonable progress.'"[122] EPA explained that its "2017 RHR preamble and the August 2019 Guidance clearly state that it is not appropriate to use the URP in this way, *i.e.,* as a 'safe harbor.'"[123] In a similar vein, many states assert that control analyses were not necessary considering the significant progress already made towards achieving the national visibility goal.[124] Yet other states asserted that additional controls for

[122] July 2021 Clarification Memo at 15.
[123] July 2021 Clarification Memo at 15-16; *see also* EPA Guidance at 25; *see also* 82 Fed. Reg. 3078, 3093, 3099-3100 (Jan. 10, 2017); *see also* 81 Fed. Reg. 66,331, 66,631 (Sept. 27, 2016); *see also* 81 Fed. Reg. 296, 326 (Jan. 5, 2016) (determining, as part of the reasonable progress federal implementation plan for Texas, "the uniform rate of progress is not a 'safe harbor' under the Regional Haze Rule."); *see also* EPA, Responses to Comments at 120, Promulgation of Air Quality Implementation Plans; State of Texas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan: Best Available Retrofit Technology and Interstate Transport Provisions, EPA Docket No. EPA-R06-OAR-2016-6011 (June 2020) ("EPA has repeatedly and consistently taken the position that meeting a specific reasonable progress goal is not, itself, a "safe harbor," and does not relieve the state of the obligation to consider additional measures for reasonable progress. If it is reasonable to make more progress than the URP, a state must do so, as EPA explained in the 1999 regional haze rule) (citing 64 Fed. Reg. at 35732); *see also* 81 Fed. Reg. at 66,370 ("EPA's longstanding interpretation of the regional haze rule is that 'the URP does not establish a 'safe harbor' for the state in setting its progress goals.") (quoting 79 Fed. Reg. 74818, 74834)).
[124] *See e.g.,* Comment Letter to Indiana at 52.

the EGUs are not necessary to ensure reasonable progress toward natural visibility in Class I areas because visibility *monitoring* indicates that visibility is improving.[125]

North Carolina,[126] Ohio,[127] Tennessee,[128] West Virginia,[129] Indiana,[130] Louisiana,[131] Michigan,[132] South Carolina,[133] Washington,[134] and many other states are making these arguments. We ask that EPA confirm in its communications with all states that the URP is not a safe harbor.

b. States cannot satisfy interstate consultations where they are flawed, incomplete and have no effect.[135]

EPA's regulations require that each applicable implementation plan for a State in which any mandatory Class I Federal area is located contain such emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress toward meeting the national goal.[136] The Clean Air Act further requires states to determine the measures necessary to make reasonable progress towards preventing future, and remedying existing, anthropogenic visibility impairment in all Class I areas.[137] Thus, "Congress was clear that both downwind states (*i.e.*, "a State in which any [mandatory Class I Federal] area . . . is located) and upwind states (*i.e.*, "a State the emissions from which may reasonably be anticipated to cause or contribute to any impairment of visibility in any such area") must revise their SIPs to include measures that will make reasonable progress at all affected Class I areas."[138]

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[125] *See e.g.*, Comment Letter to Indiana at 11.
[126] Comment Letter to North Carolina at 17 ("DAQ attempts to justify deferring any further emission reductions for every major source in the state by pointing out that Class I areas appear to be trending below these area's glide path or URP, which DAQ suggests is sufficient to achieve reasonable progress.).
[127] Comment Letter to Ohio at 18 FN65, 20.
[128] Comment Letter to Tennessee at 58-59.
[129] Comment Letter to West Virginia at 33, 80-84, .
[130] Comment Letter to Indiana at 17-19, 48 ("IDEM Impermissibly Exempts EGUs From a Four-Factor Analysis Based on the State's Purported Compliance with the Uniform Rate of Progress.").
[131] Comment Letter to Louisiana at 10-11 ("...LDEQ attempts to justify 'deferring any further' emission reductions for every major source in the state by pointing out that Louisiana's Breton Wilderness Class I area appears to be trending below these area's glide path or URP, which LDEQ suggests is 'sufficient to achieve reasonable progress.'").
[132] Comment Letter to Michigan at 7-8.
[133] Comment Letter to South Carolina at 39 (argument made by Alumax - Century Aluminum of South Carolina, which the State did not correct.); *id.* at 70 ("DHEC also claims that '[f]or Cape Romain, visibility improvements are ahead of the timeline noted on the URP.'").
[134] Comment Letter to Washington - November 2021 at 58-59.
[135] July 2021 Clarification Memo at 16-17.
[136] 42 U.S.C. § 7491(b)(2).
[137] 42 U.S.C. § 7491(a)(1).
[138] 82 Fed. Reg. at 3,094.

According to EPA, "[t]his consultation obligation is a key element of the regional haze program. Congress, the states, the courts and the EPA have long recognized that regional haze is a regional problem that requires regional solutions."[139] Congress intended this provision of the Clean Air Act to "equalize the positions of the States with respect to interstate pollution,"[140] and EPA's interpretation of this requirement accomplishes this goal by ensuring that downwind states can seek recourse from EPA if an upwind state is not doing enough to address visibility transport.[141]

In developing a long-term strategy for regional haze, EPA's regulation 40 C.F.R. § 51.308(f)(2) requires that a state take three distinct steps: consultation; demonstration; and consideration. Specifically, the regulation requires:

> (ii) The State must consult with those States that have emissions that are reasonably anticipated to contribute to visibility impairment in the mandatory Class I Federal area to develop coordinated emission management strategies containing the emission reductions necessary to make reasonable progress.
> (A) The State must demonstrate that it has included in its implementation plan all measures agreed to during state-to-state consultations or a regional planning process, or measures that will provide equivalent visibility improvement.
> (B) The State must consider the emission reduction measures identified by other States for their sources as being necessary to make reasonable progress in the mandatory Class I Federal area.[142]

Under the Regional Haze Rule, "[w]here the State has emissions that are reasonably anticipated to contribute to visibility impairment in any mandatory Class I Federal area located in another State or States, the State must consult with the other State(s) in order to develop coordinated emission management strategies."[143] Moreover, plan revisions:

> [M]ust provide procedures for continuing consultation between the State … on the implementation of the visibility protection program required by this subpart, including development and review of implementation plan revisions

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[139] 82 Fed. Reg. at 3,085, citing *Vermont v. Thomas*, 850 F.2d 99, 101 (2d Cir. 1988)).
[140] S. Rep. No. 95-127, at 41 (1977).
[141] S. Rep. No. 95-127, at 41 (1977).
[142] 40 C.F.R. § 51.308(f)(2) (emphasis added); *see also*, 64 Fed. Reg. 35,765, 35,735 (July 1, 1999) (In conducting the Four-Factor Analysis, EPA explained that "…the State must consult with other States which are anticipated to contribute to visibility impairment in the Class I area under consideration … any such State must consult with other States before submitting its long-term strategy to EPA.").
[143] 40 C.F.R. § 51.308(f)(3)(i).

and progress reports, and on the implementation of other programs having the potential to contribute to impairment of visibility in mandatory Class I Federal areas.[144]

In its 2017 amendments to the Regional Haze Rule, EPA explained that "states *must* exchange their four-factor analyses and the associated technical information that was developed in the course of devising their long-term strategies. This information includes modeling, monitoring and emissions data and cost and feasibility studies."[145] In the event of a recalcitrant state, "[t]o the extent that one state does not provide another state with these analyses and information, or to the extent that the analyses or information are materially deficient, the latter state should document this fact so that the EPA can assess whether the former state has failed to meaningfully comply with the consultation requirements."[146]

Finally, "[i]f a State contains sources which are reasonably anticipated to contribute to visibility impairment in a mandatory Class I Federal area in another State" that has established reasonable progress goals that are slower than the Uniform Rate of Progress, "the State must demonstrate that there are no additional emission reduction measures for anthropogenic sources or groups of sources in the State."[147] To that end, the "State must provide a robust demonstration, including documenting the criteria used to determine which sources or groups or sources were evaluated and how the four factors required by paragraph (f)(2)(i) were taken into consideration in selecting the measures for inclusion in its long-term strategy."[148] In any event, "[a]ll substantive interstate consultations must be documented."[149]

Nearly all states are ignoring these important and detailed interstate consultation requirements. In general, states don't ask other states to evaluate sources impacting their Class I areas. For example, North Carolina should have asked Ohio to do a four factor analysis for Cardinal and Kyger Creek coal-fired power plants in Ohio,[150] and also asked Pennsylvania to evaluate the Seward coal-fired power plant but did not.[151] Additionally, Louisiana did not ask Alabama for any evaluation of controls even though sources in Mobile, Alabama impact the Breton Wilderness Area;[152] those sources impact the adjacent environmental justice

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[144] 40 C.F.R. § 51.308(f)(4).
[145] 82 Fed. Reg. at 3,088 (emphasis added).
[146] 82 Fed. Reg. at 3,088.
[147] 40 C.F.R. § 51.308(f)(3)(ii)(B).
[148] 40 C.F.R. § 51.308(f)(3)(ii)(B).
[149] 40 C.F.R. § 51.308(f)(2)(ii)(C).
[150] Comment Letter to North Carolina at 23
[151] Comment Letter to North Carolina at 23-24.
[152] Comment Letter to Louisiana at 30-31.

communities.[153] Despite the request from MANE-VU that several states implement certain emission reduction measures under the RHR as MANE-VU's analysis found that the identified states were contributing to visibility impairment at the Acadia National Park Class I Area,[154] states either ignored or disagreed with the request.[155] Even states within MANE-VU did not respond to the MANE-VU Asks and ignored the requests to prepare the Four-Factor Analyses and SIP emission limitations in their SIPs, in some instances erroneously relying on Title V permits that are not in the SIP.[156] In those limited instances where a state asks another state to conduct Four-Factor Analyses, more often than not, the state asked does not respond.[157] Other states spend months arguing with each other—without elevating the disagreements and resolving their differences.

EPA must insist that states comply with the interstate consultation requirements. Indeed, the myriad of states uniformly ignoring these requirements is likely to result in the necessary step of EPA's issuance of regional FIPs that address the interstate regional haze impacts for the recalcitrant states.

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[153] Comment Letter to Louisiana at 31-37 (*i.e.*, four existing steel mills, more than 30 chemical companies, 15 aerospace companies, eight military bases, and more than 200 business supporting oil and gas development including three refineries and petroleum storage and transport facilities.)
[154] Comment Letter to Florida at 39, citing Letter from Jeffrey F. Koerner, Director, Division of Air Resource Management, FL DEP, to Mr. David Foerter, Executive Director Mid-Atlantic/Northeast Visibility Union/Ozone Transport Commission (Jan. 19. 2018).
[155] *See e.g.*, Comment Letter to Florida at 39; *see also* Comment Letter to Ohio at 21; *see also* Comment Letter to Tennessee at 44-45.
[156] *See e.g.*, Comment Letter to Connecticut at 10-11 (for the Ask that requires that "Electric Generating Units (EGUs) with a nameplate capacity larger than or equal to 25 MW with already installed NOX and/or SO2 controls - ensure the most effective use of control technologies on a year-round basis to consistently minimize emissions of haze precursors, or obtain equivalent alternative emission reductions" ("MANE-VU 25 MW Ask") Connecticut's SIP relied on Title V permits for the 13 sources without putting the permit requirements in the SIP); *id.* at 12 (for the Ask regarding fuel switching, Connecticut's SIP similarly relies on Title V permits); *see also* Comment Letter to Massachusetts at 10-11 (the SIP explains that it includes a list of 53 EGU sources that are subject to the MANE-VU 25 MW Ask, yet the SIP neither includes the list of 53 EGU sources nor does it contain SIP emission limitations, instead it lists one Title V permit); *see also* Comment Letter to New York at 10, 22-26.
[157] *See e.g.*, Comment Letter to Tennessee at 38-40 (neither Indiana nor Georgia responded to TDEC's request for Four-Factor Analyses).

c. States must not disregard FLM consultations.

The state must consult with the Federal Land Managers ("FLMs") and look to the FLMs' expertise regarding their resources and harms from air pollution to guide the state to ensure SIPs help restore natural skies.[158] The RHR requires that in "developing any implementation plan (or plan revision) or progress report, the State must include a description of how it addressed any comments provided by the Federal Land Managers.[159] These requirements are further clarified by EPA.[160]

While most states have engaged in some type of consultation process with FLMs, nearly all of them have disregarded the FLM consultation/asks where it really matters—in the emission reductions requirements or as manifested by the lack thereof at visibility impairing sources—and proceeded as they initially intended. To the extent that states have addressed FLM input and made changes from the prepublic version of the proposed SIP, it has largely been cosmetic. Several SIPs indicate only that they "considered" the FLM comments despite the detailed and lengthy formal FLM consultation comments. These states fail to engage with the FLM comments and fail to provide any explanation on why they ignore and/or disagree the FLM comments. Instead, the states reiterate what they have already been planning to do in the SIP. A mere indication that a state "considered" comments is not meaningful consideration of comments.[161]

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[158] FLMs have affirmative duties under 42 U.S.C. §§ 7492(a), (d) as well as mandates to protect and manage public lands under the Wilderness Act (16 U.S.C. §§ 1131-1136) and the Organics Act (54 U.S.C. § 100101).
[159] 40 C.F.R. § 51.308(i)(3); 40 C.F.R. § 51.308(f)(4).
[160] July 2021 Clarification Memo at 16-17.
[161] *Home Box Office, Inc. v. Federal Communications Commission*, 567 F.2d 9, 35 (D.C. Cir. 1977).

Several FLM consultations are incomplete. For example, in Oregon the FLMs provided a critique and input on the state's Four-Factor Analyses in the FLM consult draft,[162] however rather than evaluate and consider FLM analysis, the proposed SIP replaced nearly all of the state's Four-Factor Analyses with industry agreements maintaining the status quo instead of reductions.[163] The FLMs had no opportunity to consult on these agreements and the public there is deprived of knowing whether and how those agreements satisfy regional haze requirements from the FLM perspective. Other FLM consultations are not documented and are therefore not available to the public (*e.g.*, South Carolina,[164] Louisiana,[165] Washington[166] (only partially documented)). West Virginia's so-called consultation with the FLM raises numerous process and transparency issues.[167] The FLMs (National Park Service, USDA Forest Service and U.S. Fish and Wildlife Service) take their consultation obligations seriously and identify sources to be evaluated under Four-Factor Analyses, identify issues with a state's screening methods, recommend measures for achieving or better achieving emission reductions, and identify concerns with an outcome of no or too few emission reduction measures. Unless the FLMs are requesting minor nonsubstantive corrections to Four-Factor Analyses, states have widely disregarded the consultation comments (*e.g.*, Indiana,[168] New Jersey,[169] New York,[170] Ohio,[171] Tennessee,[172] Texas,[173] North Carolina,[174]).

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[162] Letter from Cindy Orlando Acting Regional Director National Park Service, Interior Regions 8, 9, 10, and 12, to Oregon Department of Environmental Quality, Attention: Karen F. Williams, "NPS Review of the proposed Oregon Regional Haze State Implementation Plan (SIP) for the Second Implementation Period (2018-2028)," (Oct. 29, 2021), https://drive.google.com/file/d/10W2f0MFIIvBPeAvjzGk2eCZDhH8p9KlA/view?usp=sharing, with Enclosure 1, "National Park Service (NPS) Regional Haze SIP feedback for the Oregon Department of Environmental Quality," (Nov. 1, 2021), https://drive.google.com/file/d/1gfBlqxS6TWh_BJa6xO7NkaW_oS83rp5W/view?usp=sharing.

[163] Oregon Department of Environmental Quality, "Regional Haze: 2018-2028 State Implementation Plan, Public Notice Draft" (Aug. 27, 2021), https://www.oregon.gov/deq/Regulations/rulemaking/RuleDocuments/RHSIP2021plan.pdf (last visited Jan. 21, 2022).

[164] Comment Letter to South Carolina at 55-60 (South Carolina's SIP failed to include information on whether or how the State addressed the FLM comments).

[165] Comment Letter to Louisiana at 38 ("In its proposal, LDEQ indicates that the agency LDEQ is 'presenting this draft copy [to the FLMs] seeking their input.' In other words, LDEQ failed to consult with the Federal Land Mangers until *after* the state already developed and issued its proposed SIP, making it impossible for the Federal Land Managers' recommendations to "meaningfully inform the State's decisions on the long-term strategy," as required by 40 C.F.R. § 51.308(i)(2). The proposed SIP also fails to include any information on whether or how LDEQ has addressed any FLM comments or concerns to date, as required by 40 C.F.R. § 51.308(i)(2). In essence, the LDEQ SIP transforms the Regional Haze Rule's mandatory and iterative FLM consultation process into pro forma, after-the-fact box-checking exercise." (internal citations omitted)).

[166] Comment Letter to Washington - November 2021 at 67-68 (commenting that many of Ecology's responses were non-responsive and/or inconsistent with the CAA and RHR requirements, including: (i) Perceptibility should not be considered in screening source controls for reasonable progress; (ii) Visibility improvement is not a fifth-factor "off-ramp" for emission controls; (iii) If visibility benefit

EPA must provide firm direction to the states that they must meaningfully consider and address the insight and recommendations of federal agency counterparts, and that states must use the FLM consultation comments to inform or amend the pre-public version of the SIP in response to the FLM comments or provide a reasoned basis for disagreement. Given that FLM comments are based on well-documented facts and legal concerns from the Act, RHR, EPA's guidance and

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analyses are undertaken, they should reference a clean – not dirty – background; (iv) RACT, which Ecology describes as a "C-grade" control or emission limit, clearly is less stringent than emission limits developed from application of the four-factor reasonable progress analysis; (v) Use of an outdated emission inventory is not allowed under the RHR; (vi) The state must document support for its proposed SIP decisions; and (vii) Reliance on the lack of a federal action by Department of Interior in another program that does apply to existing sources is not a legitimate basis to justify no controls at those sources.).

[167] Comment Letter to West Virginia at 53-62.

[168] Comment Letter to Indiana at 27; *id.* at 28 ("...IDEM admitted it would put on a good show in "addressing the FLMs comments as thoroughly as possible" but only to "show that Indiana has seriously evaluated the selected sources in accordance with the RH Rule and section 169A(g)(1) of the CAA which lists four factors that must be taken into consideration in determining reasonable progress" not do actually require any controls," citing Draft SIP, Appendix P at 3; *see also id.* at 50-53.

[169] Comment Letter to New Jersey at 14 ("The FLMs requested that numerous facilities be evaluated for air pollution controls/reductions based on emissions and Q/d analyses and the state has failed to provide an ample analysis or explanation for its failure to assess these sources for additional emission reducing measures.).

[170] Comment Letter to New York at 15.

[171] Comment Letter to Ohio at 19-20 (Notably, OEPA appears to not have considered comments made by the U.S. Forest Service. Additionally, OEPA merely includes the companies' response70 to the several FLM comments, without providing its independent assessment of the information submitted by the companies. In doing so, it appears that OEPA has fully endorsed the companies' submittals critiquing the FLM comments. Comments from the NPS and USFS ignored by the State included:

- The lack of federally enforceable emission limitations in the SIP;
- Improper reliance on a broad weight-of-evidence approach, including visibility, rather than consideration of the four statutory RP factor to determine RP requirements;
- The need to broaden what OEPA considers as effective emission controls;
- Sources should not be excluded from the RP analysis requirement based on "design" efficiency of emission controls;
- Inflated cost analyses (*e.g.*, inaccurate interest rate, equipment life, control efficiency and retrofit factors) prejudicing emission reduction outcome;
- Analysis based on reduced capacity, where there are no enforceable limitations on capacity, are erroneous;
- Perceptibility is not a requirement for reasonable progress;
- If visibility benefit analyses are undertaken, they should reference a clean background;
- Use of PSAT modeled visibility impacts from specific sources should not be used to generically represent other sources;
- Scale PSAT modeled visibility impacts to reflect different emission scenarios from those that were actually modeled; and
- Relieve a source or group of sources from performing a four-factor analysis and installing cost effective controls if the Class I Area impacted is below the glidepath.).

[172] Comment Letter to Tennessee at 42-44.

[173] Comment Letter to Texas at 38-30.

[174] Comment Letter to North Carolina at 18-21.

July 2021 Clarification Memorandum, the states must amend the pre-public version of the SIPs in response to comments from the FLMs.

d. States must not delay control requirements and/or determinations to the next planning period.

EPA's July 2021 Clarification Memo made clear that "[i]f four-factor analyses evaluate a reasonable range of potential control options, we anticipate that in many cases states will find that new (*i.e.*, additional) measures are necessary to make reasonable progress."[175] Indeed, based on Four-Factor Analyses states are indeed determining control options are reasonable. However, despite these determinations, several states are delaying controls until the next planning period, while other states neglect to make a determination on whether controls are reasonable. Such state determinations are contrary to EPA's July 2021 Clarification Memo, which indicated that "[a]ll new measures must be included in the SIP."[176] Washington is one such state because despite finding reasonable controls for numerous sources, Washington is delaying controls for pulp and paper mills and refineries to the next planning period, planning on a subsequent SIP revision.[177] Other states where Four-Factor Analyses demonstrated reasonable controls are available and yet the state failed to make any determination at all include: Indiana. Michigan, and North Carolina.[178]

We ask that where additional measures satisfy a Four-Factor Analysis, EPA ensure SIPs include new measures to limit emissions to make reasonable progress.

e. States must not exempt emissions from new and modified sources from the Act's RH RP requirements.

Several states appear to have permitted new construction without ensuring that the source's emissions are consistent with the RH program requirements and making progress towards meeting the national goal of preventing any future, and remedying any existing, impairment of visibility.[179] This states must not do. The reasonable progress requirements apply to existing and *new* sources.[180] Indeed, the

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[175] July 2021 Clarification Memo at 8.
[176] July 2021 Clarification Memo at 8.
[177] Comment Letter to Washington - November 2021 at 30-41 (oil refineries); *id.* at 42-50 (pulp and paper mills).
[178] *See e.g.*, Comment Letter to Indiana; *see also* Comment Letter to Michigan; *see also* Comment Letter to North Carolina.
[179] *See e.g.*, Comment Letter to South Carolina at 32 (Dominion Energy Cope Generating Station), 72 (Nucor Steel Berkley); *see id.* Comment Letter to Florida at 13, 14, 17.
[180] 42 U.S.C. §§ 7491(g); 40 C.F.R. § 51.300(a); 40 C.F.R. § 51.307(c) ("Review of any major stationary source or major modification under paragraph (b) of this section, shall be conducted in accordance with paragraph (a) of this section, and § 51.166(o), (p)(1) through (2), and (q). *In conducting such reviews the State must ensure that the source's emissions will be consistent with making reasonable progress toward the national visibility goal referred to in § 51.300(a).* The State may take into

RHR requires that in deciding whether to grant an application for construction or modification at a major source the state must ensure that the new emissions will be consistent *with making reasonable progress toward the national visibility goal.*[181] States need a rational basis for making such a determination, which must be based on a Four-Factor Analysis.[182]

Moreover, when developing a long-term strategy a state must consider "[m]easures to mitigate the impacts of construction activities."[183] As the FLM's pointed out during the first round of RH SIPs, the states often ignored these requirements and thus Round 1 RH SIPs may lack provisions to mitigate the impacts of emissions from new and modified sources.[184] EPA's 2019 Guidance made clear that "[i]f the state does not select construction activities as a source category for an analysis of control measures, the SIP must nevertheless indicate how the state has considered measures to mitigate the impacts of construction activities."[185]

EPA must insist to the states that emissions limitations for new and modified sources—including Four-Factor Analyses and necessary controls—must be considered and included during a state's decision on whether to grant an application

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account the costs of compliance, the time necessary for compliance, the energy and nonair quality environmental impacts of compliance, and the useful life of the source." (emphasis added)).

[181] 40 C.F.R. § 51.307(c).

[182] 40 C.F.R. § 51.307(c).

[183] 40 C.F.R. § 51.308(d)(3)(v)(B).

[184] Alabama Regional Haze State Implementation Plan, Appendix P, FLM Comments on Alabama's Draft SIP (Email and Attachment from Catherine Collins, USFWS, to ADEM, "Fish and Wildlife Service Comments regarding the Alabama Regional Haze State Implementation Plan," (Dec. 26, 2007), at pdf 13, EPA-R04-OAR-2009-0782-0026, https://www.regulations.gov/document/EPA-R04-OAR-2009-0782-0026 ("...the State should include a discussion about the relationship between PSD/NSR programs as part of the other programs that will benefit visibility in the LTS section. A new or modified major industrial source can have a serious impact on the State's ability to obtain RH goals. As part of the Long- Term Strategy (LTS), the State will rely in great part on the New Source Review (NSR) and Prevention of Significant Deterioration (PSD) permitting programs to assure that new sources do not unduly impair the expected progress toward natural conditions. Section 7.2.1. of the November 2007 draft SIP speaks to emissions reductions of ongoing programs but does not include a discussion of the interaction between the existing NSR program and progress on the regional haze plan. Given the uncertainty in the new source growth estimates used to develop the 2018 emission inventory, and ultimately the 2018 visibility projections, it would be appropriate for the state to discuss the relationship between the Regional Haze Plan and requirements of the NSR and PSD programs within the SIP. Specifically, how does the State anticipate addressing new sources of air pollution in the PSD process in regards to its reasonable progress goals and long term strategy; and, how will it analyze the affect [*sic*] of new emissions from these new sources on progress toward the interim visibility goals established under this SIP, as well as the ultimate goal of natural background visibility by 2064.")

[185] 2019 Guidance at 22 (which further explains that "If the state has selected construction activities as a source category for an analysis of control measures, it will consider this factor in that analysis. That analysis and the decision about what measures are necessary for reasonable progress are the subjects of Sections II.B.4 and II.B.5 of this document.")

for a construction permit. The RH SIPs must also include the necessary mitigation and emission limitations from the permit terms and conditions to make them enforceable in the SIP. Additionally, as the rule requires the long-term strategy include measures to *mitigate* the impacts of emissions construction activities, the emissions from new or modified source must be limited, otherwise the new emissions will not be consistent with making reasonable progress. Moreover, when an EGU proposes to switch fuel from coal to natural gas[186] EPA must not allow states to approve construction permits that fail to apply the Act's Four-Factor Analysis requirement and resulting mitigation measures. In the absence of such analysis and associated requirements the construction or modification of a facility may cross the Act's provisions to prevent future visibility impairment, as well as the Act's anti-backsliding provision.[187]

f. States must not assert that that reasonable progress goals determine reasonable progress.

Many states set reasonable progress goals, *before* and *in lieu of* conducting the required Four-Factor Analysis. These states have impermissibly reversed the order of the requirements. The states must first conduct the Four-Factor Analyses, determine measures for reducing visibility impairing emissions based on the Act's Four-Factor Analysis, and then use the results to develop revisions to the reasonable progress goals. The reasonable progress goals are not to be developed before the Four-Factor Analyses but as a result of the Four-Factor Analyses.[188]

One example is Washington State, where they first set the reasonable progress goals, and then conducted the Four-Factor Analyses.[189] The MANE-VU states also apply this approach, calculating reasonable progress goals based on non-enforceable reasonable progress measures.[190] In the VISTAS states, some term the

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[186] *See* discussion *infra* Section 5.b. regarding EGU source modifications switching fuel from coal to natural gas.

[187] *See e.g. Sierra Club v. Env't Prot. Agency*, 985 F.3d 1055 (D.C. Cir.), *superseded,* 21 F.4th 815 (D.C. Cir. 2021).

[188] *See e.g.*, 82 Fed. Reg. at 3090-91.

[189] Comment Letter to Washington - November 2021 at 8, 53.

[190] Comment Letter to New Jersey at 2 ("New Jersey indicates that the long term strategy must include the measures necessary to achieve the reasonable progress goals (RPGs) established by states where the Class I areas are located.1 This is backwards. The state must determine what additional emission reductions measures are needed to make reasonable progress, considering the four statutory reasonable progress factors along with the factors specified in the revised RHR. Reasonable progress goals are determined from measures that are necessary to make reasonable progress, rather than measures being identified as needed to meet RPGs. While MANE-VU may have calculated values that it and its member states refer to as RPGs, these are not RPGs until the state with the Class I area adopts them as such. Regardless of the RPGs and regardless of how current visibility or projected visibility compares to values calculated by MANE-VU, New Jersey must show that it has adopted a long-term strategy that complies with the RHR and that was developed by NJDEP based on its own reasoned decision making. Additionally, for the second implementation period, the revised RHR does not require a state to consider "the uniform rate of

reasonable progress goals the "rate of progress" goals, and all reviewed thus far merely base goals on the flawed VISTAS modeling results.[191]

EPA must make clear to the states that failure to first conduct the Four-Factor Analyses and then use the results of those Analyses and the emission limitations secured in the SIP to develop revisions to the reasonable progress goals will result in an unapprovable SIP.

4. States must not use unique approaches that conflict with Act and Regional Haze Rule.

a. *Oregon.*

Oregon's Four-Factor Analyses indicated that controls were cost effective. But the State decided to replace those Four-Factor Analyses with industry agreed-upon plans that neither result in emission reductions nor apply the Act's four factors.[192] Oregon's enabling state law is potentially illegal as it considers issues outside of the RHR.

b. Washington.

Washington's SIP found cost-effective controls but claimed they are required to follow a State-RACT process under state law, which will delay controls until at least the third round. The State indicates it lacks authority to control sources under the Act's RP requirements and incorrectly asserts that Washington State RACT "is equivalent to the" Regional Haze Rule's four-factor analysis.[193] Based on the plain language in Washington's statute for RACT—and the detailed analysis in our Comment Letter— the *five*-factor State-RACT is neither equivalent to nor more stringent than the Clean Air Act's RP Four-Factor Analysis.[194] Washington must use one of the other authorities identified in our comments[195] and cannot use its

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improvement" or require a state to consider the measures that would be needed to meet the uniform rate of progress. That requirement of 40 C.F.R. § 51.308(d) does not have a counterpart in 51.308(f).");

[191] Comment Letter to North Carolina at 17; *see also* Comment Letter to South Carolina at 60-61; *see also* Comment Letter to Tennessee at 47; *see also* Comment Letter to West Virginia at 72-73.

[192] Comment Letter to Oregon at 2 ("... after comments on the Division 223 rules were closed, DEQ fundamentally altered its approach without engaging in any kind of public process and without consulting stakeholders other than the regulated entities. Instead of ordering all 17 facilities to implement the reasonable progress controls identified through four-factor analyses, DEQ inexplicably chose to extend offers that allowed all but one of these facilities to exit the program or comply with the program without investing in the highly effective pollution-reducing technology that DEQ could—and should—have required these facilities to install to meet the state's obligations under the regional haze program.); *id.* at 4-19.

[193] Comment Letter to Washington - November 2021 at 17-22.

[194] Comment Letter to Washington - November 2021 at 17-22.

[195] Comment Letter to Washington - November 2021 at 22-25.

State-RACT process to avoid compliance with the Act's reasonable progress requirements.

c. *Texas.*

Texas' SIP used a combined source evaluation.[196] Texas evaluated the annualized cost of controls across multiple sectors and types of sources against purported visibility benefits of those controls, rather than evaluating the cost-effectiveness of controls at very large individual sources. This is essentially identical to the illegal approach Texas took in evaluating reasonable progress in Round 1.[197] EPA rejected that approach and issued its own federal implementation plan because Texas's analysis overlooked cost-effective, source-specific pollution controls at a number of individual sources, each of which had significant visibility impacts:[198]

> [I]individual sources were not effectively considered by the TCEQ. . . . A primary flaw was that the control set was overinclusive. It included controls on sources that served to increase the total cost with little visibility benefit. As was noted in our proposal, Texas adopted this approach despite evidence in the record of identified source-specific, cost-effective controls that would have resulted in large emission reductions on certain EGUs, and despite source apportionment modeling that identified large impacts from EGU sources in northeast Texas. Our proposal explained that this approach obscured benefits that might be obtained from individual sources and only considered aggregated costs. . . . Therefore, whether the state's analysis is labeled a source category analysis, an analysis of multiple individual sources, or some hybrid, we conclude that it contained serious deficiencies that would materially affect the outcome of the state's SIP process. . . . Ultimately, however, while there is flexibility in available analytical approaches, states cannot adopt an approach to reasonable progress, which by its nature overlooks cost-effective controls that would otherwise be viewed as being beneficial.

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[196] Comment Letter to Texas at 14-15; *see generally* Texas Commission on Environmental Quality, 2021 Regional Haze State Implementation Plan Revision, Chapter 7 (June 30, 2021) ["Texas Round 2 SIP"].

[197] Texas Commission on Environmental Quality, Revisions to The State Implementation Plan Concerning Regional Haz at 10-5 (Feb. 25, 2009).

[198] This response to comment has been summarized from the original, which appears in the Texas-Oklahoma FIP, 81 Fed. Reg. 313 (Jan. 5, 2016).

Due, in part, to Texas's flawed first round SIP, EPA's 2019 Guidance explicitly advises against using that annualized approach during the second planning period:

> EPA does not believe it is reasonable to solely use a threshold for the capital cost or annualized cost to determine that a measure is not necessary to make reasonable progress. Large capital costs considered in isolation may not provide complete information about the potential reasonableness of a measure; additionally, decisions to exclude control measures from consideration should also take into account relevant information for other factors.[199]

Texas's continued use of a flawed annualized, aggregate control analysis is contrary to the Regional Haze Rule, flouts EPA's explicit guidance on the topic, and must be revised. This flawed approach is especially egregious since, similar to its first round SIP, Texas's contribution to particulate sulfate visibility degradation in nine out-of-state Class one areas is *greater* than the home state's contribution; and its particulate nitrate contribution to six out-of-state Class I areas is likewise greater than the state in which the Class I area is located.[200] This makes it impossible for Texas to satisfy section 51.308(f)(3)(ii)(B)'s requirement that the state demonstrate "that there are no additional emission reduction measures for anthropogenic sources or groups of sources in the State that may reasonably be anticipated to contribute to visibility impairment in [another state's] Class I area that would be reasonable to include in its own long-term strategy."

d. *Indiana.*

Indiana's SIP contains a blanket exemption of EGUs from the Four-Factor Analysis.[201] The EGUs are the largest source sector in Indiana, "even though they generally have the greatest visibility impacts at nearby Class I areas and together account for 11 of the 20 top sources on the Q/d list" contributing 77,777 tons of NOx and 85,329 tons of SO_2 per year.[202]

e. Use of Plantwide Applicability Limits (PALs).

Some states have proposed or are considering plantwide limits—in lieu of the Unit-Specific Four-Factor Analysis requirement—that give the source the flexibility

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[199] 2019 Guidance at 39.
[200] *See* Texas Round 2 SIP at 8-47 to 8-53.
[201] Comment Letter to Indiana at 11-12 (IDEM's explanation "intends to conduct a review of the EGU sector for the January 31, 2025 progress report, pursuant to 40 CFR 51.308 (g). If necessary, IDEM will evaluate EGUs more in depth for the third implementation period of the RH Rule, to be submitted in 2028" "is unsupported by the record, arbitrary and capricious, and inconsistent with the Clean Air Act and the Regional Haze Rule, for numerous reasons.").
[202] Comment Letter to Indiana at 11; *see also* Indiana Regional Haze State Implementation Plan for the Second Implementation Period at 55 (Dec. 2021)

to decide how to meet emission reductions. Oregon proposed this in its agreements with industry.[203] The PALs are an issue for numerous reasons: (1) they fail to meet the unit-specific technology based emission limit required by the Act; (2) they don't result in a reduction equivalent to reductions from a Four-Factor Analysis; (3) they are subject to abuse because in some instances PAL emissions are based on allowable emissions, don't amount to a reduction in actual emissions (*i.e.*, PacifiCorp), and ultimately don't require installation of pollution controls.

f. Ohio.

Ohio considered affordability of controls for some of its sources.[204] While Ohio noted that there is no provision in the RHR to consider affordability, the State nevertheless considered it.[205] Consideration of costs is outside the bounds of the Act's Four-Factor Analysis.[206] Moreover, as the Kordzi Report on Ohio clearly demonstrated in the "Comments on the Carmeuse Maple Grove SO_2 Analysis,"[207] despite the source's inappropriate costing methodology that highly inflated costs, the Kordzi Report shows that "SO2 controls are available for retrofit to the Carmeuse kilns at cost-effectiveness levels that have previously been found to be cost-effective by many states."[208]

We urge EPA to instruct these states that the unique approaches outlined above are inconsistent with the Act and RHR requirements.

5. <u>States must ensure that SIPs are consistent with the Administration's priorities.</u>

a. Consideration of Environmental Justice.

State and federal authorities require consideration of environmental justice.[209] While some states acknowledge their authority, commitment and need to

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[203] Comment Letter to Oregon at 9-12 (Table comparing emission reductions projected from installation of four factor analysis requirements as compared to requirements of "alternative compliance" agreements, heavily reliant on Plant Site Emission Limits or "PSELs").
[204] Kordzi Report on Ohio at 46, citing Ohio Draft SIP at 39.
[205] Kordzi Report on Ohio at 46.
[206] *See e.g.*, Kordzi Report at 47.
[207] Kordzi Report on Ohio at 42-45.
[208] Kordzi Report on Ohio at 44-45.
[209] *See e.g.*, Comment Letter to Connecticut at 12-17; *see also* Comment Letter to Florida at 22-25 ("FL DEP Must Consider Emissions from and Include Emission Limitations on Preharvest Sugarcane Field Burning"); *see also id.* at 39-43; *see also* Comment Letter to Indiana at 55-58; *see also* Comment Letter to Louisiana at 30-34 (Louisiana did not consult with Alabama regarding sources in Mobile, Alabama that impact the Breton Wilderness Area and the environmental justice communities); *see also id.* at 38-41; *see also* Comment Letter to Massachusetts at 15-18; *see also* Comment Letter to Michigan at 17-19; *see also* Comment Letter to North Carolina at 27-31; *see also*

consider environmental justice, most if not all SIPs do not contain meaningful consideration, much less emission limitations to protect environmental justice communities. States like Oregon have gone to great lengths to develop environmental justice methods and use environmental screening thresholds, but nothing material came of such considerations.[210] Colorado acknowledged the need to consider environmental justice, but again, nothing appears to have come of it.[211] Yet other states, like North Carolina, misunderstand an environmental justice analysis, and looked at whether the communities near Class I areas were classified as environmental justice communities rather than looking at the communities impacted by sources.[212]

Finally, the Table below contains the sources NPCA identified as sources of concern due to their potential to impair visibility at Class I areas *and* their

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Comment Letter to New Jersey at 21-27; *see also* Comment Letter to New York at 16; *see also id.* 18-22; *see also* Comment Letter to Ohio at 22-25; *see also* Comment Letter to South Carolina at 87-91; *see also* Comment Letter to Tennessee at 63-68; *see also* Comment Letter to Virginia at 7-9 ; *see also* Comment Letter to Washington - November 2021 at 52-56; *see also* Comment Letter to West Virginia at 88-94.

[210] Comment Letter to Oregon at 17-20 ("Despite the claim in the SIP that DEQ incorporated environmental justice into its regional haze decisions, nothing in the SIP suggests that DEQ considered environmental justice in making the choice to extend "alternative compliance" to 16 of the 17 facilities with reasonable progress controls. While DEQ carefully established a protocol and analyzed the environmental justice and vulnerable populations "score" of each facility with cost-effective controls identified in its four-factor analysis, it then seemingly ignored this information when making consequential decisions: in place of actual significant reductions in emissions that would be achieved though the implementation of four factor reasonable progress control analyses the agency instead established alternative compliance to these facilities regardless of the environmental justice impacts and the impacts on vulnerable populations.")

[211] National Parks Conservation Association and Sierra Club's Prehearing Statement Before the Colorado Air Quality Control Commission Regarding Proposed Revisions to the Regional Haze State Implementation Plan (SIP), Regulation 23 at 13-15 ("Rather than substantively incorporate equity and environmental justice principles into this rulemaking, the Division makes only one passing reference to community concerns in the proposed SIP and supporting documents. But notably, that sole reference to community concerns is for the Cemex facility in Lyons, where the Division noted that it rejected a proposed control technology in response to community outcry against the technology. (citation omitted) Tellingly, the Division's proposal makes no mention of any community concerns in the disproportionately impacted communities in North Denver, Pueblo, or Florence, which will be impacted by the Division's actions regarding Suncor, the GCC Rio Grande – Pueblo cement plant, and the Holcim Florence cement plant.")

[212] Comment Letter to North Carolina at 29 ("While we appreciate DAQ's efforts to prepare an environmental justice analysis, it falls short. DAQ's proposed SIP explains that it overlaid the State's Class I areas with maps of potentially underserved block groups, which was then used to inform the specific EJ focused outreach for the RH program. While this is a useful first step, DAQ must do more. DAQ must involve and consider the environmental justice communities impacted by harms from the reasonable progress sources. DAQ's SIP ignores the fact that many of the reasonable progress sources are located in communities of color and many live below the poverty line. For example, PCS Phosphate Company (Aurora) and Domtar Paper Company are located in vulnerable areas where the people of color is higher than 64% and the percentage of poverty rate is higher than 30%." (citation omitted)).

likelihood to impact vulnerable communities. The selection was made using environmental justice markers such as people of color and people living below the poverty line. NPCA used American Community Survey data from the United States Census Bureau at the county and city levels to identify vulnerable communities. Additional information at the community or neighborhood levels was used when available for this selection. The sources identified below lack the best pollution controls or lack of pollution control upgrades to further reduce emissions and lessen the burden of air pollution in these communities. We will continue to make EPA aware of similar sources of concern identified in our future comment letters.

Table 1. Sources Identified by NPCA of Concern Due to Potential Impacts on Visibility at Class I Areas and Their Likelihood to Impact Vulnerable Communities.

State	Facility	County	Description	Cumulative Q/d (>=5)	% of People of Color	% of People Living Below Poverty Line	NOx (tons)	SO2 (tons)
AZ	FREEPORT MCMORAN MIAMI SMELTER	Gila	Primary Copper Smelting/Refining	223	37%	21%	173	3,930
AZ	ASARCO LLC - HAYDEN SMELTER	Gila	Primary Copper Smelting/Refining	3,801	37%	21%	46	20,498
CO	Suncor	Adams	Petroleum Refinery	46	48%	13%	593	196
CT	Wheelabrator Bridgeport	Fairfield	Municipal Waste Combustor	12	36%	9%	1,096	120
FL	SEMINOLE ELECTRIC COOPERATIVE, INC.	Putnam	Electric Power Generation	338	28%	26%	2,203	4,563
FL	Northside	Duval	Electric Power Generation	297	45%	16%	2,864	1,917
FL	Big Bend	Hillsborough	Electric Power Generation	104	49%	16%	2,277	1,156
FL	Deerhaven	Alachua	Electric Power Generation	72	38%	23%	1,388	600
FL	MOSAIC FERTILIZER, LLC	Hillsborough	Phosphatic Fertilizer Manufacturing	44	49%	16%	171	1,487
FL	U.S. SUGAR CORPORATION	Hendry	Cane Sugar Manufacturing	26	66%	25%	1,326	171
FL	SUGAR CANE GROWERS CO-OP	Palm Beach	Cane Sugar Manufacturing	8	43%	14%	486	103
FL	OSCEOLA FARMS	Palm Beach	Cane Sugar Manufacturing	6	43%	14%	379	20
IN	United States Steel Corporation - Gary Works	Lake	Steel Mill Manufacturing	235	45%	17%	3,089	3,030
IN	Indiana Harbor East	Lake	Steel Mill Manufacturing	691	45%	17%	9,001	12,959
IN	Indiana Harbor West	Lake	Steel Mill Manufacturing	101	45%	17%	1,056	1,619
LA	R. S. Nelson	Calcasieu	Electric Power Generation	164	31%	17%	2,427	7,674
LA	Big Cajun II	Pointe Coupee	Electric Power Generation	207	39%	19%	1,989	6,021
MI	EES Coke	Wayne	Iron and Steel Mills and Ferroalloy Man	113	50%	24%	1,351	2,820
MI	US Steel Great Lakes Works	Wayne	Iron and Steel Mills and Ferroalloy Man	23	50%	24%	980	1,502
NC	PCS Phosphate	Beaufort	Fertilizer Plant	267	64%	30%	408	3,140
NC	Domtar Paper	Martin	Pulp and Paper Plant	118	64%	30%	1,806	770
OH	Cleveland-Cliffs (AK Steel)	Butler	Steel Mill	179	17%	13%	1,963	1,963
OR	Owens_Brockway	Multnomah	Glass Plant	23	29%	17%	404	118
TN	TVA Cumberland	Stewart	Electricity Generation via Combusti	536	8%	19%	3,380	6,649
TN	Trelleborg Coated Systems*	Hamblen	All Other Rubber Product Manufacturing	421	18%	21%	2	0
TN	Signal Mountain Cement	Hamilton	Cement Manufacturing	65	28%	14%	1,263	1
TN	O-N Minerals Company	Union	Lime Manufacturing	15	3%	23%	350	56
TN	Packaging Corporation of America	Hardin	Pulp and Paper Plant	62	8%	22%	1,416	616
TN	Tennessee Gas Pipeline, Station 860	Hickman	Compressor Station	29	9%	21%	1,484	0
WA	Ash Grove Cement	King	Cement Manufacturing	136	38%	11%	1,368	69
WA	Ardagh Glass	King	Glass Plant	12	38%	11%	153	99
WV	Harrison Coal Plant	Harrison	Electric Power Generation	1,047	5%	16%	5,575	11,270
WV	FORT MARTIN COAL POWER STATION	Monongalia	Electric Power Generation	815	11%	21%	9,388	4,234
WV	PLEASANTS COAL POWER STATION	Pleasants	Electric Power Generation	552	4%	16%	4,514	7,044
WV	MOUNTAINEER COAL PLANT	Mason	Electric Power Generation	384	3%	18%	3,579	4,600
WV	AMERICAN BITUMINOUS POWER-GRANT TOV	Marion	Electric Power Generation	204	7%	16%	1,672	1,964
WV	LONGVIEW COAL POWER PLANT	Monongalia	Electric Power Generation	191	11%	21%	1,532	2,158
WV	WEST VIRGINIA ALLOYS, INC.	Fayette	Iron and Steel Mills and Ferroalloy Man	130	7%	18%	1,066	1,121
WV	MORGANTOWN ENERGY FACILITY	Monongalia	Fossil Fuel Electric Power Generation	70	11%	21%	1,142	703
TX	SAN MIGUEL ELECTRIC PLANT	Atascosa	Electric Power Generation	153	65%	15%	2,267	8,940
TX	TEXARKANA MILL	Cass	Paper (except Newsprint) Mills	40	23%	19%	1,796	76
TX	ODESSA CEMENT PLANT	Ector	Cement Manufacturing	12	64%	12%	938	19
TX	NEWMAN STATION	El Paso	Electric Power Generation	89	87%	22%	1,875	9
TX	WA PARISH ELECTRIC GENERATING STATION	Fort Bend	Electric Power Generation	476	65%	8%	4,589	28,811
TX	CORNUDAS PLANT	Hudspeth	Pipeline Transportation of Natural Gas	8.3	81%	32%	362	5
TX	OXBOW CALCINING	Jefferson	All Other Petroleum and Coal Products M	174	58%	19%	609	11,495
TX	TOLK STATION	Lamb	Electric Power Generation	780	59%	20%	2,488	13,625
TX	LIMESTONE ELECTRIC GENERATION STATION	Limestone	Electric Power Generation	255	40%	21%	7,470	10,240
TX	JONES STATION POWER PLANT	Lubbock	Electric Power Generation	6	45%	19%	1,395	3
TX	SANDY CREEK ENERGY STATION	McLennan	Electric Power Generation	40	43%	19%	1,147	2,961
TX	STREETMAN PLANT	Navarro	Ground or Treated Mineral and Earth M	74	42%	20%	681	3,493
TX	HARRINGTON STATION POWER PLANT	Potter	Electric Power Generation	1,005	54%	21%	2,945	10,476
TX	OAK GROVE STEAM ELECTRIC STATION	Robertson	Electric Power Generation	219	42%	15%	4,535	6,974
TX	WELSH POWER PLANT	Titus	Electric Power Generation	407	53%	20%	4,951	11,178
TX	OKLAUNION POWER STATION	Wilbarger	Electric Power Generation	386	40%	16%	5,215	1,779
TX	KEYSTONE GAS PLANT	Winkler	Natural Gas Liquid Extraction	41	62%	17%	1,130	435

* Source with extremely high PM2.5 and PM10 emissions

The RHR requires that the state should consider evaluating major and minor stationary sources or groups of sources, mobile sources, and area sources.[213] The states ignore emissions from area sources, and some states even ignore area sources that impact both visibility and vulnerable communities. For example, Florida ignored area source emissions from agricultural sugar cane burning. Much of the sugar cane acreage burned is owned or controlled by the sugar cane mills. Therefore, performing Four-Factor Analyses would logistically be a relatively straightforward exercise.[214] Moreover, green harvesting using mechanical harvesters—that does not involve burning—is already implemented in Florida and in other states.[215]

Additionally, oil and gas area sources are a problem for Class I areas and vulnerable communities.[216] Texas is an example of a state that declined to evaluate all areas sources for Four-Factor Analyses,[217] despite areas sources being the largest category contributor of NOx, Volatile Organic Carbon (VOC), ammonia (NH3), and Particulate Matter, with most of NOx, VOC and SO2 emissions from the Oil and Gas sector.[218] Moreover, Texas Emissions Inventory fails to include significant flaring emissions and drastically undercounts the actual levels of SO_2 emissions from oil and gas area sources.[219]

EPA must reinforce the need for states to engage environmental justice communities, select sources—including area sources—with priority for those in/adjacent environmental justice communities, and most importantly direct states to require reductions from environmental justice sources

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[213] 40 C.F.R. §51.308(f)(2)(i).
[214] Comment Letter to Florida at 30.
[215] Comment Letter to Florida at 31-32.
[216] Examples of Class I areas currently or potentially impacted by oil and gas emissions, several of which also impact vulnerable communities, include but are not limited to: Theodore Roosevelt and Lostwood (i.e., Bakken Shale in eastern Montana and North Dakota); Wind Cave and Badlands (i.e., Powder River Basin in northeast Wyoming); Bridger and Fitzpatrick Wilderness Areas (i.e., Pinedale Anticline and Jonah Fields in western Wyoming); Mesa Verde (i.e., North and South San Juan Basin); Carlsbad Caverns and Guadalupe Mountains (i.e., Permian Basin in southeastern New Mexico and western Texas); Canyonlands and Arches (i.e., Uintah, Paradox, and Piceance Basins in Utah and Colorado); and Rocky Mountain (i.e., Denver-Julesburg Basin).
[217] Comment Letter to Texas at 24.
[218] Comment Letter to Texas at 24-25.
[219] Comment Letter to Texas at 25.

b. For EGUs, transition from coal to natural gas should not be a solution for regional haze.

EPA must ensure that long-term strategies include appropriate measures to prevent *future* impairment of visibility in mandatory class I Federal areas.[220] Reductions achieved with controls for some pollutants will be the same as those obtained with conversion from coal to natural gas. If a switch to natural gas takes place, the state must consider and require controls (*e.g.*, SCR for turbines). Controls should be required upfront reflecting low rates and should be required at a new facility or at a facility that switches fuel. As discussed above in section 2.e, fuel switch conversion should include permit (PSD) reviews and Four-Factor Analyses.

c. Retired or under-utilized EGUs are now being used to supply energy for onsite bitcoin mining – EPA must address this head on.

Some EGUs (*e.g.*, using waste coal, peaking units and other stationary and mobile sources) were previously running at a very low capacity (or not running at all) but are now run at high capacity for bitcoin mining. States do not appear to be considering the impacts from these sources on Class I areas and environmental justice communities in their permitting and oversight/enforcement activities. Indeed, where these sources are already permitted, the state RH SIPs assume—without enforceable limitations—that these sources will continue to operate at a lower capacity. Furthermore, as explained in the above issue, when a state considers whether to permit a new source or modification, it must apply the regional haze reasonable progress Four-Factor Analysis requirements and not conduct new source permitting in a vacuum. The proliferation of these bitcoin mining sources throughout the states undermines progress of the RH program. EPA should develop a strategic policy and initiatives to address this growing problem and ensure it is applied uniformly in regional haze SIP revisions.

d. Requiring States to Incorporate Planned Retirements as Enforceable SIP Provisions, as Required by the Clean Air Act, Would Result In Significant Reductions of Greenhouse Gas Emissions.

As noted, numerous states have declined or refused to impose emission reduction measures that would satisfy a Four Factor Analysis—and in some instances, refused to even evaluate controls—based on projected source retirements or reductions in utilization. The Clean Air Act, however, requires that "[e]ach state implementation plan . . . *shall*" include "enforceable limitations and other control measures" as necessary to "meet the applicable requirements" of the Act. 42 U.S.C. § 7410(a)(2)(A). The Regional Haze Rule similarly requires each state to include "enforceable emission limitations" as necessary to ensure reasonable progress

[220] 42 U.S.C. § 7491(a)(1).

toward the national visibility goal.[221] Thus, EPA must make clear that, where the state relies on a sources' plans to permanently cease operations or reduction in utilization to ensure reasonable progress or to avoid any control analysis, the state "must" make those parameters or assumptions into enforceable emission limitations in the SIP itself. [222] Including planned retirements as enforceable SIP provisions is not only required under the Clean Air Act and the Regional Haze Rule itself, but would result in significant greenhouse gas emission reductions and other pollution co-benefits.

Conclusion

EPA must ensure that second round haze plans comply with all legal requirements and deliver on the Clean Air Act goal of restoring natural visibility conditions to our nation's treasured national parks and wilderness areas. We strongly recommend that EPA issue findings of failure to submit by January 31, 2022, and take final action on all SIPs (or FIPs) a rolling basis, by August 2023. Moreover, EPA should not delay: once it determines a SIP is deficient,[223] the agency should begin developing a FIP. Please feel free to contact us if you need additional information or have any questions regarding the contents of this letter.

Sincerely,

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[221] *See* 40 C.F.R. § 51.308(d)(3) ("The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas.")

[222] 40 C.F.R. §§ 51.308(i); (d)(3) ("The long-term strategy must include enforceable emissions limitations, compliance schedules . . ."); (f)(2) (the long-term strategy must include "enforceable emissions limitations"); *see also* August 2019 Guidance at 22 ("in selecting sources for control measure analysis," the state may choose "not selecting sources that have an enforceable commitment to be retired or replaced by 2028"); *id.* at 34 (To the extent a retirement or reduction in operation "is being relied upon for a reasonable progress determination, the measure would need to be included in the SIP and/or be federally enforceable.") (citing 40 C.F.R. § 51.308(f)(2)); 2019 Guidance at 43 ("[i]f a state determines that an in-place emission control at a source is a measure that is necessary to make reasonable progress and there is not already an enforceable emission limit corresponding to that control in the SIP, the state is required to adopt emission limits based on those controls as part of its long-term strategy in the SIP via the regional haze second planning period plan submission.").

[223] Furthermore, EPA must use its authority and reject incomplete SIPs and send them back to the states for completion. Good government and efficient use of public resources dictate the agency should not use resources in moving forward with an action knowing it is not approvable.

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List of Documents Referenced

Conservation Organizations' Comment Letters, Expert Reports and Other Relevant Documents

Arizona

Letter from National Parks Conservation Association, Sierra Club, Earthjustice to Arizona to Ryan Templeton, Elias Toon, Arizona Department of Environmental Quality "EPA July 2021 Clarification Memo and the Upcoming Arizona Regional Haze SIP Rulemaking," (Aug. 5, 2001), https://drive.google.com/file/d/1e72jUXB_ozBFoWkuTdEzEaRrtNgx8D0B/view?usp=sharing.

Colorado

Letter from Earthjustice on behalf of National Parks Conservation Association, Sierra Club, to Dena Wojtach, Lisa Devore, Air Pollution Control Division, Colorado Department of Public Health and Environment, "Colorado's Second Planning Period Regional Haze SIP — Responses to Sources' Four-Factor Analyses," (May 11, 2020), https://drive.google.com/file/d/1ysDsubB5OmsGpzpe5mQsq560utJCt0p7/view?usp=sharing , with attachments: Victoria R. Stamper, "Comments on Certain Company Submittals to the Colorado Department of Public Health and Environment on Air Pollution Controls to Make Reasonable Progress Towards the National Visibility Goal," (May 5, 2020), https://drive.google.com/file/d/1VLwqCbXL5zVxBV-AKBzaVdbeLGUY534p/view?usp=sharing; Dr. Ranajit (Ron) Sahu, Consultant, "Initial Comments on the Suncor Commerce City Refinery Regional Haze Reasonable Progress Review of Four-Factor Analyses prepared by Suncor Energy (U.S.A.) Inc. for the Colorado Department of Public Health and Environment (CDPHE), December 4, 2019," (May 11, 2020), https://drive.google.com/file/d/1YDWFap0yB-oaTxEoeyHokngGVUtO3cP8/view?usp=sharing.

Letter from Earthjustice on behalf of National Parks Conservation Association, Sierra Club, to Dena Wojtach, Lisa Devore, Air Pollution Control Division, Colorado Department of Public Health and Environment, "Proposed Amendments to Regulation 7 for Natural Gas-fired Reciprocating Internal Combustion Engines,' (May 8, 2020), with attachment, Vicki Stamper, Megan Williams, "OIL AND GAS SECTOR REASONABLE PROGRESS FOUR-FACTOR ANALYSIS OF CONTROLS FOR FIVE SOURCE CATEGORIES: NATURAL GAS-FIRED ENGINES, NATURAL GAS-FIRED TURBINES, DIESEL-FIRED ENGINES,

NATURAL GAS-FIRED HEATERS AND BOILERS, FLARING AND INCINERATION," (March 5, 2020), https://drive.google.com/file/d/1KZn9w0rzrgnIaQf1YfSK_k2RQbt9ZOKN/view?usp=sharing .

Letter from Earthjustice on behalf of National Parks Conservation Association, Sierra Club, to Colorado Air Quality Control Commission, "Request for Phase II Regional Haze Rulemaking, Regulations Number 7 and 23," (Aug. 16, 2016), including attachment, Dr. Ranajit (Ron) Sahu, Consultant, Preliminary Comments on the 4-Factor Analysis for Sulfur Dioxide (SO2) Reductions at the Plant 1 Flare and the Plant 2 No. 3 Sulfur Reduction Unit (SRU3) at the Suncor Commerce City Refinery, Denver, Colorado (July 12, 2021), https://drive.google.com/file/d/1yqh4UIjYl12xI9mwTa3Rd4gLZnuIdhET/view?usp=sharing .

Klafka, Steve, Wingra Engineering, Holcim – Florence Cement Plant Florence, Colorado Four-Factor Reasonable Progress Analysis (Sept. 30, 2021), https://drive.google.com/file/d/1C0DHVM84YoM-a-xn3LJILDB5nK8J4rKDq/view?usp=sharing.

Klafka, Steve, Wingra Engineering, GCC Rio Grande – Pueblo Cement Plant, Four-Factor Reasonable Progress Analysis (Sept. 23, 2021), https://drive.google.com/file/d/1W-EAjYr_zL9Ucj6t2PAtCEuqAVP7flc9/view?usp=sharing.

"Prehearing Statement of the Colorado Department of Public Health and Environmental, Air Pollution Control Division," *In the Matter of Proposed Revisions to Regulation No 23* (Oct. 7, 2021), https://drive.google.com/file/d/1e0Qy1qFQERRcGcvHUHihLZGOzjRvqUW4/view?usp=sharing.

"Prehearing Statement of National Parks Conservation Association and Sierra Club," Regarding Proposed Revisions to Regional Haze State Implementation Plan (SIP), Regulation Number 23 (Oct. 7, 2021), https://drive.google.com/file/d/1EXBWjU5eakde_Ark4YKGLIXzE7SGOZGo/view?usp=sharing.

Connecticut

Letter from National Parks Conservation Association and Appalachian Mountain Club, to Kiernan Wholean, Bureau of Air Management, Connecticut Department of Energy and Environmental Protection, "Comments on State of Connecticut's Notice of Intent to Revise the State

Implementation Plan for Air Quality: Regional Haze Plan for the Second Implementation Period (2018 - 2028)," (Jan. 29, 2021), https://drive.google.com/file/d/1rOMuNoV1hgx6N8FOGExoTmnDxXjN94hF/view?usp=sharing.

Delaware

Letter from Sierra Club, National Parks Conservation Association, Delaware Audubon Society, Earthjustice, to Lisa Vest, Hearing Officer, Office of the Secretary, Department of Natural Resources and Environmental Control, "Delaware's Draft Visibility State Implementation Plan (SIP) Revision," (Jan. 13, 2022), https://drive.google.com/file/d/1sPl2ax0ovifVsuKSpchLAKTT4gRqGzmG/view?usp=sharing.

Florida

Letter from National Parks Conservation Association, Coalition to Protect America's National Parks and Sierra Club, to Ashley Kung, Florida Department of Environmental Protection, "Conservation Organizations' Comments on Florida's Proposed Revisions Regional Haze State Implementation Plan for the Second Implementation Period," (July 9, 2021), https://drive.google.com/file/d/1D_I9oqlbHFLAcGDGNSgfU-QGJ4vbd_N9/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the Florida Regional Haze State Implementation Plan," (July 2021), https://drive.google.com/file/d/1X2onXDgY4WhbO0D4FUT3F5t5Xmtv4dtg/view?usp=sharing.

Indiana

Letter from Sierra Club, National Parks Conservation Association, The Coalition to Protect America's National Parks, Just Transition Northwest Indiana, Hoosier Environmental Council, Izaak Walton League, and Save the Dunes Comments on Indiana Department of Environmental Management's Proposed Regional Haze State Implementation Plan for Second Implementation Period (Nov. 15, 2021), https://drive.google.com/file/d/1XmXIZ28giuDhkcLlw5dDfX0esZa7pQiO/view?usp=sharing; with enclosure, Joe Kordzi, "A Review of the Indiana Regional Haze State Implementation Plan" (Nov. 2021), https://drive.google.com/file/d/1SUIxM5aRBCit4Wgrw6IURwrO_VD6x1VY/view?usp=sharing.

Louisiana

Letter from Sierra Club and National Parks Conservation Association, to Vivian H. Johnson, Venetta Hayes, Louisiana Department of Environmental Quality, Office of Environmental Assessment, "Sierra Club and National Parks Conservation Association Comments on Louisiana Department of Environmental Quality's ("LDEQ") Proposed State Implementation Plan ("SIP") for Regional Haze Program for the Second Implementation Period, LDEQ AI# 174156 [LDEQ 2104Pot1, Doc. ID No. 12656414 (Apr. 20, 2021)]," (July 12, 2021), https://drive.google.com/file/d/1bTugkhwmi9LEvqHH3NgtL-vo9O-U8MzN/view?usp=sharing, with enclosures, Victoria R. Stamper, "Review and Comments on Reasonable Progress Four-Factor Analyses for Sulfur Dioxide and Nitrogen Oxide Pollution Controls Evaluated as Part of the Louisiana Regional Haze Plan for the Second Implementation Period," (July 8, 2021), https://drive.google.com/file/d/1pzRZpNW_c6rliibGlcy-WMPuaz6yh49c/view?usp=sharing; D. Howard Gebhart, "Technical Review of Visibility Modeling for the Second Round of Regional Haze State Implementation Plans: State of Louisiana," (July 2021), https://drive.google.com/file/d/1h93Ntoj4sNpTjj2RedYxRexKgM9E6oCo/view?usp=sharing.

Massachusetts

Letter from National Parks Conservation Association (NPCA) and Appalachian Mountain Club, to Mark Wert, Branch Chief, Air Planning, Department of Environmental Protection, "Comments on State of Massachusetts' Notice of Intent to Revise the State Implementation Plan for Air Quality: Regional Haze Plan for the Second Implementation Period (2018 - 2028)," (May 14, 2021), https://drive.google.com/file/d/19v9LF_pLkDKO_v9bOMxhmF6ME_JJQDsY/view?usp=sharing.

Michigan

Letter from Sierra Club, National Parks Conservation Association, and the Coalition to Protect America's National Parks, to Robert Irvine EGLE, Air Quality Division, SIP Development Unit (June 30, 2021), https://drive.google.com/file/d/1oYSry6dgkE9NZpF_bbJYF1YdOjR5OAw6/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the Michigan Regional Haze State Implementation Plan" (June 2021), https://drive.google.com/file/d/1vnclCAH1wnADzJQ0pWpcnmq6mHofOqBe/view?usp=sharing.

Nebraska

Letter from National Parks Conservation Association, Sierra Club, to Director Macy, "Nebraska's Second Planning Period Regional Haze SIP Development," (July 6, 2021), https://drive.google.com/file/d/1bbFb7VSzchOFrh4Seqox1XaNi7YMOjV0/view?usp=sharing, with enclosures: Victoria R. Stamper, "Reasonable Progress Analysis for Sulfur Dioxide and Nitrogen Oxide Pollution Control Upgrades at Gerald Gentleman Station," (July 6, 2021), https://drive.google.com/file/d/1YKE7eLbxhaW7ChXqiB2n7T6h4yxoftNr/view?usp=sharing; Dr. H. Andrew Gray, "Review of Trinity's CAMx Air Dispersion Modeling Report - Visibility Impacts prepared for NPPD Gerald Gentleman Station (December 2020) and their Supplemental Report (February 2021)," (July, 6, 2021), https://drive.google.com/file/d/1JPtBiYD7s0q8evCN_4Pri4TRJUIqK3pV/view?usp=sharing.

New Hampshire

Letter from Sierra Club and the National Parks Conservation Association, to Craig A. Wright, Director, NHDES Air Resources Division, "Comments on New Hampshire's Regional Haze Plan Periodic Comprehensive Revision," (Dec. 30, 2019), https://drive.google.com/file/d/1YIFCM771jSPI5ZtfPW9g84g9hLKGN8Ay/view?usp=sharing.

New Jersey

Letter from National Parks Conservation Association and Sierra Club, to Mr. Ratzman, Bureau of Evaluation and Planning, New Jersey Department of Environmental Protection, "Comments on the New Jersey's Proposed Regional Haze SIP 2018-2028," (Oct. 21, 2019), https://drive.google.com/file/d/1O-w7PofKGZ6FOmCeaXAm7q3exk-WPDve/view?usp=sharing.

New Mexico

Letter from Diné C.A.R.E., National Parks Conservation Association, San Juan Citizens Alliance, Sierra Club, and Western Environmental Law Center, to Sandra Ely, Director, Environmental Protection Division, NMED, "New Mexico's Regional Haze Plan and San Juan Generating Station," (March 19, 2020), https://drive.google.com/file/d/1sVqnRJX0av5DjACmVoM8bkmoQaw_JMGR/view?usp=sharing.

Letter from Western Environmental Law Center, National Parks Conservation Association, to Mark Jones, Cember Hardison, New Mexico Environment Department, response to request for additional information on electrification and SCR (May 22, 2020), https://drive.google.com/file/d/1gvoM3RpHne233imcPJ0AQ9LOVR4t5tYM/view?usp=sharing, with enclosure: Vicki Stamper, Megan Williams, "Review of Claims Made by New Mexico Oil and Gas Companies Regarding Applicability of Selective Catalytic Reduction (SCR) to Lean Burn Engines," (May 22, 2020).

Letter from National Parks Conservation Association, Western Environmental Law, to Sandra Ely, Michael Baca, Mark Jones, and Kerwin Singleton New Mexico Environment Department, "Comments responding to 4-factor analysis submittals from identified oil & gas operators," (July 10, 2020), https://drive.google.com/file/d/1jsmusMW2M37vRlWdFXYLjtZwSkP9QE6Z/view?usp=sharing, with enclosure: Vicki Stamper, Megan Williams, "Assessment of Cost Effectiveness Analyses for Controls Evaluated Four – Factor Analyses for Oil and Gas Facilities For the New Mexico Environment Department's Regional Haze Plan for the Second Implementation Period," (July 2, 2020).

Victoria R. Stamper, "Comments on the Enchant/Farmington July 9, 2020 Submittal to the New Mexico Environment Department on Air Pollution Controls at San Juan Units 1 and 4 to Make Reasonable Progress Towards the National Visibility Goal," (Sept. 2, 2020), https://drive.google.com/file/d/1Y6z8z0zIPDim0PhXUbWWvNggGE9yl3vT/view?usp=sharing.

North Carolina

Letter from National Parks Conservation Association, Sierra Club, Southern Environmental Law Center, CleanAIRE NC, Coalition to Protect America's National Parks, and NC League of Conservation Voters, Appalachian Voices, Alliance to Protect our People and the Places We Live, NAACP Stokes County Branch, Center for Biological Diversity, Environment North Carolina and North Carolina Conservation Network, to Randy Strait NC Division of Air Quality, "Conservation Organizations Comments on North Carolina's Proposed Regional Haze State Implementation Plan (SIP) for North Carolina Class I Areas for the Second Planning Period (2019 - 2028)," (Oct. 15, 2021), https://drive.google.com/file/d/1WFPsE_TFWvz0r4TIOmUjqvdJ6T0frm0F/view?usp=sharing, with enclosures, Joe Kordzi, "A Review of the North Carolina Regional Haze State Implementation Plan" (Oct. 2021),

https://drive.google.com/file/d/1RDCnruI8EX9TyPzp25M-M3NdnXPBqA_i/view?usp=sharing; D. Howard Gebhart, "Technical Review of North Carolina Regional Haze State Implementation Plan Second Round of Regional Haze State Implementation Plans Supplemental Report" (Oct. 2021), https://drive.google.com/file/d/1UYHgQQAx5xKhItnEuQ3fkFpOk4EtMZ_E/view?usp=sharing.

North Dakota

Letter from National Parks Conservation Association, Sierra Club, to Jim Semerad, David E. Stroh, North Dakota Department of Environmental Quality, "North Dakota's Second Planning Period Regional Haze SIP — Responses to Source-Specific Four-Factor Analyses," (Nov. 17, 2020), https://drive.google.com/file/d/1ugPNlmSbpmY2jeZoFOxfJk7oZM9tK0gQ/view?usp=sharing, with enclosures: Joe Kordzi, "NOx and SO2 Reasonable Progress Analysis for the Otter Tail Coyote Station," (Nov. 2020), https://drive.google.com/file/d/1hOf9nAIClgu8u--KbhJQ9Crnx6ShEVdA/view?usp=sharing; Joe Kordzi, "North Dakota BART and Reasonable Progress Analysis," (Nov. 2020), https://drive.google.com/file/d/1hOf9nAIClgu8u--KbhJQ9Crnx6ShEVdA/view?usp=sharing; Joe Kordzi, Ranajit Sahu, "A Review of the Record Concerning the Technical Feasibility of Selective Catalytic Reduction on North Dakota," (Oct. 2020), https://drive.google.com/file/d/1v5vLfEXkx3eQiWi9AdWLyxwS0Z0rbWRP/view?usp=sharing.

Letter from National Parks Conservation Association, Badlands Conservation Alliance, Clean Up the River Environment, Sierra Club, to Governor Doug Burgum, Mr. Jim Semerad Director, Division of Air Quality North Dakota Department of Environmental Quality, Mr. David E. Stroh Environmental Engineer North Dakota Department of Environmental Quality, "Environmental Liabilities Resulting from the Potential Sale of Coal Creek Station," (April 19, 2021), https://drive.google.com/file/d/1f5ZSXQZWt7otMhOQMn-q8UIjF3hEfnzN/view?usp=sharing.

New York

Letter from National Parks Conservation Association, to Amanda Chudow New York Department of Environmental Conservation, "Comments on the New York Department of Environmental Conservation's Draft State Implementation Plan Revision for Regional Haze," (Oct. 7, 2019),

https://drive.google.com/file/d/17FWYJWyeRzRbsPzfp0CRmjAbTFO0rlO5/view?usp=sharing.

Ohio

Letter from National Parks Conservation Association, Sierra Club, Coalition to Protect America's National Parks, and Ohio Environmental Council, to Holly Kaloz, Ohio Environmental Protection Agency, Conservation Organizations' Comments on Ohio's Proposed Regional Haze State Implementation Plan for the Second Implementation Period (June 28, 2021), https://drive.google.com/file/d/1nXb7mzCVx6RtJiz5VahDLlPvWihmOQok/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the Ohio Regional Haze State Implementation Plan," (June 2021), https://drive.google.com/file/d/1anyw5lJOyNPjqNmG_BbHdwkhMySDOPYR/view?usp=sharing.

Oregon

Letter from Cully Air Action Team, Earthjustice, Friends of the Columbia Gorge, National Parks Conservation Association, Neighbors for Clean Air, Northwest Environmental Defense Center, Oregon Environmental Council, to Director Whitman, DEQ staff, and members of the Environmental Quality Commission, "Public Comment on Regional Haze State Implementation Plan by Environmental Justice Advocates," (Nov. 1, 2021), https://drive.google.com/file/d/1GFlenSxWEzbWIAZaLDYsrIAeqJEaHFAv/view?usp=sharing.

Pennsylvania

Letter from National Parks Conservation Association, PennFuture, Group Against Smog and Pollution, Coalition to Protect America's National Parks, Moms Clean Air Force, Clean Air Council, Earthjustice, to Mark Hammond, Director Bureau of Air Quality, Pennsylvania Department of Environmental Protection, "Regional Haze, Second Planning Period," (April 19, 2021), https://drive.google.com/file/d/18BlJzptxrW6XsFbtiop8fEunY14nX98R/view?usp=sharing, ("Preliminary Comment Letter to Pennsylvania"), with enclosure, Joe Kordzi, "A Preliminary Review and Recommendations for Selected Pennsylvania Regional Haze Sources," (April 2021), https://drive.google.com/file/d/1ea9Nbcg_vllxekNep0c2RzxY-GOjMFXM/view?usp=sharing.

South Carolina

Letter from Sierra Club, National Parks Conservation Association, Coalition to Protect America's National Parks, Coastal Conservation League, South Carolina Environmental Law Project, Southern Environmental Law Center, to Scott Bigleman, Air Regulation and Data Analysis Section, "Conservation Organizations' Comments on South Carolina's Regional Haze State Implementation Plan," (Jan. 5, 2022), https://drive.google.com/file/d/1JYrFTBefdsIdK-dVRngRNAbqQyB-0fpe/view?usp=sharing; with enclosure, Joe Kordzi, "A Review of the South Carolina Regional Haze State Implementation Plan" (Dec. 2021), https://drive.google.com/file/d/1R4C0iELLi4RcIrSYN5FCmGOOs4ox727p/view?usp=sharing.

Tennessee

Letter from National Parks Conservation Association, Sierra Club, Tennessee Citizens for Wilderness Planning and Coalition to Protect America's National Parks, to Michelle Owenby, Director, Division of Air Pollution Control, Tennessee Department of Environment and Conservation, "Conservation Organizations Comments on the Pre-Hearing Draft Tennessee Regional Haze State Implementation Plan," (Dec. 10, 2021), https://drive.google.com/file/d/1x4accQc5zY5PjzRk545gUM1gKaBryUzM/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the Indiana Regional Haze State Implementation Plan" (Nov. 2021), https://drive.google.com/file/d/1IVKUs9_L4nWXfky7NgO9Bw23z5R7XXok/view?usp=sharing.

Texas

Letter from National Parks Conservation Association, Sierra Club, Environmental Integrity Project, Air Alliance Houston, Earthjustice, to Margaret Earnest, MC206 Air Quality Division Texas Commission on Environmental Quality, "SIP Project Number 2019-112-SIP-NR," (Jan. 8. 2021), https://drive.google.com/file/d/17LyjtAKVujdcaraMOzvdPlSehEH1guGd/view?usp=sharing.

Utah

Letter from National Parks Conservation Association, HEAL Utah, Sierra Club, Utah Physicians for a Healthy Environment, Western Resource Advocates, to Bryce Bird, Director, Utah Division of Air Quality, "Preliminary comments on second planning period regional haze reasonable progress

submissions by industry," (Nov. 11, 2020), https://drive.google.com/file/d/1uoS1bzQckY7__O85blgBnggM13y3LDsO/view?usp=sharing, with enclosure: Victoria R. Stamper, "Comments on Company Submittals to the Utah Division of Air Quality on Air Pollution Controls to Make Reasonable Progress Towards the National Visibility Goal," (Oct. 28, 2020), https://drive.google.com/file/d/1CSGL2RoD-8gs3TklpBTI_ixCr1KqoXJw/view?usp=sharing.

Virginia

Letter from Appalachian Voices, Capital Region Land Conservancy, Climate Action Alliance of the Valley, Southern Environmental Law Center, Coalition to Protect America's National Parks, University of Virginia School of Law (Cale Jaffe), Moms Clean Air Force, Virginia Clinicians for Climate Action, National Parks Conservation Association, Virginia Conservation Network, Piedmont Environmental Council, Virginia Interfaith Power & Light, SERCAP, Virginia League of Conservation Voters, to The Hon. Ralph Northam, Office of the Governor, "Request for your leadership to benefit Virginians' health and welfare and to promote environmental justice via an effective clean air plan due soon to the U.S. EPA," (June 25, 2021), https://drive.google.com/file/d/1NZr44VbtZ49-gKlD1W7l1kxChZzXUnIi/view?usp=sharing.

Washington

Letter submitted on behalf of National Parks Conservation Association, by Laumann Legal, LLC., to Liem Nguyen, Judy Schwieters, Department of Ecology, "NPCA Comments on Draft Air Quality Agreed Orders for Alcoa Wenatchee Agreed Order 18100 (Chelan County), Intalco Agreed Order 18216 (Whatcom County)," (Dec. 3, 2020), https://drive.google.com/file/d/1Jx83tnMmjVnKvzciZ2wo6Qi7a7iZIUx2/view?usp=sharing.

Letter from National Parks Conservation Association, Sierra Club, the Duwamish River Cleanup Coalition, Puget Soundkeeper Alliance, Waste Action Project, to Philip Gent, Air Quality Program, Department of Ecology, "NPCA Comments Submitted for Informal comment period: Regional Haze SIP Revision - 2nd 10-Year Plan," (Feb. 16, 2021, Submitted with correction on Feb. 19, 2021), https://drive.google.com/file/d/1MbrGgMg5M7yPM-m5yo4OH9SIpGvljTnj/view?usp=sharing, including enclosure, Klafka, Steven, P.E. BCEE, Environmental Engineer, Wingra Engineering, S.C., "The Four-Factor Reasonable Progress Analysis for Ardagh Glass," (Jan. 27, 2021),

https://drive.google.com/file/d/1xXsx07y4z4K6BIgeJH0rLP7L0Ha_Iuwn/view?usp=sharing.

Letter from National Parks Conservation Association, Sierra Club, Alpine Lakes Protection Society, North Cascades Conservation Council, Olympic Park Advocates, Puget Soundkeeper Alliance, Stand.earth, Waste Action Project, to Linda Kildahl, Washington Department of Ecology, Air Quality Program, "Conservation Organizations' Comments Submitted on Washington's Proposed Regional Haze State Implementation Plan for 2018 to 2028," (Nov. 23, 2021), https://drive.google.com/file/d/19_6Z8gmTdss8yeUak4CopkEiGuIQOlF_/view?usp=sharing, with enclosure, Victoria Stamper, "Review and Comments on Washington Department of Ecology's Draft Regional Haze Plan for the Second Implementation Period: Long Term Strategy and Four-Factor Analysis of Controls," (Nov. 19, 2021), https://drive.google.com/file/d/1Iqt-K47Nq_F2SRN3AFC_G6ApWW5EwC9T/view?usp=sharing.

West Virginia

Letter from National Parks Conservation Association, Sierra Club, Appalachian Mountain Advocates, West Virginia Rivers Coalition, Mid-Ohio Valley Climate Action, Eastern Panhandle Green Coalition, West Virginia Highlands Conservancy, West Virginia Climate Alliance, to Todd Shrewsbury, WV Department of Environmental Protection, Division of Air Quality, Conservation Organizations' Comments on the Proposed Regional Haze State Implementation Plan," (Jan. 10, 2022), https://drive.google.com/file/d/15Y5tMGFBrFl5kODmH9y0RSpgvKEmbhgF/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the West Virginia Regional Haze State Implementation Plan" (Dec. 2021), https://drive.google.com/file/d/1N6BPgPyVClNmLhFcS7poLTVVSYhJ9eFW/view?usp=sharing.

Letter to VISTAS States Air Directors

Letter from Stephanie Kodish, National Parks Conservation Association, Leslie Griffith, Southern Environmental Law Center, and David Rogers, Sierra Club to VISTAS State Air Directors, "Significant Flaws in VISTAS Regional Haze CAMx Modeling and Methods; Recommendations to Develop Compliant State Implementation Plans" (May 12, 2021), https://drive.google.com/file/d/1e0KAljsvNm3Wmj3HRVeyKvafaI-dza0c/view?usp=sharing, with enclosure, D. Howard Gebhart, "Technical Review of VISTAS Visibility Modeling for the Second Round of Regional Haze State Implementation Plans" (May 2021) ("Gebhart 2020 Report"), including attachment "Gebhart Resume Final 2020,"

https://drive.google.com/file/d/1aMKbgtFxJqvrEVxeSOy96CNvoQ0xhUUv/view?usp=sharing.

Expert Technical Reports

VISTAS Modeling

D. Howard Gebhart, "Technical Review of VISTAS Visibility Modeling for the Second Round of Regional Haze State Implementation Plans" (May 2021) ("Gebhart 2020 Report"), including attachment "Gebhart Resume Final 2020," https://drive.google.com/file/d/1aMKbgtFxJqvrEVxeSOy96CNvoQ0xhUUv/view?usp=sharing .

D. Howard Gebhart, "Technical Review of North Carolina [and Other VISTAS States] Regional Haze State Implementation Plan Second Round of Regional Haze State Implementation Plans Supplemental Report" (Oct. 2021), https://drive.google.com/file/d/1UYHgQQAx5xKhItnEuQ3fkFpOk4EtMZ_E/view?usp=sharing.

Oil and Gas Sector

Vicki Stamper, Megan Williams, " OIL AND GAS SECTOR REASONABLE PROGRESS FOUR-FACTOR ANALYSIS OF CONTROLS FOR FIVE SOURCE CATEGORIES: NATURAL GAS-FIRED ENGINES, NATURAL GAS-FIRED TURBINES, DIESEL-FIRED ENGINES, NATURAL GAS-FIRED HEATERS AND BOILERS, FLARING AND INCINERATION, (March 6, 2020), https://drive.google.com/file/d/1RGWYqXKcfyWzBgxuRXzSiSaCZ9PWDH3y/view?usp=sharing.

Glass Manufacturing

Klafka, Steven, P.E. BCEE, Environmental Engineer, Wingra Engineering, S.C., "The Four-Factor Reasonable Progress Analysis for Ardagh Glass," (Jan. 27, 2021), https://drive.google.com/file/d/1xXsx07y4z4K6BIgeJH0rLP7L0Ha_Iuwn/view?usp=sharing.

Cement Kilns

Klafka, Steve, Wingra Engineering, Holcim – Florence Cement Plant Florence, Colorado Four-Factor Reasonable Progress Analysis (Sept. 30,

2021), https://drive.google.com/file/d/1C0DHVM84YoM-a-xn3LILDB5nK8J4rKDq/view?usp=sharing.

Klafka, Steve, Wingra Engineering, GCC Rio Grande – Pueblo Cement Plant, Four-Factor Reasonable Progress Analysis (Sept. 23, 2021), https://drive.google.com/file/d/1W-EAjYr_zL9Ucj6t2PAtCEuqAVP7flc9/view?usp=sharing.

Endnotes

[i] Letter from Earthjustice on behalf of National Parks Conservation Association, Sierra Club, to Dena Wojtach, Lisa Devore, Air Pollution Control Division, Colorado Department of Public Health and Environment, "Colorado's Second Planning Period Regional Haze SIP — Responses to Sources' Four-Factor Analyses," (May 11, 2020), https://drive.google.com/file/d/1ysDsubB5OmsGpzpe5mQsq560utJCt0p7/view?usp=sharing, with attachments: Victoria R. Stamper, "Comments on Certain Company Submittals to the Colorado Department of Public Health and Environment on Air Pollution Controls to Make Reasonable Progress Towards the National Visibility Goal," (May 5, 2020), https://drive.google.com/file/d/1VLwqCbXL5zVxBV-AKBzaVdbeLGUY534p/view?usp=sharing; Dr. Ranajit (Ron) Sahu, Consultant, "Initial Comments on the Suncor Commerce City Refinery Regional Haze Reasonable Progress Review of Four-Factor Analyses prepared by Suncor Energy (U.S.A.) Inc. for the Colorado Department of Public Health and Environment (CDPHE), December 4, 2019," (May 11, 2020), https://drive.google.com/file/d/1YDWFap0yB-oaTxEoeyHokngGVUtO3cP8/view?usp=sharing; *see also* Letter from Earthjustice on behalf of National Parks Conservation Association, Sierra Club, to Dena Wojtach, Lisa Devore, Air Pollution Control Division, Colorado Department of Public Health and Environment, "Proposed Amendments to Regulation 7 for Natural Gas-fired Reciprocating Internal Combustion Engines,' (May 8, 2020), with attachment, Vicki Stamper, Megan Williams, "OIL AND GAS SECTOR REASONABLE PROGRESS FOUR-FACTOR ANALYSIS OF CONTROLS FOR FIVE SOURCE CATEGORIES: NATURAL GAS-FIRED ENGINES, NATURAL GAS-FIRED TURBINES, DIESEL-FIRED ENGINES, NATURAL GAS-FIRED HEATERS AND BOILERS, FLARING AND INCINERATION," (March 5, 2020), https://drive.google.com/file/d/1KZn9w0rzrgnIaQf1YfSK_k2RQbt9ZOKN/view?usp=sharing; *see also* Letter from Earthjustice on behalf of National Parks Conservation Association, Sierra Club, to Colorado Air Quality Control Commission, "Request for Phase II Regional Haze Rulemaking, Regulations Number 7 and 23," (Aug. 16, 2016), including attachment, Dr. Ranajit (Ron) Sahu, Consultant, Preliminary Comments on the 4-Factor Analysis for Sulfur Dioxide (SO2) Reductions at the Plant 1 Flare and the Plant 2 No. 3 Sulfur Reduction Unit (SRU3) at the Suncor Commerce City Refinery, Denver, Colorado (July 12, 2021), https://drive.google.com/file/d/1yqh4UIjYl12xI9mwTa3Rd4gLZnuIdhET/view?usp=sharing; *see also* "Prehearing Statement of National Parks Conservation Association and Sierra Club," Regarding Proposed Revisions to Regional Haze State Implementation Plan (SIP), Regulation Number 23 (Oct. 7, 2021), https://drive.google.com/file/d/1EXBWjU5eakde_Ark4YKGLIXzE7SGOZGo/view?usp=sharing; *see also* Steve Klafka, Wingra Engineering, Holcim – Florence Cement Plant Florence, Colorado Four-Factor Reasonable Progress Analysis (Sept. 30, 2021), https://drive.google.com/file/d/1C0DHVM84YoM-a-xn3LILDB5nK8J4rKDq/view?usp=sharing; *see also* Steve Klafka, Wingra Engineering, GCC Rio Grande – Pueblo Cement Plant, Four-Factor

Reasonable Progress Analysis (Sept. 23, 2021), https://drive.google.com/file/d/1W-EAjYr_zL9Ucj6t2PAtCEuqAVP7flc9/view?usp=sharing.

[ii] Letter from Sierra Club and National Parks Conservation Association, to Vivian H. Johnson, Venetta Hayes, Louisiana Department of Environmental Quality, Office of Environmental Assessment, "Sierra Club and National Parks Conservation Association Comments on Louisiana Department of Environmental Quality's ("LDEQ") Proposed State Implementation Plan ("SIP") for Regional Haze Program for the Second Implementation Period, LDEQ AI# 174156 [LDEQ 2104Pot1, Doc. ID No. 12656414 (Apr. 20, 2021)]," (July 12, 2021) ("Comment Letter to Louisiana"), https://drive.google.com/file/d/1bTugkhwmi9LEvqHH3NgtL-vo9O-U8MzN/view?usp=sharing, with enclosures, Victoria R. Stamper, "Review and Comments on Reasonable Progress Four-Factor Analyses for Sulfur Dioxide and Nitrogen Oxide Pollution Controls Evaluated as Part of the Louisiana Regional Haze Plan for the Second Implementation Period," (July 8, 2021), https://drive.google.com/file/d/1pzRZpNW_c6rliibGlcy-WMPuaz6yh49c/view?usp=sharing; D. Howard Gebhart, "Technical Review of Visibility Modeling for the Second Round of Regional Haze State Implementation Plans: State of Louisiana," (July 2021), https://drive.google.com/file/d/1h93Ntoj4sNpTjj2RedYxRexKgM9E6oCo/view?usp=sharing.

[iii] Letter from National Parks Conservation Association, to Amanda Chudow New York Department of Environmental Conservation, "Comments on the New York Department of Environmental Conservation's Draft State Implementation Plan Revision for Regional Haze," (Oct. 7, 2019) ("Comment Letter to New York"), https://drive.google.com/file/d/17FWYJWyeRzRbsPzfp0CRmjAbTFO0rlO5/view?usp=sharing.

[iv] Letter from National Parks Conservation Association, Sierra Club, Tennessee Citizens for Wilderness Planning and Coalition to Protect America's National Parks, to Michelle Owenby, Director, Division of Air Pollution Control, Tennessee Department of Environment and Conservation, "Conservation Organizations Comments on the Pre-Hearing Draft Tennessee Regional Haze State Implementation Plan," (Dec. 10, 2021), https://drive.google.com/file/d/1x4accQc5zY5PjzRk545gUM1gKaBryUzM/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the Tennessee Regional Haze State Implementation Plan" (Nov. 2021), https://drive.google.com/file/d/1IVKUs9_L4nWXfky7NgO9Bw23z5R7XXok/view?usp=sharing.

[v] Letter from National Parks Conservation Association and Appalachian Mountain Club, to Kiernan Wholean, Bureau of Air Management, Connecticut Department of Energy and Environmental Protection, "Comments on State of Connecticut's Notice of Intent to Revise the State Implementation Plan for Air Quality: Regional Haze Plan for the Second Implementation Period (2018 - 2028)," (Jan. 29, 2021) ("Comment Letter to Connecticut"), https://drive.google.com/file/d/1rOMuNoV1hgx6N8FOGExoTmnDxXjN94hF/view?usp=sharing.

[vi] Letter from National Parks Conservation Association (NPCA) and Appalachian Mountain Club, to Mark Wert, Branch Chief, Air Planning, Department of Environmental Protection, "Comments on State of Massachusetts' Notice of Intent to Revise the State Implementation Plan for Air Quality: Regional Haze Plan for the Second Implementation Period (2018 - 2028)," (May 14, 2021) ("Comment Letter to Massachusetts"), https://drive.google.com/file/d/19y9LF_pLkDKO_y9bOMxhmF6ME_JJQDsY/view?usp=sharing.

[vii] Letter from National Parks Conservation Association, Sierra Club, Southern Environmental Law Center, CleanAIRE NC, Coalition to Protect America's National Parks, and NC League of Conservation Voters, Appalachian Voices, Alliance to Protect our People and the Places We Live, NAACP Stokes County Branch, Center for Biological Diversity, Environment North Carolina and North Carolina Conservation Network, to Randy Strait NC Division of Air Quality, "Conservation Organizations Comments on North Carolina's Proposed Regional Haze State Implementation Plan (SIP) for North Carolina Class I Areas for the Second Planning Period (2019 - 2028)," (Oct. 15, 2021) ("Comment Letter to North Carolina"), https://drive.google.com/file/d/1WFPsE_TFWvz0r4TIOmUjqvdJ6T0frm0F/view?usp=sharing, with enclosures, Joe Kordzi, "A Review of the North Carolina Regional Haze State Implementation Plan" (Nov. 2021), https://drive.google.com/file/d/1RDCnruI8EX9TyPzp25M-M3NdnXPBqA_i/view?usp=sharing; D. Howard Gebhart, "Technical Review of North Carolina

Regional Haze State Implementation Plan Second Round of Regional Haze State Implementation Plans Supplemental Report" (Oct. 2021), https://drive.google.com/file/d/1UYHgQQAx5xKhItnEuQ3fkFpOk4EtMZ_E/view?usp=sharing.

[viii] Letter from National Parks Conservation Association, Sierra Club, Environmental Integrity Project, Air Alliance Houston, Earthjustice, to Margaret Earnest, MC206 Air Quality Division Texas Commission on Environmental Quality, "SIP Project Number 2019-112-SIP-NR," (Jan. 8. 2021), https://drive.google.com/file/d/17LyjtAKVujdcaraMOzvdPlSehEH1guGd/view?usp=sharing.

[ix] Letter from Sierra Club, National Parks Conservation Association, Delaware Audubon Society, Earthjustice, to Lisa Vest, Hearing Officer Office of the Secretary Department of Natural Resources and Environmental Control, "Delaware's Draft Visibility State Implementation Plan (SIP) Revision," (Jan. 13, 2020), https://drive.google.com/file/d/1sPl2ax0ovifVsuKSpchLAKTT4gRqGzmG/view?usp=sharing.

[x] Letter from Sierra Club, National Parks Conservation Association, and the Coalition to Protect America's National Parks, to Robert Irvine EGLE, Air Quality Division, SIP Development Unit (June 30, 2021), https://drive.google.com/file/d/1oYSry6dgkE9NZpF_bbJYF1YdOiR5OAw6/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the Michigan Regional Haze State Implementation Plan" (June 2021) ("Comment Letter to Michigan"), https://drive.google.com/file/d/1vnclCAH1wnADzJQ0pWpcnmq6mHofOqBe/view?usp=sharing.

[xi] Letter from National Parks Conservation Association, Sierra Club, Coalition to Protect America's National Parks, and Ohio Environmental Council, to Holly Kaloz, Ohio Environmental Protection Agency, Conservation Organizations' Comments on Ohio's Proposed Regional Haze State Implementation Plan for the Second Implementation Period (June 28, 2021), https://drive.google.com/file/d/1nXb7mzCVx6RtJiz5VabDLlPvWihmOQok/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the Ohio Regional Haze State Implementation Plan," (June 2021), https://drive.google.com/file/d/1anyw5lJOyNPjqNmG_BbHdwkhMySDOPYR/view?usp=sharing.

[xii] Letter submitted on behalf of National Parks Conservation Association, by Laumann Legal, LLC., to Liem Nguyen, Judy Schwieters, Department of Ecology, "NPCA Comments on Draft Air Quality Agreed Orders for Alcoa Wenatchee Agreed Order 18100 (Chelan County), Intalco Agreed Order 18216 (Whatcom County)," (Dec. 3, 2020) ("Comment Letter to Washington – 2020"), https://drive.google.com/file/d/1Jx83tnMmjVnKvzciZ2wo6Qi7a7iZIUx2/view?usp=sharing; *see also* Letter from National Parks Conservation Association, Sierra Club, the Duwamish River Cleanup Coalition, Puget Soundkeeper Alliance, Waste Action Project, to Philip Gent, Air Quality Program, Department of Ecology, "NPCA Comments Submitted for Informal comment period: Regional Haze SIP Revision - 2nd 10-Year Plan," (Feb. 16, 2021, Submitted with correction on Feb. 19, 2021) ("Comment Letter to Washington – February 2021"), https://drive.google.com/file/d/1MbrGgMg5M7yPM-m5yo4OH9SIpGvljTnj/view?usp=sharing, including enclosure, Klafka, Steven, P.E. BCEE, Environmental Engineer, Wingra Engineering, S.C., "The Four-Factor Reasonable Progress Analysis for Ardagh Glass," (Jan. 27, 2021); *see also* Letter from National Parks Conservation Association, Sierra Club, Alpine Lakes Protection Society, North Cascades Conservation Council, Olympic Park Advocates, Puget Soundkeeper Alliance, Stand.earth, Waste Action Project, to Linda Kildahl, Washington Department of Ecology, Air Quality Program, "Conservation Organizations' Comments Submitted on Washington's Proposed Regional Haze State Implementation Plan for 2018 to 2028," (Nov. 23, 2021) ("Comment Letter to Washington – November 2021"), https://drive.google.com/file/d/19_6Z8gmTdss8yeUak4CopkEiGuIQOlF_/view?usp=sharing, with enclosure, Victoria Stamper, "Review and Comments on Washington Department of Ecology's Draft Regional Haze Plan for the Second Implementation Period: Long Term Strategy and Four-Factor Analysis of Controls," (Nov. 19, 2021), https://drive.google.com/file/d/1Iqt-K47Nq_F2SRN3AFC_G6ApWW5EwC9T/view?usp=sharing.

[xiii] Letter from National Parks Conservation Association, Coalition to Protect America's National Parks and Sierra Club, to Ashley Kung, Florida Department of Environmental Protection,

"Conservation Organizations' Comments on Florida's Proposed Revisions Regional Haze State Implementation Plan for the Second Implementation Period," (July 9, 2021) ("Comment Letter to Florida"), https://drive.google.com/file/d/1D_I9oqlbHFLAcGDGNSgfU-QGJ4vbd_N9/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the Florida Regional Haze State Implementation Plan," (July 2021), https://drive.google.com/file/d/1X2onXDgY4WhbO0D4FUT3F5t5Xmtv4dtg/view?usp=sharing.

[xiv] Letter from Sierra Club and the National Parks Conservation Association, to Craig A. Wright, Director, NHDES Air Resources Division, "Comments on New Hampshire's Regional Haze Plan Periodic Comprehensive Revision," (Dec. 30, 2019), https://drive.google.com/file/d/1YIFCM771jSPI5ZtfPW9g84g9hLKGN8Ay/view?usp=sharing.

[xv] Letter from National Parks Conservation Association, Sierra Club, Coalition to Protect America's National Parks, and Ohio Environmental Council, to Holly Kaloz, Ohio Environmental Protection Agency, Conservation Organizations' Comments on Ohio's Proposed Regional Haze State Implementation Plan for the Second Implementation Period (June 28, 2021) ("Comment Letter to Ohio"), https://drive.google.com/file/d/1nXb7mzCVx6RtJiz5VahDLlPvWihmOQok/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the Ohio Regional Haze State Implementation Plan," (June 2021), https://drive.google.com/file/d/1anyw5lJOyNPjqNmG_BbHdwkhMySDOPYR/view?usp=sharing.

[xvi]Letter from National Parks Conservation Association, Sierra Club, Appalachian Mountain Advocates, West Virginia Rivers Coalition, Mid-Ohio Valley Climate Action, Eastern Panhandle Green Coalition, West Virginia Highlands Conservancy, West Virginia Climate Alliance, to Todd Shrewsbury, WV Department of Environmental Protection, Division of Air Quality, Conservation Organizations' Comments on the Proposed Regional Haze State Implementation Plan," (Jan. 10, 2022) ("Comment Letter to West Virginia"), https://drive.google.com/file/d/15Y5tMGFBrFl5kODmH9y0RSpgvKEmbhgF/view?usp=sharing, with enclosure, Joe Kordzi, "A Review of the West Virginia Regional Haze State Implementation Plan" (Dec. 2021), https://drive.google.com/file/d/1N6BPgPyVClNmLhFcS7poLTVVSYhJ9eFW/view?usp=sharing.

[xvii] Letter from Sierra Club, National Parks Conservation Association, The Coalition to Protect America's National Parks, Just Transition Northwest Indiana, Hoosier Environmental Council, Izaak Walton League, and Save the Dunes Comments on Indiana Department of Environmental Management's Proposed Regional Haze State Implementation Plan for Second Implementation Period (Nov. 15, 2021) ("Comment Letter to Indiana"), https://drive.google.com/file/d/1XmXIZ28giuDhkcLlw5dDfX0esZa7pQiO/view?usp=sharing; with enclosure, Joe Kordzi, "A Review of the Indiana Regional Haze State Implementation Plan" (Nov. 2021), https://drive.google.com/file/d/1SUIxM5aRBCit4Wgrw6IURwrO_VD6x1VY/view?usp=sharing.

[xviii] Letter from National Parks Conservation Association and Sierra Club, to Mr. Ratzman, Bureau of Evaluation and Planning, New Jersey Department of Environmental Protection, "Comments on the New Jersey's Proposed Regional Haze SIP 2018-2028," (Oct. 21, 2019) ("Comment Letter to New Jersey"), https://drive.google.com/file/d/1O-w7PofKGZ6FOmCeaXAm7q3exk-WPDve/view?usp=sharing.

[xix] Letter from Sierra Club, National Parks Conservation Association, Coalition to Protect America's National Parks, Coastal Conservation League, South Carolina Environmental Law Project, Southern Environmental Law Center, to Scott Bigleman, Air Regulation and Data Analysis Section, "Conservation Organizations' Comments on South Carolina's Regional Haze State Implementation Plan," (Jan. 5, 2022) ("Comment Letter to South Carolina"), https://drive.google.com/file/d/1JYrFTBefdsIdK-dVRngRNAbqQyB-0fpe/view?usp=sharing; with enclosure, Joe Kordzi, "A Review of the South Carolina Regional Haze State Implementation Plan" (Dec. 2021), https://drive.google.com/file/d/1R4C0iELLi4RcIrSYN5FCmGOOs4ox727p/view?usp=sharing.

[xx] *See e.g.,* Comment Letter to New Jersey at 9 ("The MANE-VU course of action is not a safety net and, assuming New Jersey accurately interpreted and adhered to the MANE-VU Ask, has not resulted in adequate analysis or emission reduction measures to demonstrate compliance with the

Regional Haze Rule or Clean Air Act."); *id.* at 15 ("In addition to adopting enforceable measures necessary to make reasonable progress via a four-factor analysis, NJDEP also must demonstrate that it has included in its implementation plan "all measures agreed to during state-to-state consultations or a regional planning process, or measures that will provide equivalent visibility improvement." 40 C.F.R. § 51.308(f)(2)(ii). The MANE-VU states, including New Jersey, developed a course of action (i.e., the MANE-VU Asks") to assure reasonable progress towards the national visibility goal during the second implementation period. Although NJDEP's proposed SIP revision seems to indicate that New Jersey has already adopted measures to implement the MANE-VU asks, the proposed regional haze SIP revision fails to adequately identify those existing rules and/or permits, explain how those rules/permits meet the MANE-VU ask, or make clear whether the rules implementing the MANE-VU asks have been submitted to EPA as part of the SIP. This is discussed further below." (citations omitted).

[xxi] Letter from National Parks Conservation Association, Sierra Club, Earthjustice to Arizona to Ryan Templeton, Elias Toon, Arizona Department of Environmental Quality "EPA July 2021 Clarification Memo and the Upcoming Arizona Regional Haze SIP Rulemaking," (Aug. 5, 2021) ("Preliminary Comment Letter to Arizona"), https://drive.google.com/file/d/1e72jUXB_ozBFoWkuTdEzEaRrtNgx8D0B/view?usp=sharing.

[xxii] Letter from Diné C.A.R.E., National Parks Conservation Association, San Juan Citizens Alliance, Sierra Club, and Western Environmental Law Center, to Sandra Ely, Director, Environmental Protection Division, NMED, "New Mexico's Regional Haze Plan and San Juan Generating Station," (March 19, 2020) ("Preliminary Comment Letter to New Mexico"), https://drive.google.com/file/d/1sVqnRJX0av5DjACmVoM8bkmoQaw_JMGR/view?usp=sharing; *see also* Letter from Western Environmental Law Center, National Parks Conservation Association, to Mark Jones, Cember Hardison, New Mexico Environment Department, response to request for additional information on electrification and SCR (May 22, 2020), https://drive.google.com/file/d/1gyoM3RpHne233imcPJ0AQ9LOVR4t5tYM/view?usp=sharing, with enclosure: Vicki Stamper, Megan Williams, "Review of Claims Made by New Mexico Oil and Gas Companies Regarding Applicability of Selective Catalytic Reduction (SCR) to Lean Burn Engines," (May 22, 2020); *see also* Letter from National Parks Conservation Association, Western Environmental Law, to Sandra Ely, Michael Baca, Mark Jones, and Kerwin Singleton New Mexico Environment Department, "Comments responding to 4-factor analysis submittals from identified oil & gas operators," (July 10, 2020), https://drive.google.com/file/d/1jsmusMW2M37vRlWdFXYLjtZwSkP9QE6Z/view?usp=sharing, with enclosure: Vicki Stamper, Megan Williams, "Assessment of Cost Effectiveness Analyses for Controls Evaluated Four – Factor Analyses for Oil and Gas Facilities For the New Mexico Environment Department's Regional Haze Plan for the Second Implementation Period," (July 2, 2020); *see also* Victoria R. Stamper, "Comments on the Enchant/Farmington July 9, 2020 Submittal to the New Mexico Environment Department on Air Pollution Controls at San Juan Units 1 and 4 to Make Reasonable Progress Towards the National Visibility Goal," (Sept. 2, 2020), https://drive.google.com/file/d/1Y6z8z0zIPDim0PhXUbWWvNggGE9yl3vT/view?usp=sharing.

[xxiii] Letter from National Parks Conservation Association, HEAL Utah, Sierra Club, Utah Physicians for a Healthy Environment, Western Resource Advocates, to Bryce Bird, Director, Utah Division of Air Quality, "Preliminary comments on second planning period regional haze reasonable progress submissions by industry," (Nov. 11, 2020) ("Preliminary Comment Letter to Utah"), https://drive.google.com/file/d/1uoS1bzQckY7__O85blgBnggM13y3LDsO/view?usp=sharing, with enclosure: Victoria R. Stamper, "Comments on Company Submittals to the Utah Division of Air Quality on Air Pollution Controls to Make Reasonable Progress Towards the National Visibility Goal," (Oct. 28, 2020), https://drive.google.com/file/d/1CSGL2RoD-8gs3TklpBTI_ixCr1KqoXJw/view?usp=sharing.

[xxiv] Letter from National Parks Conservation Association, PennFuture, Group Against Smog and Pollution, Coalition to Protect America's National Parks, Moms Clean Air Force, Clean Air Council, Earthjustice, to Mark Hammond, Director Bureau of Air Quality, Pennsylvania Department of Environmental Protection, "Regional Haze, Second Planning Period," (April 19, 2021), ("Preliminary

Comment Letter to Pennsylvania"), https://drive.google.com/file/d/18BlJzptxrW6XsFbtiop8fEunY14nX98R/view?usp=sharing, with enclosure, Joe Kordzi, "A Preliminary Review and Recommendations for Selected Pennsylvania Regional Haze Sources," (April 2021), https://drive.google.com/file/d/1ea9Nbcg_vIlxekNep0c2RzxY-GOjMFXM/view?usp=sharing.

[xxv] Letter from National Parks Conservation Association, Sierra Club, to Director Macy, "Nebraska's Second Planning Period Regional Haze SIP Development," (July 6, 2021) ("Preliminary Comment Letter to Nebraska"), https://drive.google.com/file/d/1bbFb7VSzchOFrh4Seqox1XaNi7YMOjV0/view?usp=sharing, with enclosures: Victoria R. Stamper, "Reasonable Progress Analysis for Sulfur Dioxide and Nitrogen Oxide Pollution Control Upgrades at Gerald Gentleman Station," (July 6, 2021), https://drive.google.com/file/d/1YKE7eLbxhaW7ChXqiB2n7T6h4yxoftNr/view?usp=sharing; Dr. H. Andrew Gray, "Review of Trinity's CAMx Air Dispersion Modeling Report - Visibility Impacts prepared for NPPD Gerald Gentleman Station (December 2020) and their Supplemental Report (February 2021)," (July, 6, 2021), https://drive.google.com/file/d/1JPtBiYD7s0q8evCN_4Pri4TRJUIqK3pV/view?usp=sharing.

[xxvi] Letter from National Parks Conservation Association, Sierra Club, to Jim Semerad, David E. Stroh, North Dakota Department of Environmental Quality, "North Dakota's Second Planning Period Regional Haze SIP — Responses to Source-Specific Four-Factor Analyses," (Nov. 17, 2020) ("Preliminary Comment Letter to North Dakota – Nov. 2020"), https://drive.google.com/file/d/1ugPNlmSbpmY2jeZoFOxfJk7oZM9tK0gQ/view?usp=sharing, with enclosures: Joe Kordzi, "NOx and SO2 Reasonable Progress Analysis for the Otter Tail Coyote Station," (Nov. 2020), https://drive.google.com/file/d/1hOf9nAIClgu8u--KbhJQ9Crnx6ShEVdA/view?usp=sharing; Joe Kordzi, "North Dakota BART and Reasonable Progress Analysis," (Nov. 2020), https://drive.google.com/file/d/1hOf9nAIClgu8u--KbhJQ9Crnx6ShEVdA/view?usp=sharing; Joe Kordzi, Ranajit Sahu, "A Review of the Record Concerning the Technical Feasibility of Selective Catalytic Reduction on North Dakota," (Oct. 2020), https://drive.google.com/file/d/1v5vLfEXkx3eQiWi9AdWLyxwS0Z0rbWRP/view?usp=sharing; *see also* Letter from National Parks Conservation Association, Badlands Conservation Alliance, Clean Up the River Environment, Sierra Club, to Governor Doug Burgum, Mr. Jim Semerad Director, Division of Air Quality North Dakota Department of Environmental Quality, Mr. David E. Stroh Environmental Engineer North Dakota Department of Environmental Quality, "Environmental Liabilities Resulting from the Potential Sale of Coal Creek Station," (April 19, 2021) ("Preliminary Comment Letter to North Dakota – April 2021"), https://drive.google.com/file/d/1f5ZSXQZWt7otMhOQMn-q8UIjF3hEfnzN/view?usp=sharing.

[xxvii] Letter from Appalachian Voices, Capital Region Land Conservancy, Climate Action Alliance of the Valley, Southern Environmental Law Center, Coalition to Protect America's National Parks, University of Virginia School of Law (Cale Jaffe), Moms Clean Air Force, Virginia Clinicians for Climate Action, National Parks Conservation Association, Virginia Conservation Network, Piedmont Environmental Council, Virginia Interfaith Power & Light, SERCAP, Virginia League of Conservation Voters, to The Hon. Ralph Northam, Office of the Governor, "Request for your leadership to benefit Virginians' health and welfare and to promote environmental justice via an effective clean air plan due soon to the U.S. EPA," (June 25, 2021) ("Preliminary Comment Letter to Virginia"), https://drive.google.com/file/d/1NZr44VbtZ49-gKID1W7l1kxChZzXUnIi/view?usp=sharing.

Message

From: DeLuca, Isabel [DeLuca.Isabel@epa.gov]
Sent: 1/24/2022 9:33:52 PM
To: OAR Briefings [OAR_Briefings@epa.gov]
Subject: NACAA talkers
Attachments: 1.25.22 Goffman NACAA Board.docx; Event Form OAR Joe Goffman Winter NACAA Meeting.docx

Hi Joe,
Attached is a rather long set of bullets on the topics NACAA expressed interest in hearing about (mainly, everything OAR). This is a bit more than you can cover in the 30 minutes allotted to you, so feel free to cut. You will note a couple of areas where URLs are provided for more information (ozone design values, communications materials for EtO). I will be listening in, and if you mention these, I will drop the url into the chat box.

For the discussion part during the second half of the hour Chet Wayland and Kathryn Sargeant will be on with you to help with any detailed technical questions.

Thanks,
Isabel

Isabel DeLuca
Deputy Communications Director
Office of Air and Radiation, US EPA
Phone 202-343-9247

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/24/2022 9:37:39 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Tuesday, January 25
Attachments: Item for Joe and Tomas' overnight reading folder on US Response to Allegations of Envtl Racism; REVIEW - J to J Press Release; RE: REVIEW - J to J Press Release; NACAA talkers

Additional materials:

- OTAQ to send CA Waiver Decision memo tonight for review to OAR Briefings – check email later
- Draft USG response to an allegation of environmental racism (1 email)
- J to J Press release (2 emails) – review by 9 am tomorrow

Goffman, Joseph Calendar
Goffman.Joseph@epa.gov
On Tuesday, January 25, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Busy | Tentative | Free
Out of Office | Working Elsewhere | Outside of Working Hours

January 2022

Tue, Jan 25

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 10:00 AM	Clean School Bus Program BIL Work Code Demo
	10:00 AM – 10:40 AM	OAR Senior Staff

☐	**10:40 AM – 11:00 AM**	**Free**
■	11:00 AM – 12:00 PM	Management Time
■	12:00 PM – 1:00 PM	Lunch/Management Time
■	1:00 PM – 1:30 PM	Weekly Check-In with Joe
☐	**1:30 PM – 2:00 PM**	**Free**
■	2:00 PM – 3:00 PM	NACAA meeting (1 email)
■	3:00 PM – 3:40 PM	OTAQ Weekly
☐	**3:40 PM – 3:45 PM**	**Free**
■	3:45 PM – 4:00 PM	General Discussion
☐	**4:00 PM – 4:15 PM**	**Free**
■	4:15 PM – 4:45 PM	OAR/ADDs Quarterly (Isabel to send talkers tonight to OAR Briefings – check email later)
☐	**4:45 PM – 5:00 PM**	**Free**
■	5:00 PM – 5:25 PM	General Discussion
☐	**After 5:25 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/25/2022 5:46:02 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]; Shoaff, John [Shoaff.John@epa.gov]
Subject: Fwd: Update of 2022 Gantt chart for this PM
Attachments: OAR Reg Gantt Chart_OMB Review and Signature Dates through 2022.xlsx

As requested.

Ann (Campbell) Ferrio
Chief of Staff
Office of Air and Radiation
(202) 566-1370

Message

From: Utech, Dan [Utech.Dan@epa.gov]
Sent: 1/25/2022 8:21:27 PM
To: Cassady, Alison [Cassady.Alison@epa.gov]; Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: RE: Calling your attention to the highlighted material

We are uploading CSAPR today and will get mats out friday

From: Cassady, Alison <Cassady.Alison@epa.gov>
Sent: Tuesday, January 25, 2022 3:20 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Utech, Dan <Utech.Dan@epa.gov>
Subject: RE: Calling your attention to the highlighted material

I missed something

Alison L. Cassady
Deputy Chief of Staff for Policy
U.S. Environmental Protection Agency
Cell: (202) 941-6036

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Tuesday, January 25, 2022 3:17 PM
To: Utech, Dan <Utech.Dan@epa.gov>; Cassady, Alison <Cassady.Alison@epa.gov>
Subject: RE: Calling your attention to the highlighted material

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Utech, Dan <Utech.Dan@epa.gov>
Sent: Tuesday, January 25, 2022 3:15 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Cassady, Alison <Cassady.Alison@epa.gov>
Subject: RE: Calling your attention to the highlighted material

Just when you lost all hope…

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Tuesday, January 25, 2022 10:57 AM
To: Cassady, Alison <Cassady.Alison@epa.gov>
Cc: Utech, Dan <Utech.Dan@epa.gov>
Subject: RE: Calling your attention to the highlighted material

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation

U.S. Environmental Protection Agency

From: Cassady, Alison <Cassady.Alison@epa.gov>
Sent: Tuesday, January 25, 2022 10:53 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Utech, Dan <Utech.Dan@epa.gov>
Subject: RE: Calling your attention to the highlighted material

Thanks. Just wanted to make sure we all weren't accidentally waiting for the other person to take an action the other person thought the other guy was taking.

Alison L. Cassady
Deputy Chief of Staff for Policy
U.S. Environmental Protection Agency
Cell: (202) 941-6036

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Tuesday, January 25, 2022 10:44 AM
To: Cassady, Alison <Cassady.Alison@epa.gov>
Cc: Utech, Dan <Utech.Dan@epa.gov>
Subject: Fwd: Calling your attention to the highlighted material

Alison-FYI.

Sent from my iPhone

Begin forwarded message:

From: "McCarthy, Gina A. EOP/WHO" <Regina.A.McCarthy@ Ex. 5 Deliberative Process (DP)
Date: January 24, 2022 at 10:11:36 PM EST
To: "Goffman, Joseph" <Goffman.Joseph@epa.gov>
Cc: Ali Zaidi <Ali.A.Zaidi@ Ex. 6 Personal Privacy (PP) "Utech, Dan" <Utech.Dan@epa.gov>
Subject: Re: Calling your attention to the highlighted material

Working on it. This is a tough one. Let's connect tomorrow late afternoon. It may take a push from the Administrator. And event then it's hard.

Sent from my iPhone

On Jan 24, 2022, at 8:21 PM, Goffman, Joseph <Goffman.Joseph@epa.gov> wrote:

Any movement on this? Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Goffman, Joseph
Sent: Friday, January 21, 2022 6:56 PM
To: McCarthy, Gina A. EOP/WHO <Regina.A.McCarthy@ Ex. 6 Personal Privacy (PP)

Cc: Ali Zaidi <Ali.A.Zaidi@ Ex. 6 Personal Privacy (PP) >; Utech, Dan <Utech.Dan@epa.gov>
Subject: RE: Calling your attention to the highlighted material

Fingers crossed.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: McCarthy, Gina A. EOP/WHO <Regina.A.McCarthy Ex. 6 Personal Privacy (PP)
Sent: Friday, January 21, 2022 6:53 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Ali Zaidi <Ali.A.Zaidi@ Ex. 6 Personal Privacy (PP) >; Utech, Dan <Utech.Dan@epa.gov>
Subject: Re: Calling your attention to the highlighted material

Most excellent. Thank you.

Sent from my iPhone

On Jan 21, 2022, at 4:42 PM, Goffman, Joseph <Goffman.Joseph@epa.gov> wrote:

MEMORANDUM

SUBJECT: Proposed Rule: Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standards (Tier 1; SAN 8670; RIN 2060-AV51) – **OMB SUBMITTAL**

DATE: January 21, 2022

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

Message

From: McCarthy, Gina A. EOP/WHO [Regina.A.McCarthy Ex. 6 Personal Privacy (PP)
Sent: 1/25/2022 9:19:08 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: RE: Calling your attention to the highlighted material

Ex. 5 Deliberative Process (DP)

You're doing great Joe – thank you.

Gina

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Tuesday, January 25, 2022 4:11 PM
To: McCarthy, Gina A. EOP/WHO <Regina.A.McCarthy Ex. 6 Personal Privacy (PP) >
Subject: RE: Calling your attention to the highlighted material

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: McCarthy, Gina A. EOP/WHO <Regina.A.McCarthy Ex. 6 Personal Privacy (PP) >
Sent: Monday, January 24, 2022 10:09 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Ali Zaidi <Ali.A.Zaidi@ Ex. 6 Personal Privacy (PP) >; Utech, Dan <Utech.Dan@epa.gov>
Subject: Re: Calling your attention to the highlighted material

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Sent from my iPhone

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Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Goffman, Joseph
Sent: Friday, January 21, 2022 6:56 PM
To: McCarthy, Gina A. EOP/WHO <Regina.A.McCarthy Ex. 6 Personal Privacy (PP)
Cc: Ali Zaidi <Ali.A.Zaidi@ Ex. 6 Personal Privacy (PP)>; Utech, Dan <Utech.Dan@epa.gov>
Subject: RE: Calling your attention to the highlighted material

Fingers crossed.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: McCarthy, Gina A. EOP/WHO <Regina.A.McCarthy Ex. 6 Personal Privacy (PP)>
Sent: Friday, January 21, 2022 6:53 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Ali Zaidi <Ali.A.Zaidi@ Ex. 6 Personal Privacy (PP)>; Utech, Dan <Utech.Dan@epa.gov>
Subject: Re: Calling your attention to the highlighted material

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Sent from my iPhone

On Jan 21, 2022, at 4:42 PM, Goffman, Joseph <Goffman.Joseph@epa.gov> wrote:

MEMORANDUM

SUBJECT: Proposed Rule: Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standards (Tier 1; SAN 8670; RIN 2060-AV51) – **OMB SUBMITTAL**

DATE: January 21, 2022

Ex. 5 Deliberative Process (DP)

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Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/25/2022 9:57:30 PM
To: Weekly Report Group [Weekly_Report_Group@epa.gov]
CC: Shaw, Betsy [Shaw.Betsy@epa.gov]; DeLuca, Isabel [DeLuca.Isabel@epa.gov]; Millett, John [Millett.John@epa.gov]; Rakosnik, Delaney [rakosnik.delaney@epa.gov]; Burch, Julia [Burch.Julia@epa.gov]; Tsirigotis, Peter [Tsirigotis.Peter@epa.gov]; Haman, Patricia [Haman.Patricia@epa.gov]; Grundler, Christopher [grundler.christopher@epa.gov]; Shoaff, John [Shoaff.John@epa.gov]; Thundiyil, Karen [Thundiyil.Karen@epa.gov]; Dunham, Sarah [Dunham.Sarah@epa.gov]; Hengst, Benjamin [Hengst.Benjamin@epa.gov]; Morgan, Ruthw [morgan.ruthw@epa.gov]; Edwards, Jonathan [Edwards.Jonathan@epa.gov]; Cherepy, Andrea [Cherepy.Andrea@epa.gov]; Kocchi, Suzanne [Kocchi.Suzanne@epa.gov]; Koerber, Mike [Koerber.Mike@epa.gov]; Moeller, Njeri [Moeller.Njeri@epa.gov]; Sandfoss, Kristina [Sandfoss.Kristina@epa.gov]; Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Lau, Patrick [Lau.Patrick@epa.gov]; Graff, Michelle [graff.michelle@epa.gov]; Lubetsky, Jonathan [Lubetsky.Jonathan@epa.gov]; Olson, Heather [Olson.Heather@epa.gov]; Boylan, Thomas [boylan.thomas@epa.gov]; Biton, Leiran [biton.leiran@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]
Subject: OAR Weekly Report

Please find below OAR's report for the week ending January 28, 2022.

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/25/2022 9:57:48 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Wednesday, January 26
Attachments: 2022 ES Awards_Joe G briefing 1-26-2022 v1.1.pptx; CAA 111 GHG EGU Policy Briefing OAR 01.26.22.pptx; Decision Memo SAFE 1 Reconsideration Final 01-25-2022.docx; WFLC Virtual Engagement_01-26-22 final Agenda.docx

Goffman, Joseph Calendar
Goffman.Joseph@epa.gov
On Wednesday, January 26, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	**26**	27	28	29
30	31					

Busy
Out of Office
Tentative
Working Elsewhere
Free
Outside of Working Hours

January 2022

Wed, Jan 26

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 9:55 AM	Air Issues Meeting
	9:55 AM – 10:00 AM	**Free**
	10:00 AM – 10:40 AM	Power Sector Biweekly (1 ppt)
	10:40 AM – 11:00 AM	**Free**
	11:00 AM – 11:30 AM	Weekly EPA/OIRA check-in (Ann to send talkers)
	11:30 AM – 11:55 AM	One-on-One with Ann Ferrio
	11:55 AM – 12:00 PM	**Free**

■	12:00 PM – 1:00 PM	Lunch/Management Time
■	1:00 PM – 4:00 PM	WFLC Virtual Engagement (1 word doc)
■	1:30 PM – 2:00 PM	Video-call: Briefing California Waiver Action (1 word doc)
■	2:30 PM – 2:55 PM	One-on-One with Chris Grundler
■	3:00 PM – 3:25 PM	One-on-One with Jon Edwards
■	4:00 PM – 4:25 PM	ENERGY STAR Awards (1 ppt)
□	**4:25 PM – 4:30 PM**	**Free**
■	4:30 PM – 4:55 PM	CA Waiver Rollout Discussion
□	**4:55 PM – 5:00 PM**	**Free**
■	5:00 PM – 5:25 PM	MATs Rollout Discussion
■	5:00 PM – 5:45 PM	MEETING: Weekly CPO/EPA/DOT Vehicle Call
■	5:30 PM – 6:30 PM	HAPPY HOUR: A Year of Accomplishments at EPA!
□	**After 6:30 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/26/2022 2:08:42 AM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
Subject: RE: FOR YOUR REVIEW and CONCURRENCE: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312)

Makes sense. Thank you.

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Tuesday, January 25, 2022 6:53 PM
To: Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Subject: RE: FOR YOUR REVIEW and CONCURRENCE: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312)

Just want to acknowledge that I have this. Not sure whether I'll be ready to turn it around this evening since I would like to digest the events of the day vis a vis MATS and Transport and the pattern leading up to them before moving this forward. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 25, 2022 6:34 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Subject: FOR YOUR REVIEW and CONCURRENCE: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312)

Joe, the attached is ready for your review and concurrence to send to OP to initiate OMB review. Attached are both an RLSO and clean version of the package and a draft OMB transmittal memo as discussed with Tomas yesterday. The program has addressed Tomas' edits in the attached and he has concurred (below).

Thank you,

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

Begin forwarded message:

From: "Carbonell, Tomas" <Carbonell.Tomas@epa.gov>
Date: January 25, 2022 at 11:09:56 AM EST
To: "Campbell, Ann" <Campbell.Ann@epa.gov>
Cc: "Hooper, Daniel" <hooper.daniel@epa.gov>
Subject: RE: FOR YOU RE-REVIEW: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312)

Thanks Ann. The latest edits to the preamble look good – have suggested one minor additional revision to the new text, please see attached. I've also recommended a minor edit to the transmittal memo and the action memo, also attached. I concur with sending this forward to Joe once the program has signed off on the preamble. Best,

Tomás

From: Olson, Heather <Olson.Heather@epa.gov>
Sent: Friday, January 14, 2022 2:19 PM
To: Hooper, Daniel <hooper.daniel@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Chang, Alice <Chang.Alice@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; OAQPSREGPROCESSING <OAQPSREGPROCESSING@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>
Subject: For Review: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312)

SAN 6312

To: The Immediate Office for review and concurrence for OMB submittal

Attached for OAR concurrence and transmittal to OMB is the final rule package for Major Boiler MACT Court Remand (SAN 6312).

This is a tier 3, significant action with a planned signature date of 3/31/2022. This action does not have a court-ordered deadline.

POC: Alice Chang
202-564-2429

Thank you,

Heather Olson
U.S. Environmental Protection Agency
Office of Air and Radiation | Office of Air Policy and Program Support
(202) 564-9806

Message

From: Campbell, Ann [Campbell.Ann@epa.gov]
Sent: 1/26/2022 4:19:20 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
Subject: ADDITION: FOR YOUR REVIEW: Updates for OIRA Call

May want to check in with Jason on the GHG WP – looking for any feedback by Friday!

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

From: Campbell, Ann
Sent: Wednesday, January 26, 2022 10:39 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Nunez, Alejandra <Nunez.Alejandra@epa.gov>; Eun Kim (Kim.Eun@epa.gov) <Kim.Eun@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Subject: FOR YOUR REVIEW: Updates for OIRA Call

Ex. 5 Deliberative Process (DP)

Message

From: Gibson, Neshawne [Gibson.Neshawne@epa.gov]
Sent: 1/26/2022 8:09:24 PM
To: Gibson, Neshawne [Gibson.Neshawne@epa.gov]
Subject: Administrator's Weekly Report for 1/26/22
Attachments: Administrator Weekly Report 1.26.22 FINAL.pdf; Administrator Weekly Report 1.26.22 FINAL.docx

Hello Administrator Regan and colleagues,

Attached, please find the Administrator's Weekly Report (in both PDF and Word), which includes programs and regional office updates for the week ending January 26, 2022.

Sincerely,

Neshawne Gibson
Office of the Administrator
US Environmental Protection Agency
Phone: (202) 566-1957
Mobile: (202) 603-7617

Message

From: Culligan, Kevin [Culligan.Kevin@epa.gov]
Sent: 1/27/2022 2:27:57 AM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Koerber, Mike [Koerber.Mike@epa.gov]; Kabanda, Thierry [Kabanda.Thierry@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]
Subject: Re: Just left you a voicemail re MATS

Thanks Joe. We will get on it first thing.

Sent from my iPhone

On Jan 26, 2022, at 9:07 PM, Goffman, Joseph <Goffman.Joseph@epa.gov> wrote:

It's now entirely possible that signature on this may need to be on Thursday since the Administrator will be out of the office on Friday. So, we will need to scramble to pull the signature package together as soon as we can Thursday AM. Sorry for the ridiculously late notice. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Goffman, Joseph
Sent: Wednesday, January 26, 2022 6:09 PM
To: Arroyo, Victoria <Arroyo.Victoria@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>; Eun Kim (Kim.Eun@epa.gov) <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Subject: FW: Just left you a voicemail re MATS

Voicemail to Jason: don't hold formal clearance until Friday AM, and please tell staff that they should/can clear when ready even if the NPRM comes off the dashboard Thursday evening or Friday morning. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Goffman, Joseph
Sent: Wednesday, January 26, 2022 6:06 PM
To: 'Schwartz, Jason A. EOP/OMB' <Jason.A.Schwartz@omb.eop.gov>
Subject: Just left you a voicemail re MATS

Should be self-explanatory, but call if you need to after you listen to it. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation

U.S. Environmental Protection Agency

Message

From: Millett, John [Millett.John@epa.gov]
Sent: 1/27/2022 1:08:53 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; DeLuca, Isabel [DeLuca.Isabel@epa.gov]
Subject: RE: for Review: MATS A&N materials

Good morning, and thank you! I'll get these materials out to the MATS rollout gaggle to start the day.

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Wednesday, January 26, 2022 11:04 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Subject: RE: for Review: MATS A&N materials

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Wednesday, January 26, 2022 10:47 PM
To: Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>
Cc: Goffman, Joseph <Goffman.Joseph@epa.gov>
Subject: RE: for Review: MATS A&N materials

Thanks John – a few suggested edits to the PR here. Best,

Tomás

From: Millett, John <Millett.John@epa.gov>
Sent: Wednesday, January 26, 2022 5:43 PM
To: OAR Briefings <OAR_Briefings@epa.gov>
Subject: for Review: MATS A&N materials

I realize this may be the 3rd time this batch of materials has come through, but I think the most time-sensitive piece for review here is the press release because OPA will need to get it into the administrator's book for review.

Thanks!

~~~~~~~~~~~~~~~~~~

John Millett
Director, OAR Communications
Desk: 202-564-2903
Cell: 202-510-1822
~~~~~~~~~~~~~~~~~~

Message

From: Kim, Eunjung [Kim.Eun@epa.gov]
Sent: 1/27/2022 5:46:55 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]
Subject: RE: MATS Heads-up Call w/ OPEEE Sunday

Thank you both!

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Thursday, January 27, 2022 12:39 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>
Subject: RE: MATS Heads-up Call w/ OPEEE Sunday

Likewise, thanks

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Thursday, January 27, 2022 12:35 PM
To: Kim, Eunjung <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>
Subject: RE: MATS Heads-up Call w/ OPEEE Sunday

Yes. Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Kim, Eunjung <Kim.Eun@epa.gov>
Sent: Thursday, January 27, 2022 12:34 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Hooper, Daniel <hooper.daniel@epa.gov>
Subject: MATS Heads-up Call w/ OPEEE Sunday

Hey Joe and Tomas,

Ex. 5 Deliberative Process (DP)

Thanks!

Eunjung Kim
Special Assistant

Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/28/2022 9:08:44 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]
Subject: 2022 OAR Regulatory Agenda Outlook (draft)
Attachments: OAR 2022 Regulatory Outlook.docx

Hi Joe,

As you discussed with Ann, OAPPS has put together an initial draft document outlining OAR's 2022 Regulatory Agenda Outlook (see attached).

Please let me know if you have any questions or would like to schedule a briefing/presentation by OAPPS on the data, so we can identify next steps.

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/28/2022 9:23:53 PM
To: Lubetsky, Jonathan [Lubetsky.Jonathan@epa.gov]; Mcquilkin, Wendy [Mcquilkin.Wendy@epa.gov]; Iglesias, Amber [Iglesias.Amber@epa.gov]; Chang, Alice [Chang.Alice@epa.gov]; Culligan, Kevin [Culligan.Kevin@epa.gov]; OAQPSREGPROCESSING [OAQPSREGPROCESSING@epa.gov]
CC: Morgan, Ruthw [morgan.ruthw@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]; Goffman, Joseph [Goffman.Joseph@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Millett, John [Millett.John@epa.gov]; DeLuca, Isabel [DeLuca.Isabel@epa.gov]; Shoaff, John [Shoaff.John@epa.gov]
Subject: FW: EAMS - APPROVED for Administrator's Signature: "MATS A&N - Reconsideration" (SAN 6716.2 / NPRM / OAR / Tier 1)

FYI

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Muellerleile, Caryn <Muellerleile.Caryn@epa.gov>
Sent: Friday, January 28, 2022 4:09 PM
To: Hutson, Nick <Hutson.Nick@epa.gov>; King, Melanie <King.Melanie@epa.gov>; Farrar, Wanda <farrar.wanda@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Olson, Heather <Olson.Heather@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Schillo, Bruce <Schillo.Bruce@epa.gov>; Muellerleile, Caryn <Muellerleile.Caryn@epa.gov>; Curry, Bridgid <Curry.Bridgid@epa.gov>; Nickerson, William <Nickerson.William@epa.gov>; Corrales, Mark <Corrales.Mark@epa.gov>; Kramer, Melissa <Kramer.Melissa@epa.gov>; Lewis, Josh <Lewis.Josh@epa.gov>; Pritchard, Eileen <Pritchard.Eileen@epa.gov>; Adams, Darryl <Adams.Darryl@epa.gov>; Maignan, Tawanda <Maignan.Tawanda@epa.gov>; Auther, Larry <Auther.Larry@epa.gov>
Subject: EAMS - APPROVED for Administrator's Signature: "MATS A&N - Reconsideration" (SAN 6716.2 / NPRM / OAR / Tier 1)

Today, OP approved for the Administrator's signature: "MATS A&N - Reconsideration" (SAN 6716.2 / NPRM / OAR / Tier 1). This action has been been transmitted to OEX.
To see the details, click here.

Message

From: Kim, Eunjung [Kim.Eun@epa.gov]
Sent: 1/28/2022 11:38:07 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: Attendees for MATS call and Methane Comment Drop

Hey Tomas,
I just checked in with the attendees list for both the Sunday MATS call and the Monday methane comment drop and I believe you are clear to participate in both.

- MATS call: 2 EDF + 1 Moms Clean Air Force participants. Anticipating 20-30 total external attendees.
- Methane comment Drop: 1-4 Mom Clean Air Force + 0 EDF. Anticipating 20-30 external attendees.

Let me know if you need anything else. Thanks!

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/28/2022 9:26:25 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Monday, January 31
Attachments: SupplementalScopingPager.OAR.01.31.22.docx; Talking Points -- JG -- OG comment delivery -- 1-31-22 - EK.docx; Recent Inquires and Requests Regarding Noise Jan 2022 Rev.docx; AA briefing_Petitions Early Guidance_2022-01-31_FINAL.docx; 2022 01 31 Ozone Determinations Bkgd Briefing_v2 rev.docx; WY SIP disapproval bullets v2.docx; 2022 OAR Regulatory Agenda Outlook (draft); Methane comment drop 2021 02 09 EPA Event Memo.docx

Additional materials: Draft 2022 OAR Regulatory Agenda Outlook (1 email)

Goffman, Joseph Calendar
Goffman.Joseph@epa.gov
On Monday, January 31, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Busy | Tentative | Free
Out of Office | Working Elsewhere | Outside of Working Hours

January 2022

Mon, Jan 31

	All Day	AF OOO
	Before 8:00 AM	**Free**
	8:00 AM – 8:45 AM	**Free**
	8:45 AM – 9:00 AM	Video-call: Joe Goffman, OAR
	9:00 AM – 9:20 AM	Video-call: NEPA USPS Briefing
	9:00 AM – 9:25 AM	Delegated to Tomas: Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 9:55 AM	Air Issues Meeting
	9:55 AM – 10:00 AM	**Free**

■	10:00 AM – 10:50 AM	Bi-weekly Oil and Natural Gas (O&G) Sector Meeting (1 word doc)
□	**10:50 AM – 11:00 AM**	**Free**
■	11:00 AM – 11:40 AM	OAQPS Weekly
□	**11:40 AM – 11:45 AM**	**Free**
■	11:45 AM – 12:00 PM	Pre-brief Quiet Communities (1 word doc)
■	12:00 PM – 1:00 PM	Lunch/Management Time
■	12:30 PM – 1:00 PM	EPA/NHTSA Discussion
■	12:30 PM – 1:00 PM	Hold: Methane Campaign Comment Drop (2 word docs)
■	1:00 PM – 2:00 PM	Video-call: Weekly BID/BBB Implementation Steering Committee Meetings
■	2:00 PM – 3:00 PM	Senior Staff Meeting
■	3:00 PM – 3:50 PM	AIM Act: NPRM to Restrict HFC Use under Subsection (i) (1 word doc)
□	**3:50 PM – 4:00 PM**	**Free**
■	4:00 PM – 4:40 PM	Background briefing for two proposed rules on determinations of attainment by the attainment date and reclassifications for the 2008 and 2015 Ozone National Ambient Air Quality Standards (NAAQS) (1 word doc)
□	**4:40 PM – 5:00 PM**	**Free**
■	5:00 PM – 5:45 PM	Wyoming RH Options Discussion (1 word doc; from previous discussion)
□	**After 5:45 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Sent: 1/29/2022 3:19:55 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
Subject: RE: Release for Monday - MATS
Attachments: MATS PR 1.28.22 final draft LHv2 mdh jg tc.docx

Hi Joe, I agree with your comments and only had a few additional suggestions – please see attached.

Ex. 5 Deliberative Process (DP)

Tomás

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Friday, January 28, 2022 7:17 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: Fwd: Release for Monday - MATS

Ex. 5 Deliberative Process (DP)

Sent from my iPhone

Begin forwarded message:

From: "Hamilton, Lindsay" <Hamilton.Lindsay@epa.gov>
Date: January 28, 2022 at 6:51:07 PM EST
To: "Cassady, Alison" <Cassady.Alison@epa.gov>, "Utech, Dan" <Utech.Dan@epa.gov>, "Goffman, Joseph" <Goffman.Joseph@epa.gov>
Subject: FW: Release for Monday - MATS

White House sent back edits on the MATS release. Comms conferred with Ali.

Ex. 5 Deliberative Process (DP)

Thanks,
Lindsay

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/31/2022 1:47:20 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]
Subject: FOR YOUR REVIEW and CONCURRENCE: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312)
Attachments: Boiler MACT 2060-AU20 FR_2022-01-25_RLSO.docx; Action Memo.docx; Boiler MACT 2060-AU20 FR_2022-01-25_clean.docx; Draft Major Boilers Action Memo TC.docx; OMB Transmittal Memo_Clean.docx

Hi Joe,

The attached is ready for your review and concurrence to send to OP to initiate OMB review. Attached are both an RLSO and clean version of the package and the revised OMB transmittal memo. The program has addressed Tomas' edits in the attached and he has concurred (below). Also attached is the Action Memo (RLSO and clean version based on comments from Tomas).

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Campbell, Ann <Campbell.Ann@epa.gov>
Sent: Tuesday, January 25, 2022 6:34 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Hooper, Daniel <hooper.daniel@epa.gov>
Subject: FOR YOUR REVIEW and CONCURRENCE: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312)

Joe, the attached is ready for your review and concurrence to send to OP to initiate OMB review. Attached are both an RLSO and clean version of the package and a draft OMB transmittal memo as discussed with Tomas yesterday. The program has addressed Tomas' edits in the attached and he has concurred (below).

Thank you,

Ann (Campbell) Ferrio
Chief of Staff
EPA/Office of Air and Radiation
Office: 202 566 1370

Begin forwarded message:

From: "Carbonell, Tomas" <Carbonell.Tomas@epa.gov>
Date: January 25, 2022 at 11:09:56 AM EST

To: "Campbell, Ann" <Campbell.Ann@epa.gov>
Cc: "Hooper, Daniel" <hooper.daniel@epa.gov>
Subject: RE: FOR YOU RE-REVIEW: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312)

Thanks Ann. The latest edits to the preamble look good – have suggested one minor additional revision to the new text, please see attached. I've also recommended a minor edit to the transmittal memo and the action memo, also attached. I concur with sending this forward to Joe once the program has signed off on the preamble. Best,

Tomás

From: Olson, Heather <Olson.Heather@epa.gov>
Sent: Friday, January 14, 2022 2:19 PM
To: Hooper, Daniel <hooper.daniel@epa.gov>; Campbell, Ann <Campbell.Ann@epa.gov>
Cc: Chang, Alice <Chang.Alice@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; OAQPSREGPROCESSING <OAQPSREGPROCESSING@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>
Subject: For Review: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312)

SAN 6312

To: The Immediate Office for review and concurrence for OMB submittal

Attached for OAR concurrence and transmittal to OMB is the final rule package for Major Boiler MACT Court Remand (SAN 6312).

This is a tier 3, significant action with a planned signature date of 3/31/2022. This action does not have a court-ordered deadline.

POC: Alice Chang
202-564-2429

Thank you,

Heather Olson
U.S. Environmental Protection Agency
Office of Air and Radiation | Office of Air Policy and Program Support
(202) 564-9806

6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 63

[EPA-HQ-OAR-2018-0794; FRL-6716.2-01-OAR]

RIN 2060-AV12

National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units – Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding; Notice of Proposed Rulemaking

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The EPA is proposing to revoke a May 22, 2020 finding that it is not appropriate and necessary to regulate coal- and oil-fired electric utility steam generating units (EGUs) under Clean Air Act (CAA) section 112, and to reaffirm the Agency's April 25, 2016 finding that it remains appropriate and necessary to regulate hazardous air pollutant (HAP) emissions from EGUs after considering cost. The Agency is also reviewing another part of the May 22, 2020 action, a residual risk and technology review (RTR) of MATS. Accordingly, in addition to soliciting comments on all aspects of this proposal, the EPA is soliciting information on the performance and cost of new or improved technologies that control HAP emissions, improved methods of operation, and risk-related information to further inform the Agency's review of the MATS RTR as directed by Executive Order 13990.

DATES: Comments must be received on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

Public hearing: The EPA will hold a virtual public hearing on **[INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. See **SUPPLEMENTARY INFORMATION** for information on the hearing.

ADDRESSES: You may send comments, identified by Docket ID No. EPA-HQ-OAR-2018-0794, by any of the following methods:

- Federal eRulemaking Portal: *https://www.regulations.gov/* (our preferred method). Follow the online instructions for submitting comments.
- Email: *a-and-r-docket@epa.gov*. Include Docket ID No. EPA-HQ-OAR-2018-0794 in the subject line of the message.
- Fax: (202) 566-9744. Attention Docket ID No. EPA-HQ-OAR-2018-0794.
- Mail: U.S. Environmental Protection Agency, EPA Docket Center, Docket ID No. EPA-HQ-OAR-2018-0794, Mail Code 28221T, 1200 Pennsylvania Avenue, NW, Washington, DC 20460.
- Hand/Courier Delivery: EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004. The Docket Center's hours of operation are 8:30 a.m. – 4:30 p.m., Monday – Friday (except Federal holidays).

Instructions: All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to *https://www.regulations.gov/*, including any personal information provided. For detailed instructions on sending comments and additional information on the rulemaking process, see the **SUPPLEMENTARY INFORMATION** section of this document. Out of an abundance of caution for members of the public and our staff, the EPA Docket Center and Reading Room are closed to the public, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will

continue to provide remote customer service via email, phone, and webform. We encourage the public to submit comments via *https://www.regulations.gov/* or email, as there may be a delay in processing mail and faxes. Hand deliveries and couriers may be received by scheduled appointment only. For further information on EPA Docket Center services and the current status, please visit us online at *https://www.epa.gov/dockets*.

FOR FURTHER INFORMATION CONTACT: For questions about this proposed action, contact Melanie King, Sector Policies and Programs Division (D243-01), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-2469; and email address: *king.melanie@epa.gov*.

SUPPLEMENTARY INFORMATION:

The EPA is proposing to revoke a May 22, 2020 finding that it is not appropriate and necessary to regulate coal- and oil-fired EGUs under CAA section 112, and to reaffirm the Agency's April 25, 2016 finding that it remains appropriate and necessary to regulate HAP emissions from EGUs after considering cost. The 2016 finding was made in response to the U.S. Supreme Court's 2015 *Michigan v. EPA* decision, where the Court held that the Agency had erred by not taking cost into consideration when taking action on February 16, 2012, to affirm a 2000 EPA determination that it was appropriate and necessary to regulate HAP emissions from EGUs. In the same 2012 action, the EPA also promulgated National Emission Standards for Hazardous Air Pollutants (NESHAP) for coal- and oil-fired EGUs, commonly known as the Mercury and Air Toxics Standards or MATS.

Based on a re-evaluation of the administrative record and the statute, the EPA proposes to conclude that the framework applied in the May 22, 2020 finding was ill-suited to assessing and comparing the full range of benefits to costs, and the EPA concludes that, after applying a more

suitable framework, the 2020 determination should be withdrawn. For reasons explained in this notice, the EPA further proposes to reaffirm that it is appropriate and necessary to regulate HAP emissions from EGUs after weighing the volume of pollution that would be reduced through regulation, the public health risks and harms posed by these emissions, the impacts of this pollution on particularly exposed and sensitive populations, the availability of effective controls, and the costs of reducing this harmful pollution including the effects of control costs on the EGU industry and its ability to provide reliable and affordable electricity. This notice also presents information and analysis that has become available since the 2016 finding, pertaining to the health risks of mercury emissions and the costs of reducing HAP emissions, that lend further support for this determination.

The review that led to this proposal is consistent with the direction in Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis," signed by President Biden on January 20, 2021. In response to the Executive Order, the Agency is also reviewing another part of the May 22, 2020 action, a RTR of MATS. Accordingly, in addition to soliciting comments on all aspects of this proposal, the EPA is soliciting information on the performance and cost of new or improved technologies that control HAP emissions, improved methods of operation, and risk-related information to further inform the Agency's review of the MATS RTR as directed by the Executive Order. Results of the EPA's review of the RTR will be presented in a separate action.

Participation in virtual public hearing. Please note that the EPA is deviating from its typical approach for public hearings because the President has declared a national emergency. Due to the current Centers for Disease Control and Prevention (CDC) recommendations, as well

as state and local orders for social distancing to limit the spread of COVID-19, the EPA cannot hold in-person public meetings at this time.

The virtual public hearing will be held via teleconference on **[INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** and will convene at 10:00 a.m. Eastern Time (ET) and will conclude at 7:00 p.m. ET. The EPA may close a session 15 minutes after the last pre-registered speaker has testified if there are no additional speakers. For information or questions about the public hearing, please contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov*. The EPA will announce further details at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*.

The EPA will begin pre-registering speakers for the hearing no later than 1 business day following publication of this document in the *Federal Register*. The EPA will accept registrations on an individual basis. To register to speak at the virtual hearing, please use the online registration form available at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards* or contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov*. The last day to pre-register to speak at the hearing will be **[INSERT DATE 9 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Prior to the hearing, the EPA will post a general agenda that will list pre-registered speakers in approximate order at: *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*.

The EPA will make every effort to follow the schedule as closely as possible on the day of the hearing; however, please plan for the hearings to run either ahead of schedule or behind schedule.

Each commenter will have 5 minutes to provide oral testimony. The EPA encourages commenters to provide the EPA with a copy of their oral testimony electronically (via email) by emailing it to *king.melanie@epa.gov*. The EPA also recommends submitting the text of your oral testimony as written comments to the rulemaking docket.

The EPA may ask clarifying questions during the oral presentations but will not respond to the presentations at that time. Written statements and supporting information submitted during the comment period will be considered with the same weight as oral testimony and supporting information presented at the public hearing.

Please note that any updates made to any aspect of the hearing will be posted online at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*. While the EPA expects the hearing to go forward as set forth above, please monitor our website or contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov* to determine if there are any updates. The EPA does not intend to publish a document in the *Federal Register* announcing updates.

If you require the services of a translator or a special accommodation such as audio description, please pre-register for the hearing with the public hearing team and describe your needs by **[INSERT DATE 7 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The EPA may not be able to arrange accommodations without advanced notice.

Docket. The EPA has established a docket for this rulemaking under Docket ID No. EPA-HQ-OAR-2018-0794.[1] All documents in the docket are listed in *https://www.regulations.gov/*.

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[1] As explained in a memorandum to the docket, the docket for this action includes the documents and information, in whatever form, in Docket ID Nos. EPA-HQ-OAR-2009-0234 (National Emission Standards for Hazardous Air Pollutants for Coal- and Oil-fired Electric Utility Steam Generating Units), EPA-HQ-OAR-2002-0056 (National Emission Standards for Hazardous Air

Although listed, some information is not publicly available, *e.g.*, Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy. With the exception of such material, publicly available docket materials are available electronically in *https://www.regulations.gov/*.

Instructions. Direct your comments to Docket ID No. EPA-HQ-OAR-2018-0794. The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *https://www.regulations.gov/*, including any personal information provided, unless the comment includes information claimed to be CBI or other information whose disclosure is restricted by statute. Do not submit electronically any information that you consider to be CBI or other information whose disclosure is restricted by statute. This type of information should be submitted by mail as discussed below.

The EPA may publish any comment received to its public docket. Multimedia submissions (audio, video, *etc.*) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.*, on the Web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit *https://www.epa.gov/dockets/commenting-epa-dockets*.

Pollutants for Utility Air Toxics; Clean Air Mercury Rule (CAMR)), and Legacy Docket ID No. A-92-55 (Electric Utility Hazardous Air Pollutant Emission Study). *See* memorandum titled *Incorporation by reference of Docket Number EPA-HQ-OAR-2009-0234, Docket Number EPA-HQ-OAR-2002-0056, and Docket Number A-92-55 into Docket Number EPA-HQ-OAR-2018-0794* (Docket ID Item No. EPA-HQ-OAR-2018-0794-0005).

The *https://www.regulations.gov/* website allows you to submit your comment anonymously, which means the EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to the EPA without going through *https://www.regulations.gov/*, your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, the EPA recommends that you include your name and other contact information in the body of your comment and with any digital storage media you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, the EPA may not be able to consider your comment. Electronic files should not include special characters or any form of encryption and be free of any defects or viruses. For additional information about the EPA's public docket, visit the EPA Docket Center homepage at *https://www.epa.gov/dockets*.

The EPA is temporarily suspending its Docket Center and Reading Room for public visitors, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform. We encourage the public to submit comments via *https://www.regulations.gov/* as there may be a delay in processing mail and faxes. Hand deliveries or couriers will be received by scheduled appointment only. For further information and updates on EPA Docket Center services, please visit us online at *https://www.epa.gov/dockets*.

The EPA continues to carefully and continuously monitor information from the CDC, local area health departments, and our Federal partners so that we can respond rapidly as conditions change regarding COVID-19.

Submitting CBI. Do not submit information containing CBI to the EPA through *https://www.regulations.gov/* or email. Clearly mark the part or all of the information that you claim to be CBI. For CBI information on any digital storage media that you mail to the EPA, mark the outside of the digital storage media as CBI and then identify electronically within the digital storage media the specific information that is claimed as CBI. In addition to one complete version of the comments that includes information claimed as CBI, you must submit a copy of the comments that does not contain the information claimed as CBI directly to the public docket through the procedures outlined in *Instructions* above. If you submit any digital storage media that does not contain CBI, mark the outside of the digital storage media clearly that it does not contain CBI. Information not marked as CBI will be included in the public docket and the EPA's electronic public docket without prior notice. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 Code of Federal Regulations (CFR) part 2. Send or deliver information identified as CBI only to the following address: OAQPS Document Control Officer (C404-02), OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention Docket ID No. EPA-HQ-OAR-2018-0794. Note that written comments containing CBI and submitted by mail may be delayed and no hand deliveries will be accepted.

Preamble acronyms and abbreviations. We use multiple acronyms and terms in this preamble. While this list may not be exhaustive, to ease the reading of this preamble and for reference purposes, the EPA defines the following terms and acronyms here:

ACI	activated carbon injection
ATSDR	Agency for Toxic Substances and Disease Registry
ARP	Acid Rain Program
BCA	benefit-cost analysis
CAA	Clean Air Act

CAAA	Clean Air Act Amendments of 1990
CAMR	Clean Air Mercury Rule
CBI	Confidential Business Information
CFR	Code of Federal Regulations
CVD	cardiovascular disease
DSI	dry sorbent injection
EGU	electric utility steam generating unit
EIA	Energy Information Administration
EPA	Environmental Protection Agency
ESP	electrostatic precipitator
FF	fabric filter
FGD	flue gas desulfurization
FR	*Federal Register*
GW	gigawatt
HAP	hazardous air pollutant(s)
HCl	hydrogen chloride
HF	hydrogen fluoride
IHD	ischemic heart disease
IPM	Integrated Planning Model
IRIS	Integrated Risk Information System
kW	kilowatt
MACT	maximum achievable control technology
MATS	Mercury and Air Toxics Standards
MI	myocardial infarction
MIR	maximum individual risk
MW	megawatt
NAS	National Academy of Sciences
NESHAP	national emission standards for hazardous air pollutants
OMB	Office of Management and Budget
O&M	operation and maintenance
PM	particulate matter
PUFA	polyunsaturated fatty acid
RfD	reference dose
RIA	regulatory impact analysis
RTR	residual risk and technology review
SCR	selective catalytic reduction
SO_2	sulfur dioxide
TSD	technical support document

tpy tons per year

Organization of this document. The information in this preamble is organized as follows:

I. General Information
A. Executive Summary
B. Does this action apply to me?
C. Where can I get a copy of this document and other related information?
II. Background
A. Regulatory History
B. Statutory Background
III. Proposed Determination Under CAA Section 112(n)(1)(A)
A. Public Health Hazards Associated with Emissions From EGUs
B. Consideration of Cost of Regulating EGUs for HAP
C. Revocation of the 2020 Final Action
D. The Administrator's Proposed Preferred Framework and Proposed Conclusion
E. The Administrator's Proposed Benefit-Cost Analysis Approach and Proposed Conclusion
IV. Summary of Cost, Environmental, and Economic Impacts
V. Request for Comments and for Information to Assist with Review of the 2020 RTR
VI. Statutory and Executive Order Reviews
A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review
B. Paperwork Reduction Act (PRA)
C. Regulatory Flexibility Act (RFA)
D. Unfunded Mandates Reform Act (UMRA)
E. Executive Order 13132: Federalism
F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments
G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks
H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use
I. National Technology Transfer and Advancement Act (NTTAA)
J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

I. General Information

A. Executive Summary

On January 20, 2021, President Biden signed Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis" (86 FR 7037, January 25, 2021). The Executive Order, among other things, instructs the EPA to review the

2020 final action titled, "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units–Reconsideration of Supplemental Finding and Residual Risk and Technology Review" (85 FR 31286; May 22, 2020) (2020 Final Action) and consider publishing a notice of proposed rulemaking suspending, revising, or rescinding that action. Consistent with the Executive Order, the EPA has undertaken a careful review of the 2020 Final Action, in which the EPA reconsidered its April 25, 2016 supplemental finding (81 FR 24420) (2016 Supplemental Finding). Based on that review, the Agency proposes to find that the decisional framework for making the appropriate and necessary determination under CAA section 112(n)(1)(A) that was applied in the 2020 Final Action was unsuitable because it failed to adequately account for statutorily relevant factors. Therefore, we propose to revoke the May 2020 determination that it is not appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs under section 112 of the CAA. We further propose to reaffirm our earlier determinations – made in 2000 (65 FR 79825; December 20, 2000) (2000 Determination), 2012 (77 FR 9304; February 16, 2012) (2012 MATS Final Rule), and 2016 – that it is appropriate and necessary to regulate coal- and oil-fired EGUs under section 112 of the CAA.

In 1990, frustrated with the EPA's pace in identifying and regulating HAP, Congress radically transformed its treatment of that pollution. It rewrote section 112 of the CAA to require the EPA to swiftly regulate 187 HAP with technology-based standards that would require all major sources (defined by the quantity of pollution a facility has the potential to emit) to meet the levels of reduction achieved in practice by the best-performing similar sources. EGUs were the one major source category excluded from automatic application of these new standards. EGUs were treated differently primarily because the 1990 Amendments to the CAA (1990 Amendments) included the Acid Rain Program (ARP), which imposed criteria pollution

reduction requirements on EGUs. Congress recognized that the controls necessary to comply with this and other requirements of the 1990 Amendments might reduce HAP emissions from EGUs as well. Therefore, under CAA section 112(n)(1)(A), Congress directed the EPA to regulate EGUs if, after considering a study of "the hazards to public health reasonably anticipated to occur as a result of [HAP] emissions by [EGUs] … after imposition of the [Acid Rain Program and other] requirements of this chapter," the EPA concluded that it "is appropriate and necessary" to do so. *See* CAA section 112(n)(1)(A).

The EPA completed that study in 1998 and, in 2000, concluded that it is appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs. *See* 65 FR 79825 (December 20, 2000). The EPA reaffirmed that conclusion in 2012, explaining that the other requirements of the CAA, in particular the ARP, did not lead to the HAP emission reductions that had been anticipated because many EGUs switched to lower-sulfur coal rather than deploy pollution controls that may have also reduced emissions of HAP. Indeed, the statute contemplated that the EPA would be conducting the required study within 3 years of the 1990 Amendments; but when the EPA re-examined public health hazards remaining after imposition of the Act's requirements in 2012, the Agency accounted for over 20 years of CAA regulation, and EGUs still remained one of the largest sources of HAP pollution. Specifically, in 2012, the EPA concluded that EGUs were the largest domestic source of emissions of mercury, hydrogen fluoride (HF), hydrogen chloride (HCl), and selenium; and among the largest domestic contributors of emissions of arsenic, chromium, cobalt, nickel, hydrogen cyanide, beryllium, and cadmium. The EPA further found that a significant majority of EGUs were located at facilities that emitted above the statutory threshold set for major sources (*e.g.*, 10 tons per year (tpy) of any one HAP or 25 tpy or more of any combination of HAP). *See* 77 FR 9304 (February 16,

2012). In 2012, the EPA also established limits for emissions of HAP from coal- and oil-fired EGUs. *Id.*

Many aspects of the EPA's appropriate and necessary determination and the CAA section 112 regulations were challenged in the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit), and all challenges were denied and the finding and standards upheld in full in *White Stallion Energy Center v. EPA*, 748 F.3d 1222 (2014). The Supreme Court granted review on a single issue and, in *Michigan v. EPA*, 576 U.S. 743 (2015), the Court held that the EPA erred when it failed to consider the costs of its regulation in determining that it is appropriate and necessary to regulate HAP emissions from EGUs, and remanded that determination to the D.C. Circuit for further proceedings. Following *Michigan*, in 2016 the EPA issued a Supplemental Finding that it is appropriate and necessary to regulate EGU HAP after considering the costs of such regulation. *See* 81 FR 24420 (April 25, 2016). In 2020, the Agency reversed that determination.[2] In this action, we conclude that the methodology we applied in 2020 is ill-suited to the appropriate and necessary determination because, among other reasons, it did not give adequate weight to the significant volume of HAP emissions from EGUs and the attendant risks remaining after imposition of the other requirements of the CAA, including many adverse health and environmental effects of EGU HAP emissions that cannot be quantified or monetized. We propose, therefore, to revoke the 2020 Final Action.

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[2] The 2020 Final Action, while reversing the 2016 Supplemental Finding as to the EPA's determination that it was "appropriate" to regulate HAP from EGUs, did not rescind the Agency's prior determination that it was necessary to regulate. *See* 84 FR 2674 (February 7, 2019). Instead, the 2020 rulemaking stated that its rescission was based on the appropriate prong alone: "CAA section 112(n)(1)(A) requires the EPA to determine that both the appropriate *and* necessary prongs are met. Therefore, if the EPA finds that either prong is not satisfied, it cannot make an affirmative appropriate and necessary finding. The EPA's reexamination of its determination . . . focuses on the first prong of that analysis." *Id.*

We further propose to affirm, once again, that it is appropriate and necessary to regulate coal- and oil-fired EGUs under CAA section 112. We first examine the benefits or advantages of regulation, including new information on the risks posed by EGU HAP. We then examine the costs or disadvantages of regulation, including both the costs of compliance (which we explain we significantly overestimated in 2012) and how those costs affect the industry and the public. We then weigh these benefits and costs to reach the conclusion that it is appropriate and necessary to regulate using two alternative methodologies.

Our preferred methodology, as it was in the 2016 Supplemental Finding, is to consider all of the impacts of the regulation – both costs and benefits to society – using a totality-of the-circumstances approach rooted in the *Michigan* court's direction to "pay[] attention to the advantages *and* disadvantages of [our] decision[]." 576 U.S. at 753; *see id.* at 752 ("In particular, 'appropriate' is 'the classic broad all-encompassing term that naturally includes consideration of all relevant factors."). To help determine the relevant factors to weigh, we look to CAA section 112(n)(1)(A), the other provisions of CAA section 112(n)(1), and to the statutory design of CAA section 112.

Initially, we consider the human health advantages of reducing HAP emissions from EGUs because in CAA section 112(n)(1)(A) Congress directed the EPA to make the appropriate and necessary determination after considering the results of a "study of the hazards to public health reasonably anticipated to occur as a result of [HAP] emissions" from EGUs. *See* CAA section 112(n)(1)(A). We consider all of the advantages of reducing emissions of HAP (*i.e.*, the risks posed by HAP) regardless of whether those advantages can be quantified or monetized, and we explain why almost none of those advantages can be monetized. Consistent with CAA section 112(n)(1)(B)'s direction to examine the rate and mass of mercury emissions, and the

design of CAA section 112, which required swift reduction of the volume of HAP emissions based on an assumption of risk, we conclude that we should place substantial weight on reducing the large volume of HAP emissions from EGUs – both in absolute terms and relative to other source categories – that, absent MATS, was entering our air, water, and land, thus reducing the risk of grave harms that can occur as a result of exposure to HAP. Also consistent with the statutory design of CAA section 112, in considering the advantages of HAP reductions, we consider the distribution of those benefits, and the statute's clear goal in CAA section 112(n)(1)(C) and other provisions of CAA section 112 to protect the most exposed and susceptible populations, such as communities that are reliant on local fish for their survival, and developing fetuses. We think it is highly relevant that while EGUs generate power for all, and EGU HAP pollution poses risks to all Americans exposed to such HAP, a smaller set of Americans who live near EGUs face a disproportionate risk of being significantly harmed by toxic pollution. Finally, we also consider the identified risks to the environment posed by mercury and acid-gas HAP, consistent with CAA section 112(n)(1)(B) and the general goal of CAA section 112 to reduce risks posed by HAP to the environment.

We next weigh those advantages against the disadvantages of regulation, principally in the form of the costs incurred to control HAP before they are emitted into the environment. Consistent with the statutory design, we consider those costs comprehensively, examining them in the context of the effect of those expenditures on the economics of power generation more broadly, the reliability of electricity, and the cost of electricity to consumers. These metrics are relevant to our weighing exercise because they give us a more complete picture of the disadvantages to producers and consumers of electricity imposed by this regulation, and because our conclusion might change depending on how this burden affects the ability of the industry to

thrive and to provide reliable, affordable electricity to the benefit of all Americans. These metrics are relevant measures for evaluating costs to the utility sector in part because they are the types of metrics considered by the owners and operators of EGUs themselves. *See* 81 FR 24428 (April 25, 2016). Per CAA section 112(n)(1)(B), we further consider the availability and cost of control technologies, including the relationship of that factor to controls installed under the ARP.

As explained in detail in this document, we ultimately propose to conclude that, weighing the risks posed by HAP emissions from EGUs against the costs of reducing that pollution on the industry and society as a whole, it is worthwhile (*i.e.*, "appropriate") to regulate those emissions to protect all Americans, and in particular the most vulnerable populations, from the inherent risks posed by exposure to HAP emitted by coal- and oil-fired EGUs. We propose to find that this is true whether we are looking at the record in 2016 (*i.e.*, information available as of the time of the 2012 threshold finding and rulemaking) or at the updated record in 2021, in which we quantify additional risks posed by HAP emissions from EGUs and conclude that the actual cost of complying with MATS was almost certainly significantly less than the EPA's projected estimate in the 2011 RIA, primarily because fewer pollution controls were installed than projected and because the unexpected increases in natural gas supply led to a dramatic decrease in the price of natural gas.

In the 2016 Supplemental Finding we did not consider non-HAP health benefits that occur by virtue of controlling HAP from EGUs as a relevant factor for our consideration under the preferred approach. However, because the Supreme Court in *Michigan* directed us to consider health and environmental effects beyond those posed by HAP, "including, for instance, harms that regulation might do to human health or the environment," and stressed that "[n]o regulation is 'appropriate' if it does significantly more harm than good," 576 U.S. at 752, we

take comment on whether it is reasonable to also consider the advantages associated with non-HAP emission reductions that result from the application of HAP controls as part of our totality-of-the-circumstances approach. In the 2012 MATS Final Rule, we found that regulating EGUs for HAP resulted in substantial health benefits accruing from coincidental reductions in particulate matter (PM) pollution and its precursors. We also projected that regulating EGUs for HAP would similarly result in an improvement in ozone pollution. While we propose to reach the conclusion that HAP regulation is appropriate even absent consideration of these additional benefits, adding these advantages to the weighing inquiry would provide further support for our proposed conclusion that the advantages of regulation outweigh the disadvantages.

We recognize, as we did in 2016, that our preferred, totality-of-the-circumstances approach to making the appropriate and necessary determination is an exercise in judgment, and that "[r]easonable people, and different decision-makers, can arrive at different conclusions under the same statutory provision" (81 FR 24431; April 25, 2016). However, this type of weighing of factors and circumstances is an inherent part of regulatory decision-making, and we think it is a reasonable approach where the factors the statute identifies as important to consider cannot be quantified or monetized.

Next, we turn to our alternative approach of a formal benefit-cost analysis (BCA). This approach independently supports the determination that it is appropriate to regulate EGU HAP. Based on the 2011 Regulatory Impacts Analysis (2011 RIA)[3] performed as part of the 2012 MATS Final Rule, the total net benefits of MATS were overwhelming even though the EPA was only able to monetize one of the many benefits of reducing HAP emissions from EGUs. Like the

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[3] U.S. EPA. 2011. *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards.* EPA-452/R-11-011. Available at: *https://www3.epa.gov/ttn/ecas/docs/ria/utilities_ria_final-mats_2011-12.pdf.*

preferred approach, this conclusion is further supported by newer information on the risks posed by HAP emissions from EGUs as well as the actual costs of implementing MATS, which almost certainly were significantly lower than estimated in the 2011 RIA.

Our proposal is organized as follows. In section II.A of this preamble, we provide as background the regulatory and procedural history leading up to this proposal. We also detail, in preamble section II.B, the statutory design of HAP regulation that Congress added to the CAA in 1990 in the face of the EPA's failure to make meaningful progress in regulating HAP emissions from stationary sources. In particular, we point out that many provisions of CAA section 112 demonstrate the value Congress placed on reducing the volume of HAP emissions from stationary sources as much as possible and quickly, with a particular focus on reducing HAP related risks to the most exposed and most sensitive members of the public. This background assists in identifying the relevant statutory factors to weigh in considering the advantages and disadvantages of HAP regulation.

Against this backdrop, we propose to revoke the 2020 Final Action and reaffirm the 2016 determination that it remains appropriate to regulate HAP emissions from EGUs after a consideration of cost. Specifically, in section III.A of this preamble, we review the long-standing and extensive body of evidence, as well as new mercury-related risk analyses performed since 2016, identifying substantial risks to human health and the environment from HAP emissions from coal- and oil-fired EGUs that support a conclusion that regulating HAP emissions from EGUs is appropriate. In preamble section III.B, we analyze information regarding how the power sector elected to comply with MATS, and how our 2012 projections for the cost of regulation almost certainly overestimated the actual costs of the regulation by a significant amount. In preamble section III.C, we explain our reasons for revoking the 2020 Final Action, which

applied an ill-suited framework for evaluating cost because it gave little to no weight to the statutory concern with reducing the volume of and risks from HAP emissions to protect even the most exposed and most vulnerable members of the public. In section III.D of this preamble, we describe and apply our preferred, totality-of-the-circumstances approach, giving particular weight to the factors identified in CAA section 112(n)(1) and 112 more generally. We propose to conclude that after considering all of the relevant factors and weighing the advantages of regulation against the cost of doing so, it is appropriate and necessary to regulate EGUs under CAA section 112. In section III.E of this preamble, we propose an alternative formal benefit-cost approach for making the appropriate and necessary determination. Under this approach, we propose to conclude that it remains appropriate to regulate HAP emissions from EGUs after considering cost because the BCA issued with the MATS rule indicated that the total net benefits of MATS were overwhelming even though the EPA was only able to monetize one of many statutorily identified benefits of regulating HAP emissions from EGUs. The new information examined by the EPA with respect to updated science and cost information only strengthens our conclusions under either of these methodologies. Section IV of this preamble notes that because this proposal reaffirms prior determinations and does not impact implementation of MATS, this action, if finalized, would not change those standards.

Finally, in preamble section V, in addition to soliciting comments on all aspects of this proposed action, we separately seek comment on any data or information that will assist in the EPA's ongoing review of the RTR that the Agency completed for MATS in 2020.

B. Does this action apply to me?

The source category that is the subject of this proposal is Coal- and Oil-Fired EGUs regulated by NESHAP under 40 CFR 63, subpart UUUUU, commonly known as MATS. The

North American Industry Classification System (NAICS) codes for the Coal- and Oil-Fired EGU source category are 221112, 221122, and 921150. This list of NAICS codes is not intended to be exhaustive, but rather provides a guide for readers regarding the entities that this proposed action is likely to affect.

C. Where can I get a copy of this document and other related information?

In addition to being available in the docket, an electronic copy of this action is available on the Internet. Following signature by the EPA Administrator, the EPA will post a copy of this proposed action at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*. Following publication in the *Federal Register*, the EPA will post the *Federal Register* version of the proposal and key technical documents at this same website.

II. Background

A. Regulatory History

In the 1990 Amendments, Congress substantially modified CAA section 112 to address hazardous air pollutant emissions from stationary sources. CAA section 112(b)(1) sets forth a list of 187 identified HAP, and CAA sections 112(b)(2) and (3) give the EPA the authority to add or remove pollutants from the list. CAA section 112(a)(1) and (2) specify the two types of sources to be addressed: major sources and area sources. A major source is any stationary source or group of stationary sources at a single location and under common control that emits or has the potential to emit, considering controls, 10 tpy or more of any HAP or 25 tpy or more of any combination of HAP. CAA section 112(a)(1). Any stationary source of HAP that is not a major source is an area source.[4] CAA section 112(a)(2). All major source categories, besides EGUs,

[4] The statute includes a separate definition of "EGU" that includes both major and area source power plant facilities. CAA section 112(a)(8).

and certain area source categories, were required to be included on an initial published list of sources subject to regulation under CAA section 112. *See* CAA sections 112(a)(1) and (c)(1). The EPA is required to promulgate emission standards under CAA section 112(d) for every source category on the CAA section 112(c)(1) list.

The general CAA section 112(c) process for listing source categories does not apply to EGUs. Instead, Congress enacted a special provision, CAA section 112(n)(1)(A), which establishes a separate process by which the EPA determines whether to add EGUs to the CAA section 112(c) list of source categories that must be regulated under CAA section 112. Because EGUs were subject to other CAA requirements under the 1990 Amendments, most importantly the ARP, CAA section 112(n)(1)(A) directs the EPA to conduct a study to evaluate the hazards to public health that are reasonably anticipated to occur as a result of the HAP emissions from EGUs "after imposition of the requirements of this chapter." *See* CAA section 112(n)(1)(A); *see also Michigan v. EPA*, 576 U.S. at 748 ("Quite apart from the hazardous-air-pollutants program, the Clean Air Act Amendments of 1990 subjected power plants to various regulatory requirements. The parties agree that these requirements were expected to have the collateral effect of reducing power plants' emissions of hazardous air pollutants, although the extent of the reduction was unclear."). The provision directs that the EPA shall regulate EGUs under CAA section 112 if the Administrator determines, after considering the results of the study, that such regulation is "appropriate and necessary." CAA section 112(n)(1)(A), therefore, sets a unique process by which the Administrator is to determine whether to add EGUs to the CAA section 112(c) list of sources that must be subject to regulation under CAA section 112.

The study required under CAA section 112(n)(1)(A) is one of three studies commissioned by Congress under CAA section 112(n)(1), a subsection entitled "Electric utility steam

generating units." The first, which, as noted, the EPA was required to consider before making the appropriate and necessary determination, was completed in 1998 and was entitled the *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units–Final Report to Congress* (Utility Study).[5] The Utility Study contained an analysis of HAP emissions from EGUs, an assessment of the hazards and risks due to inhalation exposures to these emitted pollutants, and a multipathway (inhalation plus non-inhalation exposures) risk assessment for mercury and a subset of other relevant HAP. The study indicated that mercury was the HAP of greatest concern to public health from coal- and oil-fired EGUs. The study also concluded that numerous control strategies were available to reduce HAP emissions from this source category. The second study commissioned by Congress under CAA section 112(n)(1)(B), the Mercury Study Report to Congress (Mercury Study),[6] was released in 1997. Under this provision, the statute tasked the EPA with focusing exclusively on mercury, but directed the Agency to look at other stationary sources of mercury emission in addition to EGUs, the rate and mass of emissions coming from those sources, available technologies for controlling mercury and the costs of such technologies, and a broader scope of impacts including environmental effects. As in the Utility Study, the EPA confirmed that mercury is highly toxic, persistent, and bioaccumulates in food chains. Fish consumption is the primary pathway for human exposure to mercury, which can lead to higher risks in certain populations. The third study, required under CAA section 112(n)(1)(C), directed the National Institute of Environmental Health Sciences (NIEHS) to conduct a study to determine the threshold level of mercury exposure below which adverse human health effects were not expected to occur (NIEHS Study). The statute required that the study include a

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[5] U.S. EPA. *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress*. EPA–453/R–98–004a. February 1998.
[6] U.S. EPA. 1997. *Mercury Study Report to Congress*. EPA–452/R–97–003 December 1997.

threshold for mercury concentrations in the tissue of fish that could be consumed, even by sensitive populations, without adverse effects to public health. NIEHS submitted the required study to Congress in 1995.[7] *See* 76 FR 24982 (May 3, 2011). Later, after submission of the CAA section 112(n)(1) reports and as part of the fiscal year 1999 appropriations, Congress further directed the EPA to fund the National Academy of Sciences (NAS) to perform an independent evaluation of the data related to the health impacts of methylmercury, and, similar to the CAA section 112(n)(1)(C) inquiry, specifically to advise the EPA as to the appropriate reference dose (RfD) for methylmercury. Congress also indicated in the 1999 conference report directing the EPA to fund the NAS Study, that the EPA should not make the appropriate and necessary regulatory determination until the EPA had reviewed the results of the NAS Study. *See* H.R. Conf. Rep. No. 105-769, at 281-282 (1998). This last study, completed by the NAS in 2000, was entitled Toxicological Effects of Methylmercury (NAS Study),[8] and it presented a rigorous peer-review of the EPA's RfD for methylmercury. Based on the results of these studies and other available information, the EPA determined on December 20, 2000, pursuant to CAA section 112(n)(1)(A), that it is appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs and added such units to the CAA section 112(c) list of source categories that must be regulated under CAA section 112. *See* 65 FR 79825 (December 20, 2000) (2000 Determination).[9]

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[7] National Institute of Environmental Health Sciences (NIEHS) Report on Mercury; available in the rulemaking docket at EPA-HQ-OAR-2009-0234-3053.

[8] National Research Council (NAS). 2000. *Toxicological Effects of Methylmercury*. Committee on the Toxicological Effects of Methylmercury, Board on Environmental Studies and Toxicology, National Research Council. Many of the peer-reviewed articles cited in this section are publications originally cited in the NAS report.

[9] In the same 2000 action, the EPA Administrator found that regulation of HAP emissions from natural gas-fired EGUs is not appropriate or necessary because the impacts due to HAP emissions from such units are negligible. *See* 65 FR 79831 (December 20, 2000).

In 2005, the EPA revised the original 2000 Determination and concluded that it was neither appropriate nor necessary to regulate EGUs under CAA section 112 in part because the EPA concluded it could address risks from EGU HAP emissions under a different provision of the statute. *See* 70 FR 15994 (March 29, 2005) (2005 Revision). Based on that determination, the EPA removed coal- and oil-fired EGUs from the CAA section 112(c) list of source categories to be regulated under CAA section 112. In a separate but related 2005 action, the EPA also promulgated the Clean Air Mercury Rule (CAMR), which established CAA section 111 standards of performance for mercury emissions from EGUs. *See* 70 FR 28605 (May 18, 2005). Both the 2005 Revision and the CAMR were vacated by the D.C. Circuit in 2008. *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008). The D.C. Circuit held that the EPA failed to comply with the requirements of CAA section 112(c)(9) for delisting source categories, and consequently also vacated the CAA section 111 performance standards promulgated in CAMR, without addressing the merits of those standards. *Id.* at 582-84.

Subsequent to the *New Jersey* decision, the EPA conducted additional technical analyses, including peer-reviewed risk assessments on human health effects associated with mercury (2011 Final Mercury TSD)[10] and non-mercury metal HAP emissions from EGUs (2011 Non-Hg HAP Assessment)[11]. Those analyses, which focused on populations with higher fish consumption (*e.g.*, subsistence fishers) and residents living near the facilities who experienced increased

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[10] U.S. EPA. 2011. *Revised Technical Support Document: National-Scale Assessment of Mercury Risk to Populations with High Consumption of Self-caught Freshwater Fish in Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units*. Office of Air Quality Planning and Standards. December 2011. EPA-452/R-11-009. Docket ID Item No. EPA-HQ-OAR-2009-0234-19913 (2011 Final Mercury TSD).

[11] U.S. EPA. 2011. *Supplement to the Non-Hg Case Study Chronic Inhalation Risk Assessment In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units*. Office of Air Quality Planning and Standards. November 2011. EPA-452/R-11-013. Docket ID Item No. EPA-HQ-OAR-2009-0234-19912 (2011 Non-Hg HAP Assessment).

exposure to HAP through inhalation, found that mercury and non-mercury HAP emissions from EGUs remain a public health hazard and that EGUs were the largest anthropogenic source of mercury emissions to the atmosphere in the U.S. Based on these findings, and other relevant information regarding the volume of HAP, environmental effects, and availability of controls, in 2012, the EPA affirmed the original 2000 Determination that it is appropriate and necessary to regulate EGUs under CAA section 112. *See* 77 FR 9304 (February 16, 2012).

In the same 2012 action, the EPA established a NESHAP, commonly referred to as MATS, that required coal- and oil-fired EGUs to meet HAP emission standards reflecting the application of the maximum achievable control technology (MACT) for all HAP emissions from EGUs.[12] MATS applies to existing and new coal- and oil-fired EGUs located at both major and area sources of HAP emissions. An EGU is a fossil fuel-fired steam generating combustion unit of more than 25 megawatts (MW) that serves a generator that produces electricity for sale. *See* CAA section 112(a)(8) (defining EGU). A unit that cogenerates steam and electricity and supplies more than one-third of its potential electric output capacity and more than 25 MW electric output to any utility power distribution system for sale is also an EGU. *Id.*

For coal-fired EGUs, MATS includes standards to limit emissions of mercury, acid gas HAP, non-mercury HAP metals (*e.g.*, nickel, lead, chromium), and organic HAP (*e.g.*, formaldehyde, dioxin/furan). Standards for HCl serve as a surrogate for the acid gas HAP, with an alternate standard for sulfur dioxide (SO_2) that may be used as a surrogate for acid gas HAP for those coal-fired EGUs with flue gas desulfurization (FGD) systems and SO_2 continuous

[12] Although the 2012 MATS Final Rule has been amended several times, the amendments are not a result of actions regarding the appropriate and necessary determination and, therefore, are not discussed in this preamble. Detail regarding those amendatory actions can be found at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*.

emissions monitoring systems that are installed and operational. Standards for filterable PM serve as a surrogate for the non-mercury HAP metals, with standards for total non-mercury HAP metals and individual non-mercury HAP metals provided as alternative equivalent standards. Work practice standards that require periodic combustion process tune-ups were established to limit formation and emissions of the organic HAP.

For oil-fired EGUs, MATS includes standards to limit emissions of HCl and HF, total HAP metals (*e.g.*, mercury, nickel, lead), and organic HAP (*e.g.*, formaldehyde, dioxin/furan). Standards for filterable PM serve as a surrogate for total HAP metals, with standards for total HAP metals and individual HAP metals provided as alternative equivalent standards. Periodic combustion process tune-up work practice standards were established to limit formation and emissions of the organic HAP.

Additional detail regarding the types of units regulated under MATS and the regulatory requirements that they are subject to can be found in 40 CFR 63, subpart UUUUU.[13] The existing source compliance date was April 16, 2015, but many existing sources were granted an additional 1-year extension of the compliance date for the installation of controls.

After MATS was promulgated, both the rule itself and many aspects of the EPA's appropriate and necessary determination were challenged in the D.C. Circuit. In *White Stallion Energy Center v. EPA*, the D.C. Circuit unanimously denied all challenges to MATS, with one exception discussed below in which the court was not unanimous. 748 F.3d 1222 (D.C. Cir. 2014). As part of its decision, the D.C. Circuit concluded that the "EPA's 'appropriate and necessary' determination in 2000, and the reaffirmation of that determination in 2012, are amply

[13] Available at *www.ecfr.gov/cgi-bin/text-idx?node=sp40.15.63.uuuuu*.

supported by EPA's findings regarding the health effects of mercury exposure." *Id.* at 1245.[14] While joining the D.C. Circuit's conclusions as to the adequacy of the EPA's identification of public health hazards, one judge dissented on the issue of whether the EPA erred by not considering costs together with the harms of HAP pollution when making the "appropriate and necessary" determination, finding that cost was a required consideration under that determination. *Id.* at 1258-59 (Kavanaugh, J., dissenting).

The U.S. Supreme Court subsequently granted *certiorari*, directing the parties to address a single question posed by the Court itself: "Whether the Environmental Protection Agency unreasonably refused to consider cost in determining whether it is appropriate to regulate hazardous air pollutants emitted by electric utilities." *Michigan v. EPA*, 135 S. Ct. 702 (Mem.) (2014). In 2015, the U.S. Supreme Court held that "EPA interpreted [CAA section 112(n)(1)(A)] unreasonably when it deemed cost irrelevant to the decision to regulate power plants." *Michigan*, 576 U.S. at 760. In so holding, the U.S. Supreme Court found that the EPA "must consider cost–including, most importantly, cost of compliance–before deciding whether regulation is appropriate and necessary." *Id.* at 2711. It is "up to the Agency," the Court added, "to decide (as always, within the limits of reasonable interpretation) how to account for cost." *Id.* The rule was

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[14] In discussing the 2011 Final Mercury TSD, the D.C. Circuit concluded that the EPA considered the available scientific information in a rational manner, and stated:

> As explained in the technical support document (TSD) accompanying the Final Rule, EPA determined that mercury emissions posed a significant threat to public health based on an analysis of women of child-bearing age who consumed large amounts of freshwater fish. *See* [2011 Final] Mercury TSD .... The design of EPA's TSD was neither arbitrary nor capricious; the study was reviewed by EPA's independent Science Advisory Board, stated that it "support[ed] the overall design of and approach to the risk assessment" and found "that it should provide an objective, reasonable, and credible determination of potential for a public health hazard from mercury emissions emitted from U.S. EGUs." ... In addition, EPA revised the final TSD to address SAB's remaining concerns regarding EPA's data collection practices.

Id. at 1245-46.

ultimately remanded back to the EPA to complete the required cost analysis, and the D.C. Circuit left the MATS rule in place pending the completion of that analysis. *White Stallion Energy Center v. EPA*, No. 12-1100, ECF No. 1588459 (D.C. Cir. December 15, 2015).

In response to the U.S. Supreme Court's direction, the EPA finalized a supplemental finding on April 25, 2016, that evaluated the costs of complying with MATS and concluded that the appropriate and necessary determination was still valid. The 2016 Supplemental Finding promulgated two different approaches to incorporate cost into the decision-making process for the appropriate and necessary determination. *See* 81 FR 24420 (April 25, 2016). The EPA determined that both approaches independently supported the conclusion that regulation of HAP emissions from EGUs is appropriate and necessary.

The EPA's preferred approach to incorporating cost evaluated estimated costs of compliance with MATS against several cost metrics relevant to the EGU sector (*e.g.*, historical annual revenues, annual capital expenditures, and impacts on retail electricity prices), and found that the projected costs of MATS were reasonable for the sector in comparison with historical data on those metrics. The evaluation of cost metrics that the EPA applied was consistent with approaches commonly used to evaluate environmental policy cost impacts.[15] The EPA also examined as part of its cost analysis what the impact of MATS would be on retail electricity prices and the reliability of the power grid. Using a totality-of-the-circumstances approach, the EPA weighed these supplemental findings as to cost against the existing administrative record

[15] For example, see "Economic Impact and Small Business Analysis–Mineral Wool and Wool Fiberglass RTRs and Wool Fiberglass Area Source NESHAP" (U.S. EPA, 2015; *https://www.epa.gov/sites/default/files/2020-07/documents/mwwf_eia_neshap_final_07-2015.pdf*) or "Economic Impact Analysis of Final Coke Ovens NESHAP" (U.S. EPA, 2002; *https://www.epa.gov/sites/default/files/2020-07/documents/coke-ovens_eia_neshap_final_08-2002.pdf*).

detailing the identified hazards to public health and the environment from mercury, non-mercury metal HAP, and acid gas HAP that are listed under CAA section 112, and the other advantages to regulation. Based on that balancing, the EPA concluded under the preferred approach that it remains appropriate to regulate HAP emissions from EGUs after considering cost. *See* 81 FR 24420 (April 25, 2016) ("After evaluating cost reasonableness using several different metrics, the Administrator has, in accordance with her statutory duty under CAA section 112(n)(1)(A), weighed cost against the previously identified advantages of regulating HAP emissions from EGUs – including the agency's prior conclusions about the significant hazards to public health and the environment associated with such emissions and the volume of HAP that would be reduced by regulation of EGUs under CAA section 112.")

In a second alternative and independent approach (referred to as the alternative approach), the EPA considered the BCA in the 2011 RIA for the 2012 MATS Final Rule. *Id.* at 24421. In that analysis, even though the EPA was only able to monetize one HAP-specific endpoint, the EPA estimated that the final MATS rule would yield annual monetized net benefits (in 2007 dollars) of between $37 billion to $90 billion using a 3-percent discount rate and between $33 billion to $81 billion using a 7-percent discount rate, in comparison to the projected $9.6 billion in annual compliance costs. *See id.* at 24425. The EPA therefore determined that the alternative approach also independently supported the conclusion that regulation of HAP emissions from EGUs remains appropriate after considering cost. *Id.*

Several state and industry groups petitioned for review of the 2016 Supplemental Finding in the D.C. Circuit. *Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir. filed April 25, 2016). In April 2017, the EPA moved the D.C. Circuit to continue oral argument and hold the case in abeyance in order to give the then-new Administration an opportunity to review the 2016 action,

and the D.C. Circuit ordered that the consolidated challenges to the 2016 Supplemental Finding be held in abeyance (*i.e.*, temporarily on hold).[16]

Accordingly, the EPA reviewed the 2016 action, and on May 22, 2020, finalized a revised response to the *Michigan* decision. *See* 85 FR 31286 (May 22, 2020). In the 2020 Final Action, after primarily comparing the projected costs of compliance to the one post control HAP emission reduction benefit that could be monetized, the EPA reconsidered its previous determination and found that it is not appropriate to regulate HAP emissions from coal- and oil-fired EGUs after a consideration of cost, thereby reversing the Agency's conclusion under CAA section 112(n)(1)(A), first made in 2000 and later affirmed in 2012 and 2016. Specifically, in its reconsideration, the Agency asserted that the 2016 Supplemental Finding considering the cost of MATS was flawed based on its assessment that neither of the two approaches to considering cost in the 2016 Supplemental Finding satisfied the EPA's obligation under CAA section 112(n)(1)(A), as that provision was interpreted by the U.S. Supreme Court in *Michigan*. Additionally, the EPA determined that, while finalizing the action would reverse the 2016 Supplemental Finding, it would not remove the Coal- and Oil-Fired EGU source category from the CAA section 112(c)(1) list, nor would it affect the existing CAA section 112(d) emissions standards regulating HAP emissions from coal- and oil-fired EGUs that were promulgated in the 2012 MATS Final Rule.[17] *See* 85 FR 31312 (May 22, 2020).

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[16] Order, *Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir. April 27, 2017), ECF No. 1672987. In response to a joint motion from the parties to govern future proceedings, the D.C. Circuit issued an order in February 2021 to continue to hold the consolidated cases in *Murray Energy Corp. v. EPA* in abeyance. Order, *Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir. February 25, 2021), ECF No. 1887125.

[17] This finding was based on *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008), which held that the EPA is not permitted to remove source categories from the CAA section 112(c)(1) list unless the CAA section 112(c)(9) criteria for delisting have been met.

In the 2020 Final Action, the EPA also finalized the risk review required by CAA section 112(f)(2) and the first technology review required by CAA section 112(d)(6) for the Coal- and Oil-Fired EGU source category regulated under MATS.[18] The EPA determined that residual risks due to emissions of air toxics from the Coal- and Oil-Fired EGU source category are acceptable and that the current NESHAP provides an ample margin of safety to protect public health and to prevent an adverse environmental effect. In the technology review, the EPA did not identify any new developments in HAP emission controls to achieve further cost-effective emissions reductions. Based on the results of these reviews, the EPA found that no revisions to MATS were warranted. *See* 85 FR 31314 (May 22, 2020).

Several states, industry, public health, environmental, and civil rights groups petitioned for review of the 2020 Final Action in the D.C. Circuit. *American Academy of Pediatrics v. Regan*, No. 20-1221 and consolidated cases (D.C. Cir. filed June 19, 2020). On September 28, 2020, the D.C. Circuit granted the EPA's unopposed motion to sever from the lead case and hold in abeyance two of the petitions for review: *Westmoreland Mining Holdings LLC v. EPA*, No. 20-1160 (D.C. Cir. filed May 22, 2020) (challenging the 2020 Final Action as well as prior EPA actions related to MATS, including a challenge to the MATS CAA section 112(d) standards on the basis that the 2020 Final Action's reversal of the appropriate and necessary determination provided a "grounds arising after" for filing a petition outside the 60-day window for judicial

[18] CAA section 112(f)(2) requires the EPA to conduct a one-time review of the risks remaining after imposition of MACT standards under CAA section 112(d)(2) within 8 years of the effective date of those standards (risk review). CAA section 112(d)(6) requires the EPA to conduct a review of all CAA section 112(d) standards at least every 8 years to determine whether it is necessary to establish more stringent standards after considering, among other things, advances in technology and costs of additional control (technology review). The EPA has always conducted the first technology review at the same time it conducts the risk review and collectively the actions are known at RTRs.

review of MATS), and *Air Alliance Houston v. EPA*, No. 20-1268 (D.C. Cir. filed July 21, 2020) (challenging only the RTR portion of the 2020 Final Action).[19]

On January 20, 2021, President Biden signed Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis." The Executive Order, among other things, instructs the EPA to review the 2020 Final Action and consider publishing a notice of proposed rulemaking suspending, revising, or rescinding that action. In February 2021, the EPA moved the D.C. Circuit to hold *American Academy of Pediatrics* and consolidated cases in abeyance, pending the Agency's review of the 2020 Final Action as prompted in Executive Order 13990, and on February 16, 2021, the D.C. Circuit granted the Agency's motion.[20]

In the meantime, the requirements of MATS have been fully implemented, resulting in significant reductions in HAP emissions from EGUs and the risks associated with those emissions. The EPA had projected that annual EGU mercury emissions would be reduced by 75 percent with MATS implementation. In fact, EGU emission reductions have been far more substantial (down to approximately 4 tons in 2017), which represents an 86 percent reduction compared to 2010 (pre-MATS) levels. *See* Table 4 at 84 FR 2689 (February 7, 2019). Acid gas HAP and non-mercury metal HAP have similarly been reduced – by 96 percent and 81 percent, respectively – as compared to 2010 levels. *Id.* MATS is the only Federal requirement that guarantees this level of HAP control from EGUs.

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[19] Order, *Westmoreland Mining Holdings LLC v. EPA*, No. 20-1160 (D.C. Cir. September 28, 2020), ECF No. 1863712.
[20] Order, *American Academy of Pediatrics v. Regan*, No. 20-1221 (D.C. Cir. February 16, 2021), ECF No. 1885509.

The EPA is now proposing to revoke the 2020 reconsideration of the 2016 Supplemental Finding and to reaffirm once again that it is appropriate and necessary to regulate emissions of HAP from coal- and oil-fired EGUs. We will provide notice of the results of our review of the 2020 RTR in a separate future action.

B. Statutory Background

Additional statutory context is useful to help identify the relevant factors that the Administrator should weigh when making the appropriate and necessary determination.

1. Pre-1990 History of HAP Regulation

In 1970, Congress enacted CAA section 112 to address the millions of pounds of HAP emissions that were estimated to be emitted from stationary sources in the country. At that time, the CAA defined HAP as "an air pollutant to which no ambient air quality standard is applicable and which, in the judgment of the Administrator may cause, or contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness," but the statute left it to the EPA to identify and list pollutants that were HAP. Once a HAP was listed, the statute required the EPA to regulate sources of that identified HAP "at the level which in [the Administrator's] judgment provides an ample margin of safety to protect the public health from such hazardous air pollutants." CAA section 112(b)(1)(B) (pre-1990 amendments); Legislative History of the CAA Amendments of 1990 ("Legislative History"), at 3174-75, 3346 (Comm. Print 1993). The statute did not define the term "ample margin of safety" or provide a risk metric on which the EPA was to establish standards, and initially the EPA endeavored to account for costs and technological feasibility in every regulatory decision. In *Natural Resources Defense Council (NRDC) v. EPA*, 824 F.2d 1146 (D.C. Cir. 1987), the D.C. Circuit concluded that the

CAA required that in interpreting what constitutes "safe," the EPA was prohibited from considering cost and technological feasibility. *Id.* at 1166.

The EPA subsequently issued the NESHAP for benzene in accordance with the *NRDC* holding.[21] Among other things, the Benzene NESHAP concluded that there is a rebuttable presumption that any cancer risk greater than 100-in-1 million to the most exposed individual is unacceptable, and per *NRDC*, must be addressed without consideration of cost or technological feasibility. The Benzene NESHAP further provided that, after evaluating the acceptability of cancer risks, the EPA must evaluate whether the current level of control provides an ample margin of safety for any risk greater than 1-in-1 million and, if not, the EPA will establish more stringent standards as necessary after considering cost and technological feasibility.[22]

2. Clean Air Act 1990 Amendments to Section 112

In 1990, Congress radically transformed section 112 of the CAA and its treatment of hazardous air pollution. The legislative history of the amendments indicates Congress' dissatisfaction with the EPA's slow pace addressing these pollutants under the 1970 CAA: "In theory, [hazardous air pollutants] were to be stringently controlled under the existing Clean Air Act section 112. However, . . . only seven of the hundreds of potentially hazardous air pollutants have been regulated by EPA since section 112 was enacted in 1970." H.R. Rep. No. 101-490, at

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[21] National Emissions Standards for Hazardous Air Pollutants: Benzene Emissions from Maleic Anhydride Plants, Ethylbenzene/Styrene Plants, Benzene Storage Vessels, Benzene Equipment Leaks, and Coke By-Product Recovery Plants (Benzene NESHAP). 54 FR 38044 (September 14, 1989).

[22] "In protecting public health with an ample margin of safety under section 112, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1 in 1 million and (2) limiting to no higher than approximately 1 in 10 thousand the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years." Benzene NESHAP, 54 FR 38044-5, September 14, 1989.

315 (1990); *see also id.* at 151 (noting that in 20 years, the EPA's establishment of standards for only seven HAP covered "a small fraction of the many substances associated . . . with cancer, birth defects, neurological damage, or other serious health impacts."). Congress was concerned with how few sources had been addressed during this time. *Id.* ("[The EPA's] regulations sometimes apply only to limited sources of the relevant pollutant. For example, the original benzene standard covered just one category of sources (equipment leaks). Of the 50 toxic substances emitted by industry in the greatest volume in 1987, only one – benzene – has been regulated even partially by EPA."). Congress noted that state and local regulatory efforts to act in the face of "the absence of Federal regulations" had "produced a patchwork of differing standards," and that "[m]ost states . . . limit the scope of their program by addressing a limited number of existing sources or source categories, or by addressing existing sources only on a case-by-case basis as problem sources are identified" and that "[o]ne state exempts all existing sources from review." *Id.*

In enacting the 1990 Amendments with respect to the control of hazardous air pollution, Congress noted that "[p]ollutants controlled under [section 112] tend to be less widespread than those regulated [under other sections of the CAA], but are often associated with more serious health impacts, such as cancer, neurological disorders, and reproductive dysfunctions." *Id.* at 315. In its substantial 1990 Amendments, Congress itself listed 189 HAP (CAA section 112(b)) and set forth a statutory structure that would ensure swift regulation of a significant majority of these HAP emissions from stationary sources. Specifically, after defining major and area sources and requiring the Agency to list all major sources and many area sources of the listed pollutants (CAA section 112(c)), the new CAA section 112 required the Agency to establish technology-based emission standards for listed source categories on a prompt schedule and to revisit those

technology-based standards every 8 years (CAA section 112(d) (emission standards); CAA section 112(e) (schedule for standards and review)). The 1990 Amendments also obligated the EPA to evaluate the residual risk within 8 years of promulgation of technology-based standards. CAA section 112(f)(2).

In setting the standards, CAA section 112(d) requires the Agency to establish technology-based standards that achieve the "maximum degree of reduction," "including a prohibition on such emissions where achievable." CAA section 112(d)(2). Congress specified that the maximum degree of reduction must be at least as stringent as the average level of control achieved in practice by the best performing sources in the category or subcategory based on emissions data available to the Agency at the time of promulgation. This technology-based approach permitted the EPA to swiftly set standards for source categories without determining the risk or cost in each specific case, as the EPA had done prior to the 1990 Amendments. In other words, this approach to regulation quickly required that all major sources and many area sources of HAP install control technologies consistent with the top performers in each category, which had the effect of obtaining immediate reductions in the volume of HAP emissions from stationary sources. The statutory requirement that sources obtain levels of emission limitation that have actually been achieved by existing sources, instead of levels that could theoretically be achieved, inherently reflects a built-in cost consideration.[23]

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[23] Congress recognized as much:

> "The Administrator may take the cost of achieving the maximum emission reduction and any non-air quality health and environmental impacts and energy requirements into account when determining the emissions limitation which is achievable for the sources in the category or subcategory. Cost considerations are reflected in the selection of emissions limitations which have been achieved in practice (rather than those which are merely theoretical) by sources of a similar type or character."

Further, after determining the minimum stringency level of control, or MACT floor, CAA section 112(d)(2) requires the Agency to determine whether more stringent standards are achievable after considering the cost of achieving such standards and any non-air-quality health and environmental impacts and energy requirements of additional control. In doing so, the statute further specifies in CAA section 112(d)(2) that the EPA should consider requiring sources to apply measures that, among other things, "reduce the volume of, or eliminate emissions of, such pollutants . . . " (CAA section 112(d)(2)(A)), "enclose systems or processes to eliminate emissions" (CAA section 112(d)(2)(B)), and "collect, capture, or treat such pollutants when released . . ." (CAA section 112(d)(2)(C)). The 1990 Amendments also built in a regular review of new technologies and a one-time review of risks that remain after imposition of MACT standards. CAA section 112(d)(6) requires the EPA to evaluate every NESHAP no less often than every 8 years to determine whether additional control is necessary after taking into consideration "developments in practices, processes, and control technologies," without regard to risk. CAA section 112(f) requires the EPA to ensure that the risks are acceptable and that the MACT standards provide an ample margin of safety

The statutory requirement to establish technology-based standards under CAA section 112 avoided the need for the EPA to identify hazards to public health and the environment in order to justify regulation of HAP emissions from stationary sources, reflecting Congress' judgment that such emissions are inherently dangerous. *See* S. Rep. No. 101-228, at 148 ("The MACT standards are based on the performance of technology, and not on the health and environmental effects of the [HAP]."). The technology review required in CAA section

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A Legislative History of the Clean Air Act Amendments of 1990 (CAA Legislative History), Vol 5, pp. 8508 -8509 (CAA Amendments of 1989; p. 168-169; Report of the Committee on Environment and Public Works S. 1630).

112(d)(6) further mandates that the EPA continually evaluate standards to determine if additional reductions can be obtained, without consideration of the specific risk associated with the HAP emissions that would be reduced. Notably, the CAA section 112(d)(6) review of what additional reductions may be obtained based on new technology is required *even after* the Agency has conducted the CAA section 112(f)(2) review and determined that the existing standard will protect the public with an ample margin of safety.

The statutory structure and legislative history also demonstrate Congress' concern with the many ways that HAP can harm human health and Congress' goal of protecting the most exposed and vulnerable members of society. The committee report accompanying the 1990 Amendments discussed the scientific understanding regarding HAP risk at the time, including the 1989 report on benzene performed by the EPA noted above. H.R. Rep. No. 101-490, at 315. Specifically, Congress highlighted the EPA's findings as to cancer incidence, and importantly, lifetime individual risk to the most exposed individuals. *Id.* The report also notes the limitations of the EPA's assessment: "The EPA estimates evaluated the risks caused by emissions of a single toxic air pollutant from each plant. But many facilities emit numerous toxic pollutants. The agency's risk assessments did not consider the combined or synergistic effects of exposure to multiple toxics, or the effect of exposure through indirect pathways." *Id.* Congress also noted the EPA's use of the maximum exposed individual (MEI) tool to assess risks faced by heavily exposed citizens. *Id.* The report cited particular scientific studies demonstrating that some populations are more affected than others – for example, it pointed out that "[b]ecause of their small body weight, young children and fetuses are especially vulnerable to exposure to PCB-contaminated fish. One study has found long-term learning disabilities in children who had eaten high-levels of Great Lakes fish." *Id.*

The statutory structure confirms Congress' approach to risk and sensitive populations. As noted, the CAA section 112(f)(2) residual risk review requires the EPA to consider whether, after imposition of the CAA section 112(d)(2) MACT standard, there are remaining risks from HAP emissions that warrant more stringent standards to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect. *See* CAA section 112(f)(2)(A). Specifically, the statute requires the EPA to promulgate standards under the risk review provision if the CAA section 112(d) standard does not "reduce lifetime excess cancer risks to the individual most exposed to emissions from a source in the category or subcategory to less than one in one million." *Id.* Thus, even after the application of MACT standards, the statute directs the EPA to conduct a rulemaking if even *one* person has a risk, not a guarantee, of getting cancer. This demonstrates the statutory intent to protect even the most exposed member of the population from the harms attendant to exposure to HAP emissions.

If a residual risk rulemaking is required, as noted above, the statute incorporates the detailed rulemaking approach set forth in the Benzene NESHAP for determining whether HAP emissions from stationary sources pose an unacceptable risk and whether standards provide an ample margin of safety. *See* CAA section 112(f)(2)(B) (preserving the prior interpretation of "ample margin of safety" set forth in the Benzene NESHAP). That approach includes a rebuttable presumption that any cancer risk greater than 100-in-1 million to the most exposed person is per se unacceptable. For non-cancer chronic and acute risks, the EPA has more discretion to determine what is acceptable, but even then, the statute requires the EPA to evaluate the risks to the most exposed individual and our RfDs are developed with the goal of being protective of even sensitive members of the population. *See e.g.*, CAA section 112(n)(1)(C) (requiring, in part, the development of "a threshold for mercury concentration in the tissue of fish

which may be consumed (including consumption by sensitive populations) without adverse effects to public health"). If risks are found to be unacceptable, the EPA must impose additional control requirements to ensure that post CAA section 112(f) risks from HAP emissions are at an acceptable level, regardless of cost and technological feasibility.

After determining whether the risks are acceptable and developing standards to achieve an acceptable level of risk if necessary, the EPA must then determine whether more stringent standards are necessary to provide an ample margin of safety to protect public health, and at this stage we must take into consideration cost, technological feasibility, uncertainties, and other relevant factors. As stated in the Benzene NESHAP, "In protecting public health with an ample margin of safety under section 112, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants by … protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1 in 1 million." *See* 54 FR 38044-45 (September 14, 1989); *see also NRDC v. EPA*, 529 F.3d 1077, 1082 (D.C. Cir. 2008) (finding that "the Benzene NESHAP standard established a maximum excess risk of 100-in-one million, while adopting the one-in-one million standard as an aspirational goal.").

The various listing and delisting provisions of CAA section 112 further demonstrate a statutory intent to reduce risk and protect the most exposed members of the population from HAP emissions. *See, e.g.,* CAA section 112(b)(2) (requiring the EPA to add pollutants to the HAP list if the EPA determines the HAP "presents, or may present" adverse human health or adverse environmental effects); *id.* at CAA section 112(b)(3)(B) (requiring the EPA to add a pollutant to the list if a petitioner shows that a substance is known to cause or "may reasonably be anticipated to cause adverse effects to human health or adverse environmental effects"); *id.* at CAA section 112(b)(3) (authorizing the EPA to delete a substance only on a showing that "the

substance may not reasonably be anticipated to cause any adverse effects to human health or adverse environmental effects."); *id.* at CAA section 112(c)(9)(B)(i) (prohibiting the EPA from delisting a source category if even one source in the category causes a lifetime cancer risk greater than 1-in-1 million to "the individual in the population who is most exposed to emissions of such pollutants from the source."); *id.* at CAA section 7412(c)(9)(B)(i) (prohibiting the EPA from delisting a source category unless the Agency determines that the non-cancer causing HAP emitted from the source category do not "exceed a level which is adequate to protect public health with an ample margin of safety and no adverse environmental effect will result from emissions of any source" in the category); *id.* at CAA section 112(n)(1)(C) (requiring a study to determine the level of mercury in fish tissue that can be consumed by even sensitive populations without adverse effect to public health).

The deadlines for action included in the 1990 Amendments indicate that Congress wanted HAP pollution addressed quickly. The statute requires the EPA to list all major source categories within 1 year of the 1990 Amendments and to regulate those listed categories on a strict schedule that prioritizes the source categories that are known or suspected to pose the greatest risks to the public. *See* CAA sections 112(c)(1), 112(e)(1) and 112(e)(2). For area sources, where the statute provides the EPA with greater discretion to determine the sources to regulate, it also directs the Agency to collect the information necessary to make the listing decision for many area source categories and requires the Agency to act on that information by a date certain.

For example, CAA section 112(k) establishes an area source program designed to identify and list at least 30 HAP that pose the greatest threat to public health in the largest number of urban areas (urban HAP) and to list for regulation area sources that account for at least 90 percent of the area source emissions of the 30 urban HAP. *See* CAA sections 112(k) and

112(c)(3). In addition to the urban air toxics program, CAA section 112(c)(6) directs the EPA to identify and list sufficient source categories to ensure that at least 90 percent of the aggregate emissions of seven bioaccumulative and persistent HAP, including mercury, are subject to standards pursuant to CAA sections 112(d)(2) or (d)(4). *See* CAA section 112(c)(6). Notably, these requirements were *in addition to* any controls on mercury and other CAA section 112(c)(6) HAP that would be imposed if the EPA determined it was appropriate and necessary to regulate EGUs under CAA section 112. This was despite the fact that it was known at the time of enactment that other categories with much lower emissions of mercury would have to be subject to MACT standards because of the exclusion of EGUs from CAA section 112(c)(6).

As the preceding discussion demonstrates, throughout CAA section 112 and its legislative history, Congress made clear its intent to quickly secure large reductions in the volume of HAP emissions from stationary sources because of its recognition of the hazards to public health and the environment inherent in exposure to such emissions. CAA section 112 and its legislative history also reveal Congress' understanding that fully characterizing the risks posed by HAP emissions was exceedingly difficult; thus, Congress purposefully replaced a regime that required an assessment of risk in the first instance with one that assumed that risk and directed swift and substantial reductions. The statutory design and direction also repeatedly emphasize that the EPA should regulate with the most exposed and most sensitive members of the population in mind in order to achieve an acceptable level of HAP emissions with an ample margin of safety. As explained further below, this statutory context informs the EPA's judgment as to the relevant factors to weigh in the analysis of whether regulation remains appropriate after a consideration of cost.

III. Proposed Determination Under CAA Section 112(n)(1)(A)

In this action, the EPA is proposing to revoke the 2020 Final Action and to reaffirm the appropriate and necessary determination made in 2000, and reaffirmed in 2012 and 2016.[24] We propose to find that, under either our preferred totality-of-the-circumstances framework or our alternative formal BCA framework, the information that would have been available to the Agency as of the time of the 2012 rulemaking supports a determination that it is appropriate and necessary to regulate HAP from EGUs. We also consider new information regarding the hazards to public health and the environment and the costs of compliance with MATS that has become available since the 2016 Supplemental Finding, and find that the updated information strengthens the EPA's conclusion that it is appropriate and necessary to regulate HAP from coal- and oil-fired EGUs.

At the outset, we note that CAA section 112(n)(1)(A) is silent as to whether the EPA may consider updated information when acting on a remand of the appropriate and necessary

[24] Our proposal focuses on an analysis of the "appropriate" prong of the CAA section 112(n)(1)(A). The *Michigan* decision and subsequent EPA actions addressing that decision have been centered on supplementing the Agency's record with a consideration of the cost of regulation as part of the "appropriate" aspect of the overall determination. As noted, the 2020 Final Action, while reversing the 2016 Supplemental Finding as to the EPA's determination that it was "appropriate" to regulate HAP from EGUs, did not rescind the Agency's prior determination that it was necessary to regulate. *See* 84 FR 2674 (February 7, 2019) ("CAA section 112(n)(1)(A) requires the EPA to determine that both the appropriate *and* necessary prongs are met. Therefore, if the EPA finds that either prong is not satisfied, it cannot make an affirmative appropriate and necessary finding. The EPA's reexamination of its determination . . . focuses on the first prong of that analysis."). The "necessary" determination rested on two primary bases: 1) in 2012, the EPA determined that the hazards posed to human health and the environment by HAP emissions from EGUs would not be addressed in its future year modeling, which accounted for all CAA requirements to that point; and 2) our conclusion that the only way to ensure permanent reductions in U.S. EGU emissions of HAP and the associated risks to public health and the environment was through standards set under CAA section 112. *See* 76 FR 25017 (May 23, 2011). We therefore continue our focus in this proposal on reinstating the "appropriate" prong of the determination, leaving undisturbed the Agency's prior conclusions that regulation of HAP from EGUs is "necessary." *See* 65 FR 79830 (December 20, 2000); 76 FR 25017 (May 3, 2011); 77 FR 9363 (February 16, 2012).

determination. CAA section 112(n)(1)(A) directs the EPA to conduct the Utility Study within 3 years, and requires the EPA to regulate EGUs if the Administrator makes a finding that it is appropriate and necessary to do so "after" considering the results of the Utility Study. Consistent with the EPA's interpretation in 2005, 2012, 2016, and 2020, we do not read this language to *require* the EPA to consider the most-up-to-date information where the Agency is compelled to revisit the determination, but nor do we interpret the provision to *preclude* consideration of new information where reasonable. *See* 70 FR 16002 (March 29, 2005); 77 FR 9310 (February 16, 2012); 81 FR 24432 (April 25, 2016); 85 FR 31306 (May 22, 2020). As such, the Agency has applied its discretion in determining when to consider new information under this provision based on the circumstances. For example, when the EPA was revisiting the determination in 2012, we noted that "[b]ecause several years had passed since the 2000 finding, the EPA performed additional technical analyses for the proposed rule, even though those analyses were not required." 77 FR 9310 (February 16, 2012).[25] Similarly, we think that it is reasonable to consider new information in the context of this proposal, given that almost a decade has passed since we last considered updated information. In this proposed reconsideration of the determination per the President's Executive Order, both the growing scientific understanding of public health risks associated with HAP emissions and a clearer picture of the cost of control technologies and the make-up of power sector generation over the last decade may inform the question of whether it is appropriate to regulate, and, in particular, help address the inquiry that the Supreme Court directed us to undertake in *Michigan.* We believe the evolving scientific information with regard to benefits and the advantage of hindsight with regard to costs warrant considering currently available information in making this determination. To the extent that our

[25] The EPA was not challenged on this interpretation in *White Stallion*.

determination should flow from information that would have been available at the "initial decision to regulate," *Michigan*, 576 U.S. at 754, we propose conclusions here based on analyses limited to this earlier record. But we also believe it is reasonable to consider new data, and propose to find that the new information regarding both public health risks and costs bolsters the finding and supports a determination that it is appropriate and necessary to regulate EGUs for HAP.

In section III.A of this preamble, we first describe the advantages of regulation – the reduction in emissions of HAP and attendant reduction of risks to human health and the environment, including the distribution of these health benefits. We carefully document the numerous risks to public health and the environment posed by HAP emissions from EGUs. This includes information previously recognized and documented in the statutorily mandated CAA section 112(n)(1) studies, the 2000 Determination, the 2012 MATS Final Rule, and the 2016 Supplemental Finding about the nature and extent of health and environmental impacts from HAP that are emitted by EGUs, as well as additional risk analyses supported by new scientific studies. Specifically, new risk screening analyses on the connection between mercury and heart disease as well as IQ loss in children across the U.S. further supports the conclusion that HAP emissions from EGUs pose hazards to public health and the environment warranting regulating under CAA section 112. The EPA also discusses the challenges associated with fully quantifying and monetizing the human health and environmental effects associated with HAP emissions. Finally, we note that in addition to reducing the identified risks posed by HAP emissions from EGUs, regulation of such HAP emissions results in significant health and environmental co-benefits.

We then turn in preamble section III.B. to the disadvantages of regulation – the costs associated with reducing EGU HAP emissions and other potential impacts to the sector and the economy associated with MATS. With the benefit of hindsight, we first consider whether MATS actually cost what we projected in the 2011 RIA and conclude that the projection in the 2011 RIA was almost certainly a significant overestimate of the actual costs. We then evaluate the costs estimated in the 2011 RIA against several metrics relevant to the impacts those costs have on the EGU sector and American electricity consumers (*e.g.*, historical annual revenues, annual capital and production expenditures, impacts on retail electricity prices, and impacts on resource adequacy and reliability). These analyses, based on data available in 2012 and based on updated data, all show that the costs of MATS were within the bounds of typical historical fluctuations and that the industry would be able to comply with MATS and continue to provide a reliable source of electricity without price increases that were outside the range of historical variability.

In section III.C of this preamble, we explain why the methodology used in our 2020 Finding was ill-suited to determining whether EGU HAP regulation is appropriate and necessary because it gave virtually no weight to the volume of HAP that would be reduced, and the vast majority of the benefits of reducing EGU HAP, including the reduction of risk to sensitive populations, based on the Agency's inability to quantify or monetize post-control benefits of HAP regulations.

In preamble section III.D, we explain our preferred totality-of-the-circumstances methodology that we propose to use to make the appropriate determination, and our application of that methodology. This approach looks to the statute, and particularly CAA section 112(n)(1)(A) and the other provisions in CAA section 112(n)(1), to help identify the relevant factors to weigh and what weight to afford those factors. Under that methodology we weigh the

significant health and environmental advantages of reducing EGU HAP, and in particular the benefits to the most exposed and sensitive individuals, against the disadvantages of expending money to achieve those benefits – *i.e.*, the effects on the electric generating industry and its ability to provide reliable and affordable electricity. We ultimately propose to conclude that the advantages outweigh the disadvantages whether we look at the record from 2012 or at our new record, which includes an expanded understanding of the health risks associated with HAP emissions and finds that the costs projected in the 2011 RIA were almost certainly significantly overestimated. We further consider that, if we also account for the non-HAP benefits in our preferred totality-of-the-circumstances approach, such as the benefits (including reduced mortality) of coincidental reductions in PM and ozone that flow from the application of controls on HAP, the balance weighs even more heavily in favor of regulating HAP emissions from coal- and oil-fired EGUs.

Finally, in section III.E, we consider an alternative methodology to make the appropriate determination, using a formal BCA of MATS that was conducted consistent with economic principles. This methodology is not our preferred way to consider advantages and disadvantages for the CAA section 112(n)(1)(A) determination, because the EPA's inability to generate a monetized estimate of the full benefits of HAP reductions can lead to an underestimate of the monetary value of the net benefits of regulation. To the extent that a formal BCA is appropriate for making the CAA section 112(n)(1)(A) determination, however, that approach demonstrates that the monetized benefits of MATS outweigh the monetized costs by a considerable margin, whether we look at the 2012 record or our updated record. We therefore propose that it is appropriate to regulate EGUs for HAP applying a BCA approach as well.

In sum, the EPA proposes to conclude that it is appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs, whether we are applying the preferred totality-of-the-circumstances methodology or the alternative formal benefit-cost approach, and whether we are considering only the administrative record as of the original EPA response on remand to *Michigan* in 2016 or based on new information made available since that time. The information and data amassed by the EPA over the decades of administrative analysis and rulemaking devoted to this topic overwhelmingly support the conclusion that the advantages of regulating HAP emissions from coal- and oil-fired EGUs outweigh the costs. The EPA requests comment on this proposed finding and on the supporting information presented in this proposal, including information related to the risks associated with HAP emissions from U.S. EGUs and the actual costs incurred by the power sector due to MATS, as well as on the preferred and alternative methodologies for reaching the proposed conclusion.

A. Public Health Hazards Associated With Emissions From EGUs

1. Overview

The administrative record for the MATS rule detailed several hazards to public health and the environment from HAP emitted by EGUs that remained after imposition of the ARP and other CAA requirements. *See* 80 FR 75028-29 (December 1, 2015). *See also* 65 FR 79825-31 (December 20, 2000); 76 FR 24976-25020 (May 3, 2011); 77 FR 9304-66 (February 16, 2012). The EPA considered all of this information again in the 2016 Supplemental Finding, noting that this sector represented a large fraction of U.S. emissions of mercury, non-mercury metal HAP, and acid gases. Specifically, the EPA found that even after imposition of the other requirements of the CAA, but absent MATS, EGUs remained the largest domestic source of mercury, HF, HCl, and selenium and among the largest domestic contributors of arsenic, chromium, cobalt,

nickel, hydrogen cyanide, beryllium, and cadmium, and that a significant majority of EGU facilities emitted above the major source thresholds for HAP emissions.

Further, the EPA noted that the totality of risks that accrue from these emissions were significant. These hazards include potential neurodevelopmental impairment, increased cancer risks, contribution to chronic and acute health disorders, as well as adverse impacts on the environment. Specifically, the EPA pointed to results from its revised nationwide Mercury Risk Assessment (contained in the 2011 Final Mercury TSD)[26] as well as an inhalation risk assessment (2011 Non-Hg HAP Assessment) for non-mercury HAP (*i.e.*, arsenic, nickel, chromium, selenium, cadmium, HCl, HF, hydrogen cyanide, formaldehyde, benzene, acetaldehyde, manganese, and lead). The EPA estimated lifetime cancer risks for inhabitants near some coal- and oil-fired EGUs to exceed 1-in-1 million[27] and noted that this case-study-based estimate likely underestimated the true maximum risks for the EGU source category. *See* 77 FR 9319 (February 16, 2012). The EPA also found that mercury emissions pose a hazard to wildlife, adversely affecting fish-eating birds and mammals, and that the large volume of acid gas HAP associated with EGUs also pose a hazard to the environment.[28] These technical

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[26] U.S. EPA. 2011. *Revised Technical Support Document: National-Scale Assessment of Mercury Risk to Populations with High Consumption of Self-caught Freshwater Fish In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units.* Office of Air Quality Planning and Standards. November. EPA–452/R–11–009. Docket ID Item No. EPA–HQ–OAR–2009–0234–19913.

[27] The EPA determined the 1-in-1 million standard was the correct metric in part because CAA section 112(c)(9)(B)(1) prohibits the EPA from removing a source category from the list if even one person is exposed to a lifetime cancer risk greater than 1-in-1 million, and CAA section 112(f)(2)(A) directs the EPA to conduct a residual risk rulemaking if even one person is exposed to a lifetime excess cancer risk greater than 1-in-1 million. *See White Stallion* at 1235-36 (agreeing it was reasonable for the EPA to consider the 1-in-1 million delisting criteria in defining "hazard to public health" under CAA section 112(n)(1)(A)).

[28] The EPA had determined it was reasonable to consider environmental impacts of HAP emissions from EGUs in the appropriate determination because CAA section 112 directs the

analyses were all challenged in the *White Stallion* case, and the D.C. Circuit found that the EPA's risk finding as to mercury alone – that is, before reaching any other risk finding – established a significant public health concern. The court stated that "EPA's 'appropriate and necessary' determination in 2000, and its reaffirmation of that determination in 2012, are amply supported by EPA's finding regarding the health effects of mercury exposure." *White Stallion Energy Center v. EPA*, 748 F.3d 1222, 1245 (D.C. Cir. 2014). Additional scientific evidence about the human health hazards associated with EGU HAP emissions that has been collected since the 2016 Supplemental Finding and is discussed in this section has extended our confidence that these emissions pose an unacceptable risk to the American public and in particular, to vulnerable, exposed populations.

This section of the preamble starts by briefly reviewing the long-standing and extensive body of evidence, including new scientific information made available since the 2016 Supplemental Finding, which demonstrates that HAP emissions from oil- and coal-fired EGUs present hazards to public health and the environment warranting regulation under CAA section 112 (section III.A.2). This is followed by an expanded discussion of the health risks associated with domestic EGU mercury emissions based on additional evidence regarding cardiovascular effects that has become available since the 2016 Supplemental Finding (section III.A.3). In section III.A.4, the EPA describes the reasons why it is extremely difficult to estimate the full health and environmental impacts associated with exposure to HAP. We note the longstanding challenges associated with quantifying and monetizing these effects, which may be permanent

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EPA to consider impacts of HAP emissions on the environment, including in the CAA section 112(n)(1)(B) Mercury Study. *See White Stallion* at 1235-36 (agreeing it was reasonable for the EPA to consider the environmental harms when making the appropriate and necessary determination).

and life-threatening and are often distributed unevenly (*i.e.*, concentrated among highly exposed individuals). Next, the section provides an expanded discussion of some identified environmental justice (EJ) issues associated with these emissions (section III.A.5). Section III.A.6 identifies health effects associated with other, non-HAP emissions from EGUs such as SO_2, direct $PM_{2.5}$ and other $PM_{2.5}$ and ozone precursors. Because these pollutants are co-emitted with HAP, the controls necessary to reduce HAP emissions from EGUs often reduce these pollutants as well. After assessing all the evidence, the EPA concludes again (section III.A.7) that regulation of HAP emissions from EGUs under CAA section 112 greatly improves public health for Americans by reducing the risks of premature mortality from heart attacks, cancer, and neurodevelopmental delays in children, and by helping to restore economically vital ecosystems used for recreational and commercial purposes. Further, we conclude that these public health improvements will be particularly pronounced for certain segments of the American population that are especially vulnerable (*e.g.*, subsistence fishers[29] and their children) to impacts from EGU

[29] Subsistence fishers, who by definition obtain a substantial portion of their dietary needs from self-caught fish consumption, can experience elevated levels of exposure to chemicals that bioaccumulate in fish including, in particular, methylmercury. Subsistence fishing activity can be related to a number of factors including socio-economic status (poverty) and/or cultural practices, with ethnic minorities and tribal populations often displaying increased levels of self-caught fish consumption (Burger *et al.*, 2002, Shilling *et al.*, 2010, Dellinger 2004).

Burger J, (2002). *Daily consumption of wild fish and game: exposures of high end recreationalists*. International Journal of Environmental Health Research 12:4, p. 343-354.

Shilling F, White A, Lippert L, Lubell M, (2010). *Contaminated fish consumption in California's Central Valley Delta*. Environmental Research 110, p. 334-344.

Dellinger J, (2004). *Exposure assessment and initial intervention regarding fish consumption of tribal members in the Upper Great Lakes Region in the United States*. Environmental Research 95, p. 325-340.

HAP emissions. In addition, the concomitant reductions in co-emitted pollutants will also provide substantial public health and environmental benefits.

2. Overview of Health Effects Associated with Mercury and Non-Mercury HAP

In calling for the Agency to consider the regulation of HAP from EGUs, the CAA stipulated that the EPA complete three studies (all of which were extensively peer-reviewed) exploring various aspects of risk posed to human health and the environment by HAP released from EGUs. The first of these studies, the Utility Study, published in 1998, focused on the hazards to public health specifically associated with EGU-sourced HAP including, but not limited to, mercury. *See* CAA section 112(n)(1)(A). A second study, the Mercury Study, released in 1997, while focusing exclusively on mercury, was broader in scope including not only human health, but also environmental impacts and specifically addressed the potential for mercury released from multiple emissions sources (in addition to EGUs) to affect human health and the environment. *See* CAA section 112(n)(1)(B). The third study, required under CAA section 112(n)(1)(C), the NIEHS Study, submitted to Congress in 1995, considered the threshold level of mercury exposure below which adverse human health effects were not expected to occur. An additional fourth study, the NAS Study, directed by Congress in 1999 and completed in 2000, focused on determining whether a threshold for mercury health effects could be identified for sensitive populations and, as such, presented a rigorous peer review of the EPA's RfD for methylmercury. The aggregate results of these peer-reviewed studies commissioned by Congress as part of CAA section 112(n)(1) supported the determination that HAP emissions from EGUs represented a hazard to public health and the environment that would not be addressed through imposition of the other requirements of the CAA. In the 2 decades that followed, the EPA has

continued to conduct additional research and risk assessments and has surveyed the latest science related to the risk posed to human health and the environment by HAP released from EGUs.

a. Review of Health Effects and Previous Risk Analyses for Methylmercury

Mercury is a persistent and bioaccumulative toxic metal that, once released from power plants into the ambient air, can be readily transported and deposited to soil and aquatic environments where it is transformed by microbial action into methylmercury. *See* Mercury Study; 76 FR 24976 (May 3, 2011) (2011 NESHAP Proposal); 80 FR 75029 (December 1, 2015) (2015 Proposal). Methylmercury bioaccumulates in the aquatic food web eventually resulting in highly concentrated levels of methylmercury within the larger and longer-living fish, which can then be consumed by humans.[30] As documented in both the NAS Study and the Mercury Study, fish and seafood consumption is the primary route of human exposure to methylmercury, with populations engaged in subsistence-levels of consumption being of particular concern.[31] The NAS Study reviewed the effects of methylmercury on human health, concluding that it is highly toxic to multiple human and animal organ systems. Of particular concern is chronic prenatal exposure via maternal consumption of foods containing methylmercury. Elevated exposure has been associated with developmental neurotoxicity and manifests as poor performance on neurobehavioral tests, particularly on tests of attention, fine motor function, language, and visual-spatial ability. Evidence also suggests potential for adverse effects on the cardiovascular

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[30] We recognize that mercury deposition over land with subsequent impacts to agricultural-sourced food may also represent a public health concern, however as noted below, primary exposure to the U.S. population is through fish consumption.

[31] In light of the methylmercury impacts, the EPA and the Food and Drug Administration have collaborated to provide advice on eating fish and shellfish as part of a healthy eating pattern (*https://www.fda.gov/food/consumers/advice-about-eating-fish*). In addition, states provide fish consumption advisories designed to protect the public from eating fish from waterbodies within the state that could harm their health based on local fish tissue sampling.

system, adult nervous system, and immune system, as well as potential for causing cancer.[32] Below we review the broad range of public health hazards associated with methylmercury exposure.

Neurodevelopmental Effects of Exposure to Methylmercury. Methylmercury is a powerful neurotoxin. Because the impacts of the neurodevelopmental effects of methylmercury are greatest during periods of rapid brain development, developing fetuses and young children are particularly vulnerable. Children born to populations with high fish consumption (*e.g.*, people consuming fish as a dietary staple) or impaired nutritional status (*e.g.*, people with iron or vitamin C deficiencies) are especially vulnerable to adverse neurodevelopmental outcomes. These dietary and nutritional vulnerabilities are often particularly pronounced in underserved communities with minority populations and low-income populations that have historically faced economic and environmental injustice and are overburdened by cumulative levels of pollution.[33]

Infants in the womb can be exposed to methylmercury when their mothers eat fish and shellfish that contain methylmercury. This exposure can adversely affect unborn infants' growing brains and nervous systems. Children exposed to methylmercury while they are in the womb can have impacts to their cognitive thinking, memory, attention, language, fine motor skills, and visual spatial skills. Based on scientific evidence reflecting concern about a range of neurodevelopmental effects seen in children exposed *in utero* to methylmercury, the EPA defined an RfD of 0.0001 mg/kg-day for methylmercury.[34] An RfD is defined as an estimate

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[32] National Research Council. 2000. *Toxicological Effects of Methylmercury*. Washington, DC: The National Academies Press. *https://doi.org/10.17226/9899*.
[33] Burger J, 2002. *Daily consumption of wild fish and game: Exposures of high end recreationalists*. International Journal of Environmental Health Research 12:4, p. 343-354.
[34] U.S. EPA. 2001. *IRIS Summary for Methylmercury*. U.S. Environmental Protection Agency, Washington, DC. (USEPA, 2001).

(with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime (EPA, 2002).[35]

Prenatal exposure to methylmercury from maternal consumption of fish has been associated with several adverse neurodevelopmental outcomes in various fish consuming populations. Although data are limited, the EPA has focused on several subpopulations likely to be at higher risk from methylmercury exposure associated with EGU HAP due to fish consumption. As part of the 2011 Final Mercury TSD, the EPA completed a national-scale risk assessment focused on mercury emissions from domestic EGUs. Specifically, we examined risk associated with mercury released from U.S. EGUs that deposits to watersheds within the continental U.S., bioaccumulates in fish as methylmercury, and is consumed when fish are eaten by female subsistence fishers of child-bearing age and other freshwater self-caught fish consumers. There is increased risk for *in utero* exposure and adverse outcomes in children born to female subsistence fishers with elevated exposure to methylmercury. The risk assessment modeled scenarios representing high-end self-caught fish consumers active at inland freshwater lakes and streams. The analysis estimated that 29 percent of the watersheds studied would lead to female subsistence fishers having exposures which exceeded the methylmercury RfD, based on *in utero* effects, due in whole or in part to the contribution of domestic EGU emissions of mercury. This included up to 10 percent of modeled watersheds where deposition from U.S. EGUs alone leads to potential exposures that exceed the RfD.[36]

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[35] U.S. EPA. 2002. *A Review of the Reference Dose and Reference Concentration Processes*. EPA/630/P-02/002F, December 2002.

[36] The EPA chose this risk metric in part because CAA section 112(n)(1)(C) directed the NIEHS to develop a threshold for mercury concentration in fish tissue that can be consumed by even

In addition to the 2011 Final Mercury TSD focusing on subsistence fishers referenced above, the EPA also completed a RIA in 2011 including the characterization of benefits associated with the prospective reduction of U.S. EGU mercury emissions under MATS.[37] However, due to limitations on the available data with regard to the extent of subsistence fishing activity in the U.S., which prevented the enumeration of subsistence fisher populations, the EPA was unable to develop a quantitative estimate of the reduction in population-level risk or associated dollar benefits for children of female subsistence fishers. Instead, in the 2011 MATS RIA, the EPA focused on a different population of self-caught fish consumers that could be enumerated. Specifically, we quantitatively estimated the amount and value of IQ loss associated with prenatal methylmercury exposure among the children of recreational anglers consuming self-caught fish from inland freshwater lakes, streams and rivers (unlike subsistence fishers, available data allow the characterization of recreational fishing activity across the U.S. including enumeration of these populations). Although the EPA acknowledged uncertainty about the size of the affected population and acknowledged that it could be underestimated, these unborn children associated with recreational anglers represented precisely the type of sensitive population most at risk from mercury exposure that CAA section 112 is designed to protect. The results generated in the 2011 RIA for recreational anglers suggested that by reducing

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sensitive populations without adverse effect and because CAA section 112(c)(6) demonstrates a special interest in protecting the public from exposure to mercury.

[37] The 2011 MATS RfD-based risk assessment focusing on the subsistence fisher population was designed as a screening-level analysis to inform consideration for whether U.S. EGU-sourced mercury represented a public health hazard. As such, the most appropriate risk metric was modeled exposure (for highly-exposed subsistence fishers) compared to the RfD for methylmercury. By contrast, the 2011 RIA was focused on estimating the dollar benefits associated with MATS and as such focused on a health endpoint which could be readily enumerated and then monetized, which at the time was IQ for infants born to recreational anglers.

methylmercury exposure, MATS was estimated to yield an additional 511 IQ points among the affected population of children, which would increase their future lifetime earnings. The EPA noted at the time that the analysis likely underestimated potential benefits for children of recreational anglers since, due to data limitations, it did not cover consumption of recreationally caught seafood from estuaries, coastal waters, and the deep ocean which was expected to contribute significantly to overall exposure. Nevertheless, this single endpoint alone, evaluated solely for the recreational angler, provides evidence of potentially significant health harm from methylmercury exposure.

In 2011 we noted that other, more difficult to quantify endpoints may also contribute to the overall burden across a broader range of subgroups. The metrics studied in addition to IQ include those measured by performance on neurobehavioral tests, particularly on tests of attention, fine motor-function, language, and visual spatial ability (USEPA, 2001; Agency for Toxic Substances and Disease Registry (ATSDR), 1999).[38] Such adverse neurodevelopmental effects are well documented in cohorts of subsistence fisher populations (*i.e.*, Faroe Islands and the Nunavik region of Arctic Canada).

At this time, the EPA is conducting an updated methylmercury IRIS assessment and recently released preliminary assessment materials, an IRIS Assessment Plan (IAP) and Systematic Review Protocol for methylmercury.[39] The update to the methylmercury IRIS assessment will focus on updating the quantitative aspects of neurodevelopmental outcomes associated with methylmercury exposure. As noted in these early assessment materials, new studies are available, since 2001, assessing the effects of methylmercury exposure on cognitive

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[38] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. *Toxicological profile for mercury*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.
[39] *https://iris.epa.gov/ChemicalLanding/&substance_nmbr=73*.

function, motor function, behavioral, structural, and electrophysiological outcomes at various ages following prenatal or postnatal exposure to methylmercury (USEPA, 2001; NAS Study; 84 FR 13286 (April 4, 2019);[40] 85 FR 32037 (May 8, 2020)).[41]

Cardiovascular Impacts of Exposure to Methylmercury. The NAS Study indicated that there was evidence that exposure to methylmercury in humans and animals can have adverse effects on both the developing and adult cardiovascular system. Infant exposure in the womb to methylmercury has been associated with altered blood-pressure and heart-rate variability in children. In adults, dietary exposure to methylmercury has been linked to a higher risk of acute myocardial infarction (MI), coronary heart disease, or cardiovascular heart disease. To date, the EPA has not attempted to utilize a quantitative dose-response assessment for cardiovascular effects associated with methylmercury exposures because of a lack of consensus among scientists on the dose-response functions for these effects and inconsistency among available studies as to the association between methylmercury exposure and various cardiovascular system effects.

However, additional studies have become available that have increased the EPA's confidence in characterizing the dose-response relationship between methylmercury and adverse cardiovascular outcomes. These new studies were leveraged to inform new quantitative screening analyses (described in section III.A.3, below) to estimate one cardiovascular endpoint – incidence of MI mortality – that may potentially be linked to U.S. EGU mercury emissions as well as the number of U.S. EGU impacted watersheds. In addition to a new meta-analysis (Hu *et*

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[40] *Availability of the IRIS Assessment Plan for Methylmercury*. 84 FR 13286 (April 4, 2019).
[41] *Availability of the Systematic Review Protocol for the Methylmercury Integrated Risk Information System (IRIS) Assessment*. 85 FR 32037 (May 28, 2020).

al., 2021)[42] on the association of methylmercury generally with cardiovascular disease (CVD), stroke, and ischemic heart disease (IHD), there is a limited body of existing literature that has examined associations between mercury and various cardiovascular outcomes. These include acute MI, hypertension, atherosclerosis, and heart rate variability (Roman *et al.*, 2011).[43]

Immunotoxic Effects of Exposure to Methylmercury. Although exposure to some forms of mercury can result in a decrease in immune activity or an autoimmune response (ATSDR, 1999), evidence for immunotoxic effects of methylmercury is limited (NAS Study).

Other Mercury-Related Human Toxicity Data Including Potential Carcinogenicity. The Mercury Study noted that methylmercury is not a potent mutagen but is capable of causing chromosomal damage in a number of experimental systems. The NAS Study indicated that the evidence that human exposure to methylmercury causes genetic damage is inconclusive; it noted that some earlier studies showing chromosomal damage in lymphocytes may not have controlled sufficiently for potential confounders. One study of adults living in the Tapajos River region in Brazil (Amorim *et al.*, 2000)[44] reported a relationship between methylmercury concentration in hair and DNA damage in lymphocytes, as well as effects on chromosomes. Long-term methylmercury exposures in this population were believed to occur through consumption of fish,

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[42] Hu, X. F., Lowe, M., Chan, H.M., *Mercury exposure, cardiovascular disease, and mortality: A systematic review and dose-response meta-analysis*. Environmental Research 193 (2021),110538.

[43] Roman HA, Walsh TL, Coull BA, Dewailly É, Guallar E, Hattis D, Mariën K, Schwartz J, Stern AH, Virtanen JK, Rice G. *Evaluation of the cardiovascular effects of methylmercury exposures: current evidence supports development of a dose-response function for regulatory benefits analysis*. Environ Health Perspect. 2011 May;119(5):607-14. doi: 10.1289/ehp.1003012. Epub 2011 Jan 10.

[44] Amorim MI, Mergler D, Bahia MO, Dubeau H, Miranda D, Lebel J, Burbano RR, Lucotte M. *Cytogenetic damage related to low levels of methyl mercury contamination in the Brazilian Amazon*. An Acad Bras Cienc. 2000 Dec;72(4):497-507. doi: 10.1590/s0001-37652000000400004.

suggesting that genotoxic effects (largely chromosomal aberrations) may result from dietary, chronic methylmercury exposures similar to and above those seen in the populations studied in the Faroe Islands and Republic of Seychelles. Since 2000, more recent studies have evaluated methylmercury genotoxicity *in vitro* in human and animal cell lines and *in vivo* in rats.

Based on limited human and animal data, methylmercury is classified as a "possible human carcinogen" by the International Agency for Research on Cancer (IARC, 1993)[45] and in IRIS (USEPA, 2001). However, a quantitative estimate of the carcinogenic risk of methylmercury has not been assessed under the IRIS program at this time. Multiple human epidemiological studies have found no significant association between methylmercury exposure and overall cancer incidence, although a few studies have shown an association between methylmercury exposure and specific types of cancer incidence (*e.g.*, acute leukemia and liver cancer) (NAS Study).

Some evidence of reproductive and renal toxicity in humans from methylmercury exposure exists. However, overall, human data regarding reproductive, renal, and hematological toxicity from methylmercury are very limited and are based on studies of the two high-dose poisoning episodes in Iraq and Japan or animal data, rather than epidemiological studies of chronic exposures at the levels of interest in this analysis.

b. Review of Health Effects for Non-Mercury HAP

As noted earlier, EGUs are the largest source of HCl, HF, and selenium emissions, and are a major source of metallic HAP emissions including arsenic, chromium, nickel, cobalt, and

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[45] International Agency for Research on Cancer (IARC) Working Group on the Evaluation of Carcinogenic Risks to Humans. *Beryllium, Cadmium, Mercury, and Exposures in the Glass Manufacturing Industry*. Lyon (FR): International Agency for Research on Cancer; 1993. (IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, No. 58.) Mercury and Mercury Compounds. Available from: *https://www.ncbi.nlm.nih.gov/books/NBK499780*.

others. Exposure to these HAP, depending on exposure duration and levels of exposures, is associated with a variety of adverse health effects. These adverse health effects may include chronic health disorders (*e.g.*, irritation of the lung, skin, and mucus membranes; decreased pulmonary function, pneumonia, or lung damage; detrimental effects on the central nervous system; damage to the kidneys; and alimentary effects such as nausea and vomiting).

As of 2021, three of the key metal HAP emitted by EGUs (arsenic, chromium, and nickel) have been classified as human carcinogens, while three others (cadmium, selenium, and lead) are classified as probable human carcinogens. Overall (metal and non-metal), the EPA has classified four of the HAP emitted by EGUs as human carcinogens and five as probable human carcinogens. *See* 76 FR 25003–25005 (May 3, 2011) for a fuller discussion of the health effects associated with these pollutants.

As summarized in the *Supplement to the Non-Hg Case Study Chronic Inhalation Risk Assessment In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units* (2011 Non-Hg HAP Assessment),[46] the EPA previously completed a refined chronic inhalation risk assessment for 16 EGU case studies in order to assess potential public health risk associated with non-mercury HAP. The 16 case studies included one unit that used oil and 15 that used coal. As noted in the 2015 Proposal, this set of case studies was designed to include those facilities with potentially elevated cancer and non-cancer risk based on an initial risk screening of prospective EGU units completed utilizing the Human Exposure Model paired with HAP emissions data obtained from the 2005 National Emissions Inventory.

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[46] U.S. EPA. 2011. *Supplement to the Non-Hg Case Study Chronic Inhalation Risk Assessment In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units.* Office of Air Quality Planning and Standards. November. EPA–452/R–11–013. Docket ID Item No. EPA-HQ-OAR-2009-0234-19912.

For each of the 16 case study facilities, we conducted refined dispersion modeling with the EPA's AERMOD (American Meteorological Society/Environmental Protection Agency Regulatory Model) system to calculate annual ambient concentrations (*see* 2011 Non-Hg HAP Assessment). Average annual concentrations were calculated at census block centroids. We calculated the MIR for each facility as the cancer risk associated with a continuous lifetime (24 hours per day, 7 days per week, and 52 weeks per year for a 70-year period) exposure to the maximum concentration at the centroid of an inhabited census block, based on application of the unit risk estimate from the EPA's IRIS program. Based on estimated actual emissions, the highest estimated individual lifetime cancer risk from any of the 16 case study facilities was 20-in-1 million, driven by nickel emissions from the one case study facility with oil-fired EGUs. Of the facilities with coal-fired EGUs, five facilities had MIR greater than 1-in-1 million (the highest was 5-in-1 million), with the risk from four due to emissions of chromium VI and the risk from one due to emissions of nickel. There were also two facilities with coal-fired EGUs that had MIR equal to 1-in-1 million. Based on this analysis, the EPA concludes that cancer risks associated with these HAP emissions supports a finding that it is appropriate to regulate HAP emissions from EGUs.

c. Review of Other Adverse Environmental Effects Associated with EGU HAP Emissions

Ecological Effects of Methylmercury. Along with the human health hazards associated with methylmercury, it is well-established that birds and mammals are also exposed to methylmercury through fish consumption (Mercury Study). At higher levels of exposure, the harmful effects of methylmercury include slower growth and development, reduced reproduction, and premature mortality. The effects of methylmercury on wildlife are variable across species but have been observed in the environment for numerous avian species and

mammals including polar bears, river otters, and panthers. These adverse effects can propagate into impacts on human welfare to the extent they influence economies that depend on robust ecosystems (*e.g.*, tourism).

Ecological Effects of Acid Gas HAP. Even after the ARP was largely implemented in 2005, EGU sources comprised 82 percent of all anthropogenic HCl (a useful surrogate for all acid gas HAP) emissions in the U.S. When HCl dissolves in water, hydrochloric acid is formed. When hydrochloric acid is deposited by rainfall into terrestrial and aquatic ecosystems, it results in acidification of those systems. The MATS rule was expected to result in an 88 percent reduction in HCl emissions. As part of a recent Integrated Science Assessment (EPA, 2020),[47] the EPA concluded that the body of evidence is sufficient to infer a causal relationship between acidifying deposition and adverse changes in freshwater biota. Affected biota from acidification of freshwater include plankton, invertebrates, fish, and other organisms. Adverse effects can include physiological impairment, as well as alteration of species richness, community composition, and biodiversity in freshwater ecosystems. This evidence is consistent and coherent across multiple species. More species are lost with greater acidification.

3. Post-2016 Screening-Level Risk Assessments of Methylmercury Impacts

This section of the preamble describes three screening-level risk assessments completed since the 2016 Supplemental Finding that further strengthen the conclusion that U.S. EGU-sourced mercury represents a hazard to public health. These "screening-level" assessments are designed as broad bounding exercises intended to illustrate the potential scope and public health importance of methylmercury risks associated with U.S. EGU emissions. In some cases, they

[47] U.S. EPA. *Integrated Science Assessment (ISA) for Oxides of Nitrogen, Oxides of Sulfur and Particulate Matter Ecological Criteria* (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-20/278, 2020.

incorporate newer peer-reviewed literature that was not available to the Agency previously. Remaining uncertainties, however, prohibit the EPA from generating a more precise estimate at this time. Two of the three risk assessments focus on the potential for methylmercury exposure to increase the risk of MI-related mortality in adults and for that reason, section III.A.3.a begins by describing the methodology used in the analyses, including discussion of the concentration response (CR) function[48] for MI-related mortality and the incorporation of confidence cutpoints designed to address uncertainty. Then, the EPA describes an extension of the original watershed-level subsistence fisher methylmercury risk assessment to evaluate the potential for elevated MI-mortality risk among subsistence fishers (section III.A.3.b). In addition, a separate risk assessment is presented for elevated MI mortality among all adults utilizing a bounding approach that explores potential risks associated with exposure of the general U.S. population to methylmercury (sourced from U.S. EGUs) through fish consumption (section III.A.3.c). Finally, focusing on neurodevelopmental outcomes, another bounding analysis is presented that focuses on the risk of IQ points loss in children exposed *in utero* through maternal fish consumption by the population of general U.S. fish consumers (section III.A.3.d). Each of these analyses quantify potential impacts on incidence of adverse health effects. Section III.A.4 provides illustrative examples of how these incidence estimates translate to monetized benefits.

a. Methodology for Estimating MI-Mortality

[48] Concentration-response functions relate levels of exposure for the chemical of interest to the probability or rate of response for the adverse health outcome in the exposed individual or population. Typically these mathematical relationships are based on data obtained either from human epidemiology studies, clinical studies, or toxicological (animal) studies. In this case, CR functions for MI-related mortality are based on epidemiology studies as discussed further below.

This section describes the methodology used in the new screening-level risk assessments related to mortality, including the EPA's application of a CR function characterizing the relationship between increased MI-mortality and methylmercury exposure. As discussed further in the 2021 Risk TSD,[49] which is contained in the docket for this action, the approach draws on recommendations provided by an expert panel convened by the EPA in 2010 to evaluate the cardiovascular effects associated with methylmercury exposure (the findings of the expert panel were summarized as a peer-reviewed paper, Roman *et al.*, 2011). The panel "found the body of evidence exploring the link between [methylmercury] and acute myocardial infarction (MI) to be sufficiently strong to support its inclusion in future benefits analyses, based both on direct epidemiological evidence of [a methylmercury]–MI link and on [methylmercury's] association with intermediary impacts that contribute to MI risk." Given the likely mechanism of action associated with MI, the panel further recommended that either hair-mercury or toenail-mercury be used as an exposure metric because both reflect a longer-term pattern of exposure. Regarding the shape of the CR function, the panel noted that the EURAMIC study (Guallar *et al.*, 2002)[50] had identified a log-linear model form with log-of exposure providing the best fit using toenail mercury as the biomarker of exposure. The panel also discussed the issue of potential effect

[49] U.S. EPA. 2021. *National-Scale Mercury Risk Estimates for Cardiovascular and Neurodevelopmental Outcomes for the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units – Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding; Notice of Proposed Rulemaking*.

[50] Guallar E, Sanz-Gallardo MI, van't Veer P, Bode P, Aro A, Gómez-Aracena J, Kark JD, Riemersma RA, Martín-Moreno JM, Kok FJ; Heavy Metals and Myocardial Infarction Study Group. *Mercury, fish oils, and the risk of myocardial infarction*. N Engl J Med. 2002 Nov 28;347(22):1747-54. doi: 10.1056/NEJMoa020157.

modification by cardioprotective compounds including polyunsaturated fatty acids (PUFA).[51] KIHD and EURAMIC datasets "provide the strongest and most useful data sets for quantifying methylmercury-related incidence of MI." However, the panel did note the disconnect between typical levels of exposure to methylmercury in the U.S. population and the relatively higher levels of exposure reflected in the two recommended epidemiology studies (KIHD and EURAMIC). Therefore, the panel suggested that consideration be given to restricting modeling MI mortality to those with higher concentrations reflecting the levels of exposure found in the two key epidemiology studies (corresponding to roughly 75th to 95th percentile hair-mercury levels for U.S. women of child-bearing age, as characterized in National Health and Nutrition Examination Survey (NHANES) data and referenced by the panel).

In the intervening period since the release of the expert panel's findings in 2011 (Roman *et al.*, 2011), the EPA has continued to review literature characterizing the relationship between methylmercury exposure and cardiovascular effects. While the EPA has not yet conducted a systematic review, two recent studies are of particular interest for quantifying the potential relationship between U.S. EGU mercury emissions and acute MI that informed a modeling approach. Giang and Selin (2016)[52] presented an approach for modeling MI mortality reflecting a number of the recommendations presented in Roman *et al.*, 2011 including the use of the KIHD and EURAMIC studies as the basis for a CR function including both the log-linear functional

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[51] Virtanen JK, Voutilainen S, Rissanen TH, Mursu J, Tuomainen TP, Korhonen MJ, Valkonen VP, Seppänen K, Laukkanen JA, Salonen JT. *Mercury, fish oils, and risk of acute coronary events and cardiovascular disease, coronary heart disease, and all-cause mortality in men in eastern Finland*. Arterioscler Thromb Vasc Biol. 2005 Jan;25(1):228-33. doi: 10.1161/01.ATV.0000150040.20950.61. Epub 2004 Nov 11.

[52] Giang A, Selin NE. *Benefits of mercury controls for the United States*. Proc Natl Acad Sci U S A. 2016 Jan 12;113(2):286-91. doi: 10.1073/pnas.1514395113. Epub 2015 Dec 28.

form and the effect estimate derived from the KIHD study results. A second study, Hu *et al.* 2021,[53] presented a meta-analysis looking at the relationship between methylmercury exposure and mortality. That paper utilized eight studies each determined to be of good quality and reflecting at a minimum, adjustments for age, sex, and n-3 PUFA in specifying dose-response relationships. Historically, studies which account for n-3 PUFA have assumed a linear relationship between PUFAs and risk of MI (Roman *et al.*, 2011). However, the association between PUFA intake and cardiovascular risk may not be linear (Mozaffarian and Rimm, 2006).[54] The potential for confounding and effect modification by PUFA and selenium makes it difficult to interpret the relationship between methylmercury and MI, particularly at lower doses where there is potential for masking of methylmercury toxicity. The results of the meta-analysis by Hu *et al.*, 2021 illustrated this phenomenon with their J-shaped functions for both IHD and CVD, both of which showed an initial region of negative slope (diminishing net risk with methylmercury exposure) before reaching an inflection point (between 1 and 2 microgram per gram (μg/g) hair-mercury depending on the endpoint) where the function turns positive (increasing risk).

For the EPA's new screening-level assessment, we have considered the recommendations presented in Roman *et al.*, 2011, as well as the J-shaped functions presented in Hu *et al.*, 2021, and their implications for considering overall confidence in specifying the relationship between cardiovascular-related mortality and methylmercury exposure. In particular, the EPA has higher

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[53] Hu XF, Lowe M, Chan HM. *Mercury exposure, cardiovascular disease, and mortality: A systematic review and dose-response meta-analysis*. Environ Res. 2021 Feb;193:110538. doi: 10.1016/j.envres.2020.110538. Epub 2020 Dec 5.

[54] Mozaffarian D, Rimm EB. *Fish intake, contaminants, and human health: evaluating the risks and the benefits*. JAMA. 2006 Oct 18;296(15):1885-99. doi: 10.1001/jama.296.15.1885. Erratum in: JAMA. 2007 Feb 14;297(6):590.

confidence in the log-linear relationship at levels of hair-mercury exposure above the selected confidence cutpoints. In specifying these confidence cutpoints (for modeling MI mortality) we have looked to recommendations presented in Roman *et al.*, 2011, specifically that we consider modeling risk for levels of exposure reflected in the EURAMIC and KIHD studies (with these equating to roughly 0.66 and 1.9 μg/g hair-mercury, respectively, or approximately the 75th-95th percentile of hair-mercury levels seen in women of childbearing age in available 1999-2000 NHANES survey data[55]). Further, we note that these confidence cutpoints roughly match the inflection point for IHD and CVD seen in the J-shaped plot presented in Hu *et al.*, 2021, which further supports their use in defining regions of methylmercury exposure above which we have increased confidence in modeling MI mortality. However, as noted earlier, we are not concluding here that there is an absence of risk below these cutpoints, as such conclusions would require a weight of the evidence analysis and subsequent independent peer review. Rather, we are less confident in our ability to specify the nature of the CR function in those lower exposure regions due to possible effect modification and/or confounding by PUFA and/or selenium. Therefore, in applying the CR function in modeling MI mortality, we included a set of three functions–two including the cutpoints described above and a third no-cutpoint version of the function reflecting the assumption that risk extends across the entire range of methylmercury exposure. In terms of the other elements of the CR function (shape and effect estimate), we have also followed the advice presented in Roman *et al.*, 2011, as further illustrated through the analysis published by

[55] NHANES has not continued to collect hair-mercury data in subsequent years since the NHANES dataset referenced here. While NHANES has continued with total blood-mercury monitoring, hair mercury is a better biomarker for characterizing methylmercury exposure over time. Given that the CR functions based on the KIHD study (as well as observations presented in Roman *et al.* 2011 regarding cardio-modeling) were all based on hair-mercury, this was chosen as the anchoring analytical biometric. The potential for bias due to the use of the 1999-2000 NHANES data is further discussed in the 2021 Risk TSD.

Giang and Selin 2016, and utilized a log-linear form and an effect estimate of 0.10 for MI mortality obtained from the KIHD study (*see* 2021 Risk TSD). As with the other risk estimates presented for methylmercury, these estimates reflect the baseline for U.S. EGUs prior to implementation of MATS (*i.e.*, 29 tons).

b. Increased MI-Mortality Risk in Subsistence Fishers Exposed to Methylmercury

This screening-level analysis of MI -mortality risk is an extension of the female subsistence-fisher-based at-risk watershed analysis originally completed as part of the 2011 risk assessment supporting the appropriate and necessary determination (USEPA, 2011) and documented in the 2011 Final Mercury TSD. In that original analysis, a series of female subsistence fisher risk scenarios was evaluated for a subset of 3,141 watersheds within the continental U.S. for which there were sampled methylmercury fish tissue data (that fish tissue data allowing a higher-confidence empirically-based assessment of methylmercury risk to be generated for those watersheds). For each watershed, we used the fish tissue methylmercury data to characterize total mercury-related risk and then we estimated the portion of that total risk attributable to U.S. EGUs (based on the fraction of total mercury deposition to those watersheds associated with U.S. EGU emissions as supported by the Mercury Maps approach, USEPA, 2011).[56]

We have now extended the at-risk watershed analysis completed in 2011 for the subsistence fisher scenarios to include an assessment of the potential for increased MI mortality

[56] A detailed discussion of the Mercury Maps approach (establishing a proportional relationship between mercury deposition and methylmercury concentrations in fish at the watershed level) is presented in section 1.4.6.1 of the 2011 Final Mercury TSD which in turn references: *Mercury Maps - A Quantitative Spatial Link Between Air Deposition and Fish Tissue Peer Reviewed Final Report*. U.S. EPA, Office of Water, EPA-823-R-01-009, September, 2001.

risk.[57] Specifically, we have utilized the U.S. EGU-attributable methylmercury exposure estimates (µg/kg-day methylmercury intake) generated for the subsistence fisher scenario in each watershed to generate equivalent hair-mercury exposure estimates for that subsistence fisher scenario in each watershed (*see* 2021 Risk TSD for additional detail on the conversion of daily methylmercury intake rates into hair-mercury levels). We then compare those hair-mercury levels to the confidence cutpoints developed for the MI mortality screening-level risk assessment described above in section III.A.3.a. If the hair-mercury level for a particular watershed is above either the EURAMIC or KIHD confidence cutpoint (*i.e.*, above 0.66 and 1.9 µg/g hair-mercury, respectively), then we consider that watershed to be at increased risk for MI mortality exclusively due to that U.S. EGU-attributable methylmercury exposure.[58] Note, that this is not to suggest that exposures at watersheds where U.S. EGU-attributable contributions are below these cutpoints are without risk, but rather that when exposure levels exceed these cutpoints, we have increased confidence in concluding there is an increased risk of MI mortality for subsistence fishers active within that watershed. It is also important to note that in many cases, total methylmercury exposure (*i.e.*, EGU contribution plus contributions from other sources) may exceed these confidence cutpoints such that subsistence fishers active at those watersheds would be at increased risk of MI mortality at least in part due to EGU emissions. *See White Stallion*, 748 F.3d at 1242-43 (finding reasonable the EPA's decision to consider cumulative impacts of

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[57] Note that while the 2011 Final Mercury TSD, in utilizing an RfD-based approach reflecting neurodevelopmental effects, focused on female subsistence fishers; the analysis focused on MI-mortality risk covers all adult subsistence fishers, and we use our cutpoint bounding analysis because there is not an RfD focused specifically on cardiovascular effects for methylmercury.

[58] Although we have used the MI-mortality CR function described in section III.A.3.a of this preamble to generate mortality incidence estimates for the general fish consuming population (*see* section III.A.3.c), this is not possible for subsistence fishers since we are not able at this point to enumerate them. Consequently, we use the confidence cutpoints associated with that CR function to identify exposures associated with MI mortality risk as described here.

HAP from EGUs and other sources in determining whether HAP emissions from EGUs pose a hazard to public health under CAA section 112(n)(1)(A)); *see also* CAA section 112(n)(1)(B) (directing the EPA to study the cumulative impacts of mercury emissions from EGUs and other domestic stationary sources of mercury).

Table 3 of the 2021 Risk TSD presents the results of the analysis of risk for MI-mortality for the subsistence fisher scenarios. As with the original RfD-based risk estimates, these results are dimensioned on two key parameters (*self-caught fish consumption rate* and *the watershed percentile exposure level - hair-mercury µg/g*). Those watershed percentile hair-mercury values that exceed the EURAMIC-based MI mortality confidence cutpoints (0.66 µg/g hair-mercury) are shaded in the table and those cells that also exceed the KIHD-based MI mortality confidence cutpoint (1.9 µg/g hair-mercury) are bolded. Once again, these thresholds identify levels of methylmercury exposure (hair-mercury) associated with a clear association with MI-related health effects (*i.e.*, increased risk). Unlike the RfD-based risk estimates, for MI-mortality estimates we only focus on U.S. EGU-attributable methylmercury (*i.e.*, whether U.S. EGU-attributable hair-mercury exceeds the cutpoints of interest).

Results for the typical subsistence fisher, representing high-end self-caught fish consumption in the U.S. population, suggest that up to 10 percent of the watersheds modeled are associated with hair-mercury levels (due to U.S. EGU mercury emissions alone) that exceed the lower EURAMIC cutpoint for MI-mortality risk, with 1 percent of modeled watersheds also exceeding the KIHD cutpoint (due to U.S. EGU-mercury emissions alone). For low-income Black subsistence fishers active in the Southeast, up to 25 percent of the watersheds exceed the lower EURAMIC confidence threshold (assuming the highest rate of fish consumption), with

only the upper 1 percent of watersheds exceeding the KIHD threshold (again based only on U.S. EGU-sourced mercury exposure).

c. Characterization of MI-Mortality Risk for the General U.S. Population Resulting from the Consumption of Commercially-Sourced Fish

The second of the three new screening-level risk analyses estimates the incidence of MI mortality in the general U.S. population resulting from consumption of commercially-sourced fish containing methylmercury emitted from U.S. EGUs.[59] This is accomplished by first estimating the total burden of methylmercury-related MI mortality in the U.S. population and then estimating the fraction of that total increment attributable to U.S. EGUs. The task of modeling this health endpoint can involve complex mechanistic modeling of the multi-step process leading from U.S. EGU mercury emissions to mercury deposition over global/regional fisheries to bioaccumulation of methylmercury in fisheries stocks to exposure of U.S. fish consumers through consumption of those commercially-sourced fish (*e.g.*, Giang and Selin, 2016). However, in recognition of the uncertainty associated with attempting to model this more complex multi-step process, we have instead developed a simpler screening analysis approach intended to generate a range of risk estimates that reflects the impact of critical sources of uncertainty associated with this exposure scenario. Rather than attempting to generate a single high-confidence estimate of risk, which in our estimation is challenging given overall uncertainty associated with this exposure pathway, the goal with the bounding approach is simply to

[59] Although the analysis presented here focuses on methylmercury exposure associated with fish consumption which, as noted earlier, is the primary source of methylmercury exposure for the U.S. population, EGU mercury deposited to land can also impact other food sources including those associated with agricultural production (*e.g.*, rice). In the context of fish consumption, commercially-sourced fish refers to fish consumed in restaurants or from food stores.

generate a range of risk estimates for MI mortality that furthers our understanding of the significant public health burden associated with EGU HAP emissions.

The bounding approach developed for this particular scenario is based on the assumption that fish sourced from global commercial fisheries are loaded by mercury deposited to those fisheries and that the fraction of that deposited mercury originating from U.S. EGUs will eventually be reflected as a fraction of methylmercury in those fish and subsequently as a fraction of MI mortality risk associated with those U.S. EGUs. One of the challenges associated with this screening analysis is how to attribute domestic EGU contributions to global fisheries and how that might vary from location to location. For simplicity, the bounding analysis includes two assumptions: (1) A potential lower-bound reflecting the assumption that U.S. fish consumption is largely sourced from global fisheries and consequently the U.S. EGU contribution to total global mercury emissions (anthropogenic and natural) can be used to approximate the U.S. EGU fractional contribution to MI mortality and (2) a potential upper-bound where we assume that fisheries closer to U.S. EGUs (*e.g.*, within the continental U.S. or just offshore and/or along the U.S. Atlantic and Pacific coastlines) supply most of the fish and seafood consumed within the U.S., and therefore U.S. EGU average deposition over the U.S. (as a fraction of total mercury deposition) can be used to approximate the U.S. EGU fractional contribution to MI mortality (*see* 2021 Risk TSD for more detail).[60] The EPA is continuing to review the literature (including consideration of research by FDA) to better define the relative

[60] Another way of stating this is that the lower-bound estimate reflects an assumption that U.S. EGU mercury is diluted as part of a global pool and impacts commercial fish sourced from across the globe (with lower levels of methylmercury contribution) while the upper-bound estimate reflects a focus on more near-field regional impacts by U.S. EGU mercury to fish sourced either within the continental U.S. or along its coastline (with greater relative contribution to methylmercury levels).

contributions for sources of fish consumed within the U.S. Note that the bounding analysis also includes consideration for another key source of uncertainty, namely, the specification of the CR function linking methylmercury exposure to increased MI mortality and, in particular, efforts to account for increased confidence in specifying the CR function for higher levels of methylmercury exposure through the use of confidence cutpoints (section III.A.3.a). Additional detail on the stepwise process used to first generate the total U.S. burden of MI-mortality related to total methylmercury exposure and then apportion that total risk estimate to the fraction contributed by U.S. EGUs is presented the 2021 Risk TSD. Based on the 29 tons of mercury emitted by U.S. EGUs prior to implementation of MATS, the bounding estimates from the fraction of total mercury deposition attributable to U.S. EGUs at the global scale is 0.48 percent (lower bound) and 1.8 percent (upper bound). These estimated bounding percentages are important since they have a significant impact on the overall incidence of MI mortality ultimately attributable to U.S. EGU-sourced mercury.

Reflecting both the spread in the apportionment of U.S. EGU-sourced mercury (as described above) and application of the three possible applications of the CR function for MI mortality (no confidence-cutpoint, KIHD cutpoint, EURAMIC cutpoint), the estimated MI-mortality attributable to U.S. EGU-sourced mercury for the general U.S. population associated primarily with consumption of commercially-sourced fish ranges from 5 to 91 excess deaths each year.[61] For those Americans with high levels of methylmercury in their body (*i.e.*, above certain cutpoints), the science suggests that any additional increase in methylmercury exposure will raise the risk of fatal heart attacks. Based on this screening analysis, even after imposition of

[61] Inclusion of 95th percentile confidence intervals for the effect estimate used in modeling MI mortality extends this range to from 3 to 143 deaths (reflecting the 5th percentile associated with the 5 lower bound estimate to the 95th percentile for the upper bound estimate of 91).

the ARP and other CAA criteria pollutant requirements that also reduce HAP emissions from domestic EGU sources, we find that mercury emissions from EGUs pose a risk of premature mortality due to MI.

d. Characterization of IQ loss for Children Born to Mothers in the General U.S. Population Resulting from the Consumption of Commercially Sourced Fish (and Other Food Items Containing Methylmercury)

The third new screening-level risk analysis estimates the incidence of IQ loss in children in the general U.S. population resulting from maternal consumption of commercially sourced fish containing methylmercury attributable to U.S. EGUs (resulting in subsequent prenatal exposure to methylmercury). The approach used in estimating incidence of this adverse health effect shares several elements with the approach described above for modeling MI mortality in the general U.S. population, including in particular, the method used to apportion the total methylmercury-related health burden to the fraction associated with U.S. EGU mercury emissions (*e.g.*, use of lower and upper bound estimates of the fractional contribution of domestic EGU sources). Other elements of the modeling approach, including the specification of the number of children born annually in the U.S., the specification of maternal baseline hair-mercury levels (utilizing NHANES data) and the characterization of the linkage between methylmercury exposure (*in utero*) and IQ loss, are based on methods used in the original 2011 benefits analysis completed for MATS (USEPA, 2011) and are documented in the 2021 Risk TSD.

As with the MI-mortality estimates described earlier, the two bounding estimates for the fraction of total mercury deposition attributable to U.S. EGUs at the global and regional scales (0.48 percent and 1.8 percent, respectively) have a significant impact on the overall magnitude of

IQ points lost (for children born to the general U.S. population) which are ultimately attributable to U.S. EGUs. However, the EPA has relatively high confidence in modeling this endpoint due to greater confidence in the IQ loss CR function. The range in IQ points lost annually due to U.S. EGU-sourced mercury is estimated at 1,600 to 6,000 points, which is distributed across the population of U.S. children covered by this analysis.[62] Given variation in key factors related to maternal methylmercury exposure, it is likely that modeled IQ loss will not be uniformly distributed across the population of exposed children and may instead, display considerable heterogeneity.[63] The bounding analysis described here was not designed to characterize these complex patterns of heterogeneity in IQ loss across the population of children simulated and we note that such efforts would be subject to considerable uncertainty. However, it does provide evidence of specific adverse outcomes with real implications to those affected. Even small degradations in IQ in the early stages of life are associated with diminished future outcomes in education and earnings potential.

4. Most HAP Benefits Cannot Be Quantified or Monetized

Despite the array of adverse health and environmental risks associated with HAP emissions from U.S. coal- and oil-fired EGUs documented above, as the above discussion demonstrates, it can be technically challenging to estimate the extent to which EGU HAP emissions will result in adverse effects quantitively across the U.S. population absent regulation.

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[62] Inclusion of 95th percentile confidence intervals for the effect estimate used in modeling this endpoint extends this range to from 80 to 12,600 IQ points lost (reflecting the 5th and 95th percentiles).

[63] Maternal exposure (and hence IQ impacts to children) from U.S. EGU-sourced mercury can display considerable variation due to (a) spatial patterns of U.S. EGU mercury fate and transport (including deposition and methylation) which affects impacts on fish methylmercury and (b) variations in fish consumption by mothers (including differences in daily intake, types of fish consumed and geographical origins of that fish).

In fact, the vast majority of the post-control benefits of reducing HAP cannot be quantified or monetized with sufficient quality to inform regulatory decisions due to data gaps, particularly with respect to sensitive populations. But that does not mean that these benefits are small, insignificant, or nonexistent. There are numerous unmonetized effects that contribute to additional benefits realized from emissions reductions. These include additional reductions in neurodevelopmental and cardiovascular effects from exposure to methylmercury, adverse ecosystem effects including mercury-related impacts on recreational and commercial fishing, health risks from exposure to non-mercury HAP, and health risks in EJ subpopulations that face disproportionally high exposure to EGU HAP.

Congress well understood the challenges in monetizing risks. As discussed in section II.B above, the statutory language in CAA section 112 clearly supports a conclusion that the intended benefit of HAP regulation is a reduction in the volume of HAP emissions to reduce assumed and identified risks from HAP with the goal of protecting even the most exposed and most sensitive members of the population. The statute requires the EPA to move aggressively to quickly reduce and eliminate HAP, placing high value on doing so in the face of uncertainty regarding the full extent of harm posed by hazardous pollutants on human health and welfare. The statute also clearly places great value on protecting even the most vulnerable members of the population, by instructing the EPA, when evaluating risk in the context of a determination of whether regulation is warranted, to focus on risk to the most exposed and most sensitive members of the population. *See, e.g.,* CAA sections 112(c)(9)(B), 112(f)(2)(B), and 112(n)(1)(C). For example, in evaluating the potential for cancer effects associated with emissions from a particular source category under CAA section 112(f)(2), the EPA is directed by Congress to base its determinations on the maximum individual risk (MIR) to the most highly exposed individual living near a source.

Similarly, in calculating the potential for non-cancer effects to occur, the EPA evaluates the impact of HAP to the most exposed individual and accounts for sensitive subpopulations.

Notably, Congress in CAA section 112 did not require the EPA to quantify risk across the entire population, or to calculate average or "typical" risks. The statutory design focusing on maximum risk to individuals living near sources acknowledges the inherent difficulty in enumerating HAP effects, given the large number of pollutants and the uncertainties associated with those pollutants, as well as the large number of sources emitting HAP. However, this does not mean that these effects do not exist or that society would not highly value these reductions, despite the fact that the post-control effects of the reductions generally cannot be quantified. The EPA has long acknowledged the difficulty of quantifying and monetizing HAP benefits. In March 2011, the EPA issued a report on the post-control benefits and costs of the CAA. This Second Prospective Report[64] is the latest in a series of EPA studies that estimate and compare the post-control benefits and costs of the CAA and related programs over time. Notably, it was the first of these reports to include any attempt to quantify and monetize the impacts of reductions in HAP, and it concentrated on a small case study for a single pollutant, entitled "Air Toxics Case Study – Health Benefits of Benzene Reductions in Houston, 1990-2020." As the EPA summarized in the Second Prospective Report, "[t]he purpose of the case study was to demonstrate a methodology that could be used to generate human health benefits from CAAA controls on a single HAP in an urban setting, while highlighting key limitations and uncertainties in the process. …Benzene was selected for the case study due to the availability of human epidemiological studies linking its exposure with adverse health effects." (pg. 5-29). In

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[64] U.S. EPA Office of Air and Radiation, April 2011. *The Benefits and Costs of the Clean Air Act from 1990 to 2020*, Final Report – Rev. A. Available at *https://www.epa.gov/sites/production/files/2015-07/documents/fullreport_rev_a.pdf.*

describing the approach, the EPA noted: "[b]oth the Retrospective analysis and the First Prospective analysis omitted a quantitative estimation of the benefits of reduced concentrations of air toxics, citing gaps in the toxicological database, difficulty in designing population-based epidemiological studies with sufficient power to detect health effects, limited ambient and personal exposure monitoring data, limited data to estimate exposures in some critical microenvironments, and insufficient economic research to support valuation of the types of health impacts often associated with exposure to individual air toxics." (pg. 5-29). These difficulties have long hindered the Agency's ability to quantify post-control HAP impacts and estimate the monetary benefits of HAP reductions.

In preparing the benzene case study for inclusion in the Second Prospective Report, the Agency asked the Advisory Council on Clean Air Compliance Analysis (the Council) to review the approach. In its 2008 consensus advice to the EPA after reviewing the benzene case study,[65] the Council noted that "Benzene… has a large epidemiological database which OAR used to estimate the health benefits of benzene reductions due to CAAA controls. The Council was asked to consider whether this case study provides a basis for determining the value of such an exercise for HAP benefits characterization nationwide." They concluded:

> As recognized by OAR, the challenges for assessing progress in health improvement as a result of reductions in emissions of hazardous air pollutants (HAPs) are daunting. Accordingly, EPA has been unable to adequately assess the economic benefits associated with health improvements from HAP reductions due to a lack of exposure-response functions, uncertainties in emissions inventories and background levels, the difficulty of extrapolating risk estimates to low doses and the challenges of tracking health progress for diseases, such as cancer, that have long latency periods. …
>
> The benzene case study successfully synthesized best practices and implemented the standard damage function approach to estimating the benefits of

[65] U.S. EPA Advisory Council on Clean Air Act Compliance Analysis, Review of the Benzene Air Toxics Health Benefits Case Study. July 11, 2008. Available at *https://nepis.epa.gov/Exe/ZyPDF.cgi/P1000ZYP.PDF?Dockey=P1000ZYP.PDF.*

> reduced benzene, however the Council is not optimistic that the approach can be repeated on a national scale or extended to many of the other 187 air toxics due to insufficient epidemiological data. With some exceptions, it is not likely that the other 187 HAPs will have the quantitative exposure-response data needed for such analysis. Given EPA's limited resources to evaluate a large number of HAPs individually, the Council urges EPA to consider alternative approaches to estimate the benefits of air toxics regulations.

In addition to the difficulties noted by the Council, there are other challenges that affect the EPA's ability to fully characterize post-control impacts of HAP on populations of concern, including sensitive groups such as children or those who may have underlying conditions that increase their risk of adverse effects following exposure to HAP. Unlike for criteria pollutants such as ozone and PM, the EPA lacks information from controlled human exposure studies conducted in clinical settings which enable us to better characterize dose-response relationships and identify subclinical outcomes. Also, as noted by the Council and by the EPA itself in preparing the benzene case study, the almost universal lack of HAP-focused epidemiological studies is a significant limitation. Estimated risks reported in epidemiologic studies of fine PM ($PM_{2.5}$) and ozone enable the EPA to estimate health impacts across large segments of the U.S. population and quantify the economic value of these impacts. Epidemiologic studies are particularly well suited to supporting air pollution health impact assessments because they report measures of population-level risk that can be readily used in a risk assessment.

However, such studies are infrequently performed for HAP. Exposure to HAP is typically more uneven and more highly concentrated among a smaller number of individuals than exposure to criteria pollutants. Hence, conducting an epidemiologic study for HAP is inherently more challenging; for starters, the small population size means such studies often lack sufficient statistical power to detect effects. For example, in the case of mercury, the most exposed and most sensitive members of the population may be both small and highly

concentrated, such as the subsistence fishers that the EPA has identified as likely to suffer deleterious effects from U.S. EGU HAP emissions. While it is possible to estimate the potential risks confronting this population in a case-study approach (an analysis that plays an important role in supporting the public health hazard determination for mercury as discussed above in sections III.A.2 and III.A.3), it is not possible to translate these risk estimates into post-control quantitative population-level impact estimates for the reasons described above.

Further, for many HAP-related health endpoints, the Agency lacks economic data that would support monetizing HAP impacts, such as willingness to pay studies that can be used to estimate the social value of avoided outcomes like heart attacks, IQ loss, and renal or reproductive failure. In addition, the absence of socio-demographic data such as the number of affected individuals comprising sensitive subgroups further limits the ability to monetize HAP-impacted effects. All of these deficiencies impede the EPA's ability to quantify and monetize post-control HAP-related impacts even though those impacts may be severe and/or impact significant numbers of people.

Though it may be difficult to quantify and monetize most post-control HAP-related health and environmental benefits, this does not mean such benefits are small. The nature and severity of effects associated with HAP exposure, ranging from lifelong cognitive impairment to cancer to adverse reproductive effects, implies that the economic value of reducing these impacts would be substantial if they were to be quantified completely. By extension, it is reasonable to expect both that reducing HAP-related incidence affecting individual endpoints would yield substantial benefits if fully quantified, and moreover that the total societal impact of reducing HAP would be quite large when evaluated across the full range of endpoints. In judging it appropriate to regulate based on the risks associated with HAP emissions from U.S. EGUs, the

EPA is placing weight on the likelihood that these effects are significant and substantial, as supported by the health evidence. The EPA's new screening-level analyses laid out in the Risk TSD for this proposal illustrate this point. Specifically, in exploring the potential for MI-related mortality risk attributable to mercury emissions from U.S. EGUs, the EPA's upper bound estimate is that these emissions may contribute to as many as 91 additional premature deaths each year. The value society places on avoiding such severe effects is very high; as the EPA illustrates in the valuation discussion in the 2021 Risk TSD, the benefit of avoiding such effects could approach $720 million per year. Similarly, for IQ loss in children exposed *in utero* to U.S. EGU-sourced mercury, our upper bound estimate approaches 6,000 IQ points lost which could translate into a benefit approaching $50 million per year.

These estimates are intended to illustrate the point that the HAP impacts are large and societally meaningful, but not to suggest that they are even close to the full benefits of reducing HAP. There are many other unquantified effects of reducing EGU HAP that would also have substantial value to society. As described above, mercury alone is associated with a host of adverse health and environmental effects. The statute clearly identifies this basket of effects as a significant concern in directing the EPA to study them specifically. If the EPA were able to account for all of these post-control effects in our quantitative estimates, the true benefits of MATS would be far clearer. However, available data and methods currently preclude a full quantitative accounting of the post-control impacts of reducing HAP emissions from U.S. EGUs and a monetization of these impacts.

There are other aspects of social willingness to pay that are not accounted for in the EPA's quantitative estimate of benefits either. For example, in previous MATS-related rulemakings and analysis, the EPA has not estimated what individuals would be willing to pay in

order to reduce the exposure of *others* who are exposed (even if they are not experiencing high levels of HAP exposure themselves). These may be considered and quantified as benefits depending on whether it is the health risks to others in particular that is motivating them.[66] For example, Cropper *et al*. (2016) found that focus group participants indicated a preference for more equitable distribution of health risks than for income, which indicates that it is specifically the risks others face that was important to the participants.[67] This result is particularly important as exposure to HAP is often disproportionately borne by underserved and underrepresented communities (Bell and Ebisu, 2012).[68] Unfortunately, studies to quantify the willingness to pay for a more equitable distribution of HAP exposures are limited, so quantification of this benefit likely cannot be performed until new research is conducted.

The HAP-related legislative history for the 1990 Amendments includes little discussion of the monetized benefits of HAP, perhaps due to these attendant difficulties. When such monetized benefits were estimated in several outside reports submitted to Congress before passage of the 1990 Amendments, the estimates were based on reduced cancer deaths and the value of the benefits that are quantified were estimated to be small as compared to the estimated costs of regulating HAP emissions under CAA section 112. *See, e.g., A Legislative History of the Clean Air Act Amendments of 1990*, Vol. I at 1366-67 (November 1993) (estimating the total annual cost of CAA section 112 to be between $6 billion and $10 billion per year and the

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[66] Jones-Lee, M. W. *Paternalistic Altruism and the Value of Statistical Life*. The Economic Journal, vol. 102, no. 410, 1992, pp. 80–90.
[67] Cropper M., Krupnick A., and W. Raich, *Preferences for Equality in Environmental Outcomes*, Working Paper 22644 *http://www.nber.org/papers/w22644*
National Bureau of Economic Research, September 2016.
[68] Bell, Michelle L., and Keita Ebisu. *Environmental inequality in exposures to airborne particulate matter components in the United States*. Environmental Health Perspectives 120.12 (2012): 1699-1704.

estimated annual benefits to be between $0 and $4 billion per year); *id.* at 1372-73 (estimating the total annual cost of CAA section 112 to be between $14 billion and $62 billion per year and the estimated annual benefits to be between $0 and $4 billion per year). Despite the apparent disparity of estimated costs and monetized benefits, Congress still enacted the revisions to CAA section 112. Thus, it is reasonable to conclude that Congress found HAP emissions to be worth regulating even without evidence that the monetized benefits of doing so were greater than the costs. The EPA believes this stems from the value that the statute places on reducing HAP regardless of whether the post-control benefits of doing so can be quantified or monetized, and the statute's purpose of protecting even the most exposed and most sensitive members of the population.

5. Characterization of HAP Risk Relevant to Consideration of Environmental Justice

In assessing the adverse human health effects of HAP pollution from EGUs, we note that these effects are not borne equally across the population, and that some of the most exposed individuals and subpopulations – protection of whom is, as noted, of particular concern under CAA section 112 – are minority and/or low-income populations. Executive Order 12898 (59 FR 7629; February 16, 1994) establishes Federal executive policy on EJ issues. That Executive Order's main provision directs Federal agencies, to the greatest extent practicable and permitted by law, to make EJ part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. Executive Order 14008 (86 FR 7619; February 1, 2021) also calls on Federal agencies to make achieving EJ part of their missions "by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other

cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts." That Executive Order also declares a policy "to secure environmental justice and spur economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and under-investment in housing, transportation, water and wastewater infrastructure, and health care." Under Executive Order 13563, Federal agencies may consider equity, human dignity, fairness, and distributional considerations, where appropriate and permitted by law.

In the context of MATS, exposure scenarios of clear relevance from an EJ perspective include the full set of subsistence fisher scenarios included in the watershed-level risk assessments completed for the rule. Subsistence fisher populations are potentially exposed to elevated levels of methylmercury due to their elevated levels of self-caught fish consumption which, in turn, are often driven either by economic need (*i.e.*, poverty) and/or cultural practices. In the context of MATS, we completed watershed-level assessments of risks for a broad set of subsistence fisher populations covering two health endpoints of clear public health significance including: (a) neurodevelopmental effects in children exposed prenatally to methylmercury (the methylmercury-based RfD analysis described in the 2011 Final Mercury TSD) and (b) potential for increased MI-mortality risk in adults due to methylmercury exposure (section III.A.3.b above).

The general subsistence fisher population that was evaluated nationally for both analyses was not subdivided by socioeconomic status, race, or cultural practices.[69] Therefore, the risk

[69] Note that the RfD-based analysis described in the 2011 Final Mercury TSD and referenced here addressed the potential for neurodevelopmental effects in children and therefore focused on the ingestion of methylmercury by female subsistence fishers. By contrast, the analysis focusing on increased MI-mortality risk for subsistence fishers described in the 2021 Risk TSD and referenced here was broader in scope and encompassed all adult subsistence fishers.

estimates derived do not fully inform our consideration of EJ impacts, although the significantly elevated risks generated for this general population are clearly relevant from a public health standpoint. However, the other, more differentiated subsistence fisher populations, which are subdivided into smaller targeted communities, are relevant in the EJ context and in some instances were shown to have experienced levels of risk significantly exceeding those of the general subsistence fisher population, as noted earlier in section III.A.3.b.

In particular, for the watershed analysis focusing on the methylmercury RfD-based analysis (*i.e.*, neurodevelopmental risk for children exposed prenatally), while the general female fisher scenario suggested that modeled exposures (from U.S. EGU-sourced mercury alone) exceeded the methylmercury RfD in approximately 10 percent of the watersheds modeled (2011 Final Mercury TSD, Table 2-6), for low-income Black subsistence fisher females in the Southeast, modeled exposures exceeded the RfD in approximately 25 percent of the watersheds. These results suggest a greater potential for adverse effects in low-income Black populations in the Southeast. Similarly, while the general subsistence fisher had exposure levels suggesting an increased risk for MI-mortality risk in 10 percent of the watersheds modeled, two sub-populations were shown to be even further disadvantaged. Low-income Black and white populations in the Southeast and tribal fishers active near the Great Lakes had the potential for increased risk in 25 percent of the watersheds modeled.[70] Both of these results (the

[70] Recognizing challenges in obtaining high-end consumption rates for tribal populations active in areas of high U.S. EGU impact (*e.g.*, Ohio River valley, areas of the central Southeast such as northern Georgia, northern South Carolina, North Carolina and Tennessee) there is the potential for our analysis of tribal-associated risk to have missed areas of elevated U.S. EGU-sourced mercury exposure and risk. In that case, estimates simulated for other subsistence populations active in those areas (*e.g.*, low-income whites and Blacks in the Southeast as reported here and in Table 3 of the 2021 Risk TSD) could be representative of the ranges of risk experienced by tribal populations to the extent that cultural practices result in similar levels of increased fish consumption.

neurodevelopmental RfD-based analysis and the analysis of increased MI-mortality risk) suggest that subsistence fisher populations that are racially or culturally, geographically, and income-differentiated could experience elevated risks relative to not only the general population but also the population of subsistence fishers generally. We think these results are relevant in considering the benefits of regulating EGU HAP.

6. Overview of Health and Environmental Effects Associated with non-HAP Emissions from EGUs

Alongside the HAP emissions enumerated above, U.S. EGUs also emit a substantial quantity of criteria pollutants, including direct $PM_{2.5}$, nitrogen oxides (NO_x) (including NO_2), and SO_2, even after implementation of the ARP and numerous other CAA requirements designed to control criteria pollutants. In the 2011 RIA, for example, the EPA estimated that U.S. EGUs would emit 3.4 million tons of SO_2 and 1.9 million tons of NO_x in 2015 prior to implementation of any controls under MATS (*see* Table ES-2). These EGU SO_2 emissions were approximately twice as much as all other sectors combined (EPA SO_2 Integrated Science Assessment, 2017).[71] These pollutants contribute to the formation of $PM_{2.5}$ and ozone criteria pollutants in the atmosphere, the exposure to which is causally linked with a range of adverse public health effects. SO_2 both directly affects human health and is a precursor to $PM_{2.5}$. Short-term exposure to SO_2 causes respiratory effects, particularly among adults with asthma. SO_2 serves as a precursor to $PM_{2.5}$, the exposure to which increases the risk of premature mortality among adults, lung cancer, new onset asthma, exacerbated asthma, and other respiratory and cardiovascular diseases. Likewise, EGU-related emissions of NO_x will adversely affect human health in the

[71] U.S. EPA. *Integrated Science Assessment for Sulfur Oxides – Health Criteria* (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-17-451, December 2017.

form of respiratory effects including exacerbated asthma. NO_x is a precursor pollutant to both $PM_{2.5}$ and ground-level ozone. Exposure to ozone increases the risk of respiratory-related premature death, new onset asthma, exacerbated asthma, and other outcomes. Fully accounting for the human health impacts of reduced EGU emissions under MATS entails quantifying both the direct impacts of HAP as well as the avoided premature deaths and illnesses associated with reducing these co-emitted criteria pollutants. Similarly, U.S. EGUs emit substantial quantities of CO_2, a powerful greenhouse gas (GHG): the EPA estimated these emissions at 2.23 million metric tpy in 2015 (2011 RIA, Table ES-2). The environmental impacts of GHG emissions are accounted for through the social cost of carbon,[72] which can be used to estimate the benefits of emissions reductions due to regulation.

Not all of the non-HAP benefits of MATS were quantified or monetized in the 2011 RIA. However, the EPA thoroughly documented these potential effects and identified those for which quantification and/or monetization was possible. Specifically, the EPA calculated the number and value of avoided $PM_{2.5}$-related impacts, including 4,200 to 11,000 premature deaths, 4,700 nonfatal heart attacks, 2,600 hospitalizations for respiratory and cardiovascular diseases, 540,000 lost work days, and 3.2 million days when adults restrict normal activities because of respiratory symptoms exacerbated by $PM_{2.5}$ (2011 RIA, p. ES-3). We also estimated substantial additional

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[72] *See https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html*: "EPA and other federal agencies use estimates of the social cost of carbon (SC-CO_2) to value the climate impacts of rulemakings. The SC-CO_2 is a measure, in dollars, of the long-term damage done by a ton of carbon dioxide (CO_2) emissions in a given year. This dollar figure also represents the value of damages avoided for a small emission reduction (*i.e.*, the benefit of a CO_2 reduction). The SC-CO_2 is meant to be a comprehensive estimate of climate change damages and includes changes in net agricultural productivity, human health, property damages from increased flood risk, and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning. However, given current modeling and data limitations, it does not include all important damages."

health improvements for children from reductions in upper and lower respiratory illnesses, acute bronchitis, and asthma attacks. In addition, we included in our monetized co-benefits estimates the effect from the reduction in CO_2 emissions resulting from this rule, based on the interagency SC-CO_2 estimates. These benefits stemmed from imposition of MATS and would be coincidentally realized alongside the HAP benefits.

7. Summary of Public Health Hazards Associated with Emissions from EGUs

The EPA is proposing to find that the evidence provided in this section of the preamble, informed where possible with new scientific evidence available since the publication of the 2016 Supplemental Finding, once again demonstrates that HAP released from U.S. EGUs represent a significant public health hazard absent regulation under CAA section 112. As noted earlier, the EPA found that even after imposition of the other requirements of the CAA, EGUs were the largest domestic source of mercury, HF, HCl, and selenium and among the largest domestic contributors of arsenic, chromium, cobalt, nickel, hydrogen cyanide, beryllium, and cadmium. The EPA has documented a wide range of adverse health effects in children and adults associated with mercury including, in particular, neurodevelopmental effects in children exposed prenatally (*e.g.*, IQ, attention, fine motor-function, language, and visual spatial ability) and a range of cardiovascular effects in adults including fatal MI and non-fatal IHD. Non-mercury HAP have also been associated with a wide range of chronic health disorders (*e.g.*, irritation of the lung; decreased pulmonary function, pneumonia, or lung damage; detrimental effects on the central nervous system; and damage to the kidneys). Furthermore, three of the key metal HAP emitted by EGUs (arsenic, chromium, and nickel) have been classified as human carcinogens and there is evidence to suggest that, prior to MATS, emissions from these sources had the potential to result in cancer risks greater than 1-in-1 million.

Further, this section describes the results from several new screening-level risk assessments considering mercury from domestic EGU sources. These risk assessments focused on two broad populations of exposure: (a) subsistence fishers exposed to mercury through self-caught fish consumption within the continental U.S. and (b) the general U.S. population exposed to mercury through the consumption of commercially-sourced fish (*i.e.*, purchased from restaurants and food stores). The results of these screening-level risk assessments are useful for informing our understanding about the potential scope and public health importance of these impacts, but remaining uncertainties prohibit precise estimates of the size of these impacts currently. For example, numerous studies considering multiple, large cohorts have shown that people exposed to high amounts of mercury are at higher risk of fatal and non-fatal CVD. While U.S. EGUs are only one of multiple global sources that contribute to this mercury exposure, the EPA's screening analysis suggests the potential for U.S. EGU emissions of mercury to contribute to premature mortality in the general U.S. population.

Furthermore, as part of the subsistence fisher analyses, we included scenario modeling for a number of EJ-relevant populations showing that several populations (including low-income Blacks and whites in the Southeast and tribal populations near the Great Lakes) had risk levels that were significantly above the general subsistence fisher population modeled for the entire U.S. As noted earlier, the EPA believes that Congress intended in CAA section 112 to address risks to the most exposed and most sensitive members of the public. These additional risk assessments suggest that there are populations that are particularly vulnerable to EGU HAP emissions, including populations of concern from an EJ standpoint.

MATS plays a critical role in reducing the significant volume and risks associated with EGU HAP emissions discussed above. Mercury emissions have declined by 86 percent, acid gas

HAP by 96 percent, and non-mercury metal HAP by 81 percent since 2010 (pre-MATS). *See* Table 4 at 84 FR 2689 (February 7, 2019). MATS is the only Federal requirement that guarantees this level of HAP control from EGUs. At the same time, the concomitant reductions in CO_2, NOx, and SO_2, also provide substantial public health and environmental benefits. Given the numerous and important public health and environmental risks associated with EGU emissions, the EPA again concludes that the advantages of regulating HAP emissions from this sector are significant. Acknowledging the difficulties associated with characterizing risks from HAP emissions discussed earlier in this section, we solicit comments about the health and environmental hazards of EGU HAP emissions discussed in this section and the appropriate approaches for quantifying such risks, as well any information about additional risks and hazards not discussed in this proposal.

B. Consideration of Cost of Regulating EGUs for HAP

1. Introduction

In evaluating the costs and disadvantages of MATS, we begin with the costs to the power industry of complying with MATS. This assessment uses a sector-level (or system-level) accounting perspective to estimate the cost of MATS, looking beyond just pollution control costs for directly affected EGUs to include incremental costs associated with changes in fuel supply, construction of new capacity, and costs to non-MATS units that were also projected to adjust operating decisions as the power system adjusted to meet MATS requirements. Such an approach is warranted due to the nature of the power sector, which is a large, complex, and interconnected industry. This means that while the MATS requirements are directed at a subset of EGUs in the power sector, the compliance actions of the MATS-regulated EGUs can affect production costs and revenues of other units due to generation shifting and fuel and electricity price changes.

Thus, the EPA's projected compliance cost estimate represents the incremental costs to the entire power sector to generate electricity, not just the compliance costs projected to be incurred by the coal- and oil-fired EGUs that are regulated under MATS. Limiting the cost estimate to only those expenditures incurred by EGUs directly regulated by MATS would provide an incomplete estimate of the costs of the rule.

Using this broad view, in the 2011 RIA we projected that the compliance cost of MATS would be $9.6 billion per year in 2015.[73] This estimate of compliance cost was based on the change in electric power generation costs between a base case without MATS and a policy case where the sector complies with the HAP emissions limits in the final MATS. The EPA generated this cost estimate using the Integrated Planning Model (IPM).[74] This model is designed to reflect electricity markets as accurately as possible using the best available information from utilities, industry experts, natural gas and coal market experts, financial institutions, and government statistics. Notably, the model includes cost and performance estimates for state-of-the-art air pollution control technologies with respect to mercury and other HAP controls. But there are inherent limits to what can be predicted *ex ante*. And because the estimate was made 5 years prior to full compliance with MATS, stakeholders, including a leading power sector trade association, have indicated that our initial cost projection significantly overestimated actual costs expended by industry. There are significant challenges to producing an *ex post* cost estimate that

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[73] All costs were reported in 2007 dollars.

[74] IPM, developed by ICF International, is a state-of-the-art, peer-reviewed, dynamic, deterministic linear programming model of the contiguous U.S. electric power sector. IPM provides forecasts of least-cost capacity expansion, electricity dispatch, and emission control strategies while meeting electricity demand and various environmental, transmission, dispatch, and reliability constraints. The EPA has used IPM for over 2 decades to understand power sector behavior under future business-as-usual conditions and to evaluate the economic and emission impacts of prospective environmental policies.

provides an apples-to-apples comparison to our initial cost projections, due to the complex and interconnected nature of the industry. However, independent analyses provided to the EPA indicate that we may have overestimated the cost of MATS by billions of dollars per year. Moreover, there have been significant changes in the power sector in the time since MATS was promulgated that were not anticipated in either EPA or U.S. Energy Information Administration (EIA) projections at the time.[75] Entirely outside of the realm of EPA regulation, there were dramatic shifts in the cost of natural gas and renewables, state policies, and Federal tax incentives, which have also further encouraged construction of new renewables. These have led to significantly faster and greater than anticipated retirement of coal capacity and coal-fired generation.

While there are significant limitations to producing an *ex post* cost estimate, we have endeavored, where possible, to approximate the extent of our overestimate. The unexpected shifts in the power sector, including the rapid increase in natural gas supplies that occurred after promulgation of MATS, resulted in our projected estimates of natural gas prices to be approximately double what they were in actuality. Incremental natural gas expenditures accounted for approximately 25 percent of the $9.6 billion compliance cost estimate for 2015 in the 2011 RIA. The market trends of the power sector also had major impacts on the number of controls installed and operated on coal-fired EGUs in the years following promulgation of MATS. With respect to just pollution control installation and operation, we project that we overestimated annual compliance costs by at least $2.2 to 4.4 billion per year, simply as a result

[75] In 2009, coal-fired generation was by far the most important source of utility scale generation, providing more power than the next two sources (natural gas and nuclear) combined. By 2016, natural gas had passed coal-fired generation as the leading source of generation in the U.S. While natural gas-fired generation, nuclear generation and renewable generation have all increased since 2009, coal-fired generation has significantly declined.

of fewer pollution controls being installed than were estimated in the 2011 RIA. Though this range of an overestimate is limited to costs associated with pollution controls and operation, those costs made up 70 percent of the projected $9.6 billion figure.

We additionally find that the controls that were installed at MATS-regulated EGUs were likely both less expensive and more effective in reducing pollution than originally projected, resulting in our estimate likely being too high for these reasons as well. Lastly, since completing the 2011 RIA, we have updated several assumptions in our modeling that would also have resulted in a lower cost estimate had they been incorporated into our modeling at the time of the rule. Taking into account the above considerations, we believe we overestimated the cost of MATS by billions of dollars.

We next examine the projected cost of MATS – both total cost and specific types of costs – using sector-level metrics that put those cost estimates in context with the economics of the power sector. The reason we examine these metrics is to better understand the disadvantages that expending these costs had on the EGU industry and the public more broadly, just as on the benefits side we look beyond the volume of pollution reductions to the health and environmental advantages conferred by the reductions.

For purposes of these analyses, we use the 2011 RIA projections, keeping in mind our newer analyses, which indicated that those projections were almost certainly overestimated. Specific to the power sector, we evaluate the projected costs of the rule to revenues from electricity sales across nearly 20 years, and we compare the projected expenditures required under the rule with historic expenditures by the industry over the same time period. We additionally evaluate broader impacts on the American public by looking at projected effects of MATS on retail electricity prices and our analyses of whether the power sector could continue to

provide adequate and reliable electricity after imposition of the rule. We find that, when viewed in context, the projected costs of MATS to both the power sector and the public were small relative to these metrics and well within the range of historical variability. Moreover, experience has borne out our projection that the EGU sector could continue to provide adequate, reliable, and affordable electricity to the American public after the imposition of the rule.

Section III.B.2 contains our discussion of the ways in which the compliance costs for MATS were likely overestimated. Section III.B.3 expands upon and re-evaluates the cost metrics used in the 2016 Supplemental Finding by adding post-promulgation information to our analysis, and we discuss impacts on power sector generating capacity. In section III.B.4, we propose to reaffirm additional cost considerations regarding the availability and cost of control technologies discussed in earlier rulemakings, and in section III.B.5, we provide our proposed conclusions regarding the costs, or disadvantages, of regulating HAP from EGUs.

2. Compliance Cost Projections in the 2011 RIA Were Likely Significantly Overestimated

In issuing this proposal, the EPA finds itself in a position Congress was not likely to have contemplated when it promulgated the 1990 Amendments. The statute contemplated that the EPA would have completed the required studies and presumably made its determination more than 20 years ago. Due to litigation and multiple changes of administration following *Michigan,* we are, at this point, nearly 10 years after promulgation of the regulation about which we are making a threshold determination, and 5 years after full implementation of that regulation. The vast majority of MATS-affected sources were required to be in compliance with the rule's requirements by April 2016, and installation of new controls–or upgrades to existing controls–

were in place by 2017.[76] This means we now have on hand unit-level data regarding installations, a clearer picture about market trends, and updated, more accurate assumptions that, taken together, produce a very different picture of the actual costs of MATS than what we projected when we reaffirmed the appropriate and necessary determination and promulgated the rule in 2012. Therefore, while the Agency considers that the information that was available at the time of MATS promulgation provided a valid analytical basis for the threshold appropriate and necessary determination, because many years have elapsed since then, the EPA believes it is reasonable to examine how the power sector has evolved since MATS was finalized and, with the benefit of hindsight, compare important aspects of the 2011 RIA projections with what actually happened since MATS was promulgated. Because our obligation under CAA section 112(n)(1)(A) is to fully consider the advantages and disadvantages of regulating a large, critically important industry, whose role impacts the lives of every American, we think it is important to evaluate and consider the best, currently available information, even if, as discussed in sections III.B.3 and 4, the pre-existing record supports the same conclusion. This *ex post* examination demonstrates that the EPA almost certainly significantly overestimated compliance costs in the 2011 RIA, which further supports the determination that regulation is appropriate and necessary after considering cost. We also do not view this updated, post-hoc evaluation of what happened post-promulgation as undermining the record we established in 2012. Models are not invalidated "solely because there might be discrepancies between those predictions and the

[76] Affected sources were required to be in compliance with the requirements in MATS within 3 years after the effective date of the rule (*i.e.*, by April 2015). However, sources were allowed to request an additional year to comply with the rule and the vast majority of sources were required to be in compliance with the rule's requirements by April 2016. We therefore think 2017 is a reasonable year in which to analyze installed controls on the EGU fleet.

real world. That possibility is inherent in the enterprise of prediction." *EME Homer City Generation, L.P. v. EPA*, 795 F.3d 118, 135-36 (D.C. Cir. 2015).

In an ideal world, with perfect information, we would be able to generate an *ex post* analysis of regulatory costs that could be compared to our *ex ante* cost estimate prepared at the time MATS was issued. However, it is extremely challenging to produce rigorous retrospective estimates of regulatory costs. A literature review and series of case studies performed by EPA staff provides insights on how analysts can perform retrospective cost analysis.[77] Kopits *et al.* (2015) identifies several challenges associated with *ex post* cost assessments, including data limitations with respect to how facilities chose to comply with regulations and comprehensive facility-level pollution abatement costs. A key component to a rigorous retrospective analysis noted by the authors that can be particularly difficult to achieve is an accurate definition of the counterfactual, that is, what would have occurred absent the rule. It is this counterfactual that provides the baseline against which the incremental costs of regulation are estimated.

In the case of MATS, to construct an estimate of *ex post* implementation costs that is directly comparable to the *ex ante* 2011 RIA cost estimate, we would first need to accurately attribute changes in the power sector that were due to MATS requirements rather than to market and technological changes, other regulations, or, importantly, combinations of these factors (*i.e.*, properly specify the counterfactual). Second, we would need actual information of the incremental costs that had been associated with facility-level operational changes due to MATS, such as observed changes in dispatch, actual fuel consumption, and how controls in MATS-affected units were actually operated. Even the operation of non-MATS affected units would be

[77] Kopits, E., A. McGartland, C. Morgan, C. Pasurka, R. Shadbegian, N. B. Simon, D. Simpson and A. Wolverton (2015). *Retrospective cost analyses of EPA regulations: a case study approach*. Journal of Benefit-Cost Analysis 5(2): 173-193.

relevant to such an analysis, because operational decisions are interconnected on the grid via dispatch decisions as well as through fuel markets. While there may be approaches such as econometric analysis, simulation modeling, and event study analysis that could capture and estimate components of the problem identified above and derive an estimate of *ex post* MATS costs, the approach would very likely require different methods and assumptions than the 2011 RIA estimates which were based on the comparison of two forward-looking sets of projections. Even if we undertook such additional analysis or modeling, ultimately we would still only be able to provide a new *estimate* of regulatory costs, not an *actual* cost. Given how challenging it is to produce rigorous retrospective estimates of regulatory costs, particularly at a system-level, an *ex post* analysis is better suited to comparing particular aspects of the analysis, which can help us understand whether costs in the 2011 RIA were over- or under-estimated and can yield a general sense of how much reality diverged from the projection, than to attempting to generate a new and precise "actual" total compliance cost estimate for MATS.

Estimating retrospective costs for a rule of the magnitude of MATS is an especially significant challenge because the rule regulates hundreds of units within a complex, interdependent, and dynamic economic sector. Units within the power sector are also subject to many regulatory requirements and other economic drivers. While we can observe the decisions of the sector and individual units in terms of decisions on controls, fuels, and retirement, we cannot pinpoint the reason(s) behind each unit-level decision. With respect to identifying the counterfactual against which to evaluate retrospective compliance costs, several unforeseen factors since MATS promulgation have driven changes in the power sector that have led to the composition of the current fleet being different than the fleet projected in the 2011 RIA. For example, dramatic increases in the supply of natural gas, along with advances in cost and

performance of renewable generation technologies and low electricity demand growth, none of which were fully anticipated in the 2011 RIA, have made strong contributions to shifts away from coal-fired generation.[78,79] Additionally, other EPA regulations such as the Disposal of Coal Combustion Residuals from Electric Utilities final rule, the Steam Electric Power Generating Effluent Guidelines - 2015 Final Rule, and the 2020 Steam Electric Reconsideration Rule, were promulgated after MATS.[80] While the compliance periods of these rules all postdate the MATS compliance date, utilities are likely to consider multiple regulations simultaneously when making planning decisions, a likelihood that also complicates the identification of the counterfactual scenario of a world without MATS that is needed to generate an *ex post* incremental cost estimate of MATS that would be directly comparable to the *ex ante* 2011 RIA cost estimate.

Even though it is extremely challenging to produce the type of *ex post* incremental cost estimate discussed above, several stakeholders have conducted analyses, focusing on different components of the regulation's cost, to assess actual costs of compliance. While none of these estimates can be precisely compared against the EPA *ex ante* estimates because they use different methods than the power sector modeling the EPA used in the 2011 RIA, all of the independent analyses suggested that the actual compliance costs expenditures were significantly lower – by billions of dollars – than the EPA estimated in the 2011 RIA.

First, a 2015 analysis by Andover Technology Partners focused on the capital and operating costs associated with the actual installation and operation of pollution control

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[78] Linn, J. and K. McCormack (2019). *The Roles of Energy Markets and Environmental Regulation in Reducing Coal-Fired Plant Profits and Electricity Sector Emissions*. RAND Journal of Economics 50: 733-767.
[79] Coglianese, J., *et al*. (2020). *The Effects of Fuel Prices, Environmental Regulations, and Other Factors on U.S. Coal Production, 2008-2016*. The Energy Journal 41(1): 55-82.
[80] 85 FR 53516 (August 28, 2020), 80 FR 67838 (November 3, 2015), and 85 FR 64650 (October 13, 2020), respectively.

equipment at MATS-regulated units and made two key findings: the number of installed controls was significantly lower than the number of controls that was projected in the 2011 RIA and the cost of the installed controls was generally lower than the control costs that the EPA assumed in the 2011 RIA modeling. Based on these findings, the study estimated that the EPA's projected cost of compliance was over-estimated by approximately $7 billion.[81,82] In other words, the Andover Technology Partners estimated that the EPA's projected cost was approximately four times higher than their retrospective estimate of cost, which they estimated to be approximately $2 billion per year.

Second, a 2017 study performed by M.J. Bradley & Associates (MJB&A) used information from the EIA and estimated that owners and operators of coal-fired EGUs incurred total capital expenditures on environmental retrofits of $4.45 billion from December 2014 to April 2016.[83] To the EPA's understanding, the MJB&A cost estimate represents total upfront capital costs (not ongoing operating and maintenance expenditures), and is not annualized as was the capital expenditure in the 2011 RIA-based projected cost estimate. For comparison, the estimated total upfront (not annualized) capital expenditures underpinning the 2011 RIA annual compliance cost estimate is about $36.5 billion, which is more than eight times higher than the

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[81] Declaration of James E. Staudt, Ph.D., CFA, at 3, *White Stallion Energy Center v. EPA*, No. 12-1100 (D.C. Cir., December 24, 2015). Also available at Docket ID Item No. EPA-HQ-OAR-2009-0234-20549.

[82] In addition to the 2015 study, Andover Technology Partners produced two other analyses in 2017 and 2019, respectively, that estimated the ongoing costs of MATS. The 2017 report estimated that the total annual operating cost for MATS-related environmental controls was about $620 million, an estimate that does not include ongoing payments for installed environmental capital. The 2019 report estimates the total annual ongoing incremental costs of MATS to be about $200 million; again, this estimate does not include ongoing MATS-related capital payment. The 2017 report is available in Docket ID Item No. EPA-HQ-OAR-2018-0794-0794. The 2019 report is available in Docket ID Item No. EPA-HQ-OAR-2018-0794-1175.

[83] Available in Docket ID Item No. EPA-HQ-OAR-2018-0794-1145.

MJB&A estimates. This result suggests that the capital cost component of the 2011 RIA cost projections was significantly overestimated, potentially by a factor of more than eight.

Third, the Edison Electric Institute (EEI), the association that represents all U.S. investor-owned electric companies, estimated that by April 2019, owners and operators of coal- and oil-based EGUs incurred *cumulative* (not annual) compliance costs of more than $18 billion to comply with MATS, including both capital and operations and maintenance costs since MATS became effective in April 2012.[84] In order to provide a simple comparison between the EEI figure, which was incurred over 7 years, and the annualized amount presented in the 2011 RIA ($9.6 billion), we can divide the EEI figure by 7 to estimate an average annual amount of approximately $2.6 billion, which is similar to the Andover Technology Partners estimate of approximately $2 billion. Also in line with the Andover Technology Partners estimate, EEI's estimate suggests that the annual costs related to MATS compliance were overestimated in the 2011 RIA by approximately $7 billion. While there is some uncertainty in the amount of time over which those costs were incurred, as well as the exact nature of those expenditures, it is clear that the information provided by EEI supports a conclusion that the costs of compliance with MATS were significantly lower than the Agency's projections.

In summary, it is the EPA's understanding that two of these studies indicate that the 2011 RIA may have overestimated annual compliance costs by approximately $7 billion, and the third study finds that the projected total upfront capital costs may have been overestimated by a factor of more than eight. While each of these retrospective cost estimates is developed from bases that are dissimilar from one another and, in particular, from how the EPA developed the prospective cost estimates in the 2011 RIA, each of the independent analyses indicate that the costs of MATS

[84] Available in Docket ID Item No. EPA-HQ-OAR-2018-0794-2267.

are likely significantly less than the EPA estimated in the 2011 RIA.

For this proposal, the EPA has evaluated whether the *ex ante* estimates in the 2011 RIA were likely accurate, overestimated, or underestimated, and the details of the EPA's new analysis are contained in the docketed TSD (referred to herein as the "Cost TSD").[85] Consistent with our systems-level approach, we begin our analysis with an evaluation of natural gas expenditures during the relevant time period. The rapid decrease in the price of natural gas during this time period affected U.S. power generation profoundly, including U.S. EGU fuel expenditures; this has significant implications for our *ex post* analysis because natural gas expenditures constituted approximately 25 percent of the projected 2015 compliance costs in the 2011 RIA.[86] These market shifts in the industry also impacted expenditures associated with the installation and operation of pollution control equipment at MATS-affected facilities. Those costs constituted a majority – about 70 percent – of the projected annual compliance costs in 2015. The following sections closely examine these two components of the compliance cost and use available information to evaluate whether the projected compliance costs reported in the 2011 RIA were likely higher or lower than actual costs. We also review important cost assumptions used in the 2011 RIA. Taken together, this suite of quantitative and qualitative evaluations indicates that the projected costs in the 2011 RIA were almost certainly significantly overestimated. We find that the 2011 RIA's estimate of the number of installations alone led to an overestimate of about $2.2 to $4.4 billion, and that if recent updates to the cost and performance assumption for pollution

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[85] U.S. EPA. 2021. *Supplemental Data and Analysis for the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units – Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding; Notice of Proposed Rulemaking ("Cost TSD").*

[86] We projected that regulation of coal- and oil-fired EGUs under MATS would induce units to switch to natural gas, which in turn would increase the price of natural gas and the cost of those expenditures.

controls had been reflected in the 2011 RIA modeling, the projected compliance costs would likely have been even lower (suggesting the overestimate could be greater than $4.4 billion).

a. Natural Gas Supply

The natural gas industry has undergone significant change in recent years. Starting in the mid-2000s, technological changes in natural gas drilling and extraction initiated major market changes that resulted in significant increases to domestic supplies of natural gas. As these technologies have continued to advance, they have had a lasting impact on natural gas markets, resulting in major shifts in the economics of electric sector operations given the abundant supply of natural gas at relatively low costs. This section summarizes these changes and the implications for the cost projection presented in the 2011 RIA.

In 2005, the EIA estimated that proved reserves of natural gas were 213 trillion cubic feet (tcf).[87] In 2019, the estimate of proved reserves was 495 tcf, an increase of 132 percent. The market effects of this major supply shift were profound across the economy, but especially for the power sector. By the end of 2019, aided by advances in drilling and hydraulic fracturing techniques, natural gas production from tight and shale gas formations was the major source of domestic production (*see* Table 1 below) and had increased three-fold from 2005 production levels.

TABLE 1: U.S. NATURAL GAS PRODUCTION, BY SOURCE (TRILLION CUBIC FEET)

Year	Tight/Shale Gas	Other Lower 48 onshore	Lower 48 Offshore	Other
2005	7.2	5.1	3.4	2.3
2006	8.0	5.1	3.2	2.3
2007	9.0	4.9	3.1	2.3

[87] *U.S. Crude Oil and Natural Gas Proved Reserves, Year-end 2019* (Table 9: U.S. proved reserves of natural gas). EIA, January 11, 2021 release available at *https://www.eia.gov/naturalgas/crudeoilreserves*. Accessed July 23, 2021.

2008	10.3	4.9	2.6	2.4
2009	11.1	4.5	2.7	2.4
2010	12.4	4.2	2.5	2.2
2011	14.8	4.0	2.0	2.1
2012	16.7	3.7	1.6	2.0
2013	17.6	3.5	1.4	1.7
2014	19.5	3.4	1.3	1.6
2015	21.0	3.2	1.4	1.5
2016	21.1	2.8	1.3	1.4
2017	22.2	2.7	1.1	1.3
2018	25.7	2.7	1.0	1.3
2019	29.3	2.4	1.0	1.2
2020	29.2	2.3	1.2	1.2

Source: U.S. EIA, *https://www.eia.gov/energyexplained/natural-gas/where-our-natural-gas-comes-from.php*, accessed July 25, 2021.

Note: "Other" includes production from Alaska and Coalbed Methane sources.

As a result, the natural gas market underwent a long period of sustained low prices (*see* Table 2 below). These market shifts were not fully anticipated or predicted by observers, as indicated by natural gas futures prices at the time of MATS promulgation. Although these changes took root in the mid-2000s, the lasting market disruption would take more time to cement itself. From 2010 through 2019, the U.S became one of the world's leading producers of natural gas, breaking domestic production records year-on-year through the decade, while maintaining record-low prices. During this timeframe, the U.S. shifted from a *total* net energy importer to an exporter,[88] while maintaining some of the lowest relative natural gas prices globally.[89]

TABLE 2: NATURAL GAS PRICES

[88] *Monthly Energy Review*, EIA (June 24, 2021) and *Today in Energy* ("U.S. total energy exports exceed imports in 2019 for the first time in 67 years"), EIA (April 20, 2020) available at *https://www.eia.gov/todayinenergy/detail.php?id=43395*. Accessed July 23, 2021.
[89] BP, *Statistical Review of World Energy 2021* available at *https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html*. Accessed July 23, 2021.

Year	NYMEX Natural Gas Henry Hub Natural Gas Futures ($/MMBtu), Annual Average, As Of: 2011-03-16	NYMEX Natural Gas Henry Hub Natural Gas Futures ($/MMBtu), Annual Average, As Of: 2011-12-21	Henry Hub Spot Natural Gas Index Annual Average Price ($/MMBtu)
2005	--	--	8.63
2006	--	--	6.74
2007	--	--	6.96
2008	--	--	8.90
2009	--	--	3.94
2010	--	--	4.37
2011	4.24	--	4.00
2012	4.91	3.43	2.75
2013	5.31	4.07	3.73
2014	5.67	4.43	4.37
2015	6.04	4.66	2.63
2016	6.36	4.90	2.51
2017	6.67	5.16	2.98
2018	6.97	5.43	3.16
2019	7.25	5.70	2.56
2020	7.50	5.96	2.03
2021	7.76	6.23	
2022	8.02	6.50	
2023	8.28	6.78	
2024	--	7.06	

Source: Annual Average Henry Hub Price, EIA. NYMEX price, from S&P Global data. 2015 data from 2011 RIA, Chapter 3.

The EPA projected a 2015 natural gas price of roughly $5/MMBtu when MATS was finalized in December 2011, which was a reasonable expectation based on prevailing market conditions at that time. However, natural gas prices post-MATS promulgation ended up being considerably lower than anticipated, which resulted in major shifts in the economics of fossil fuel-fired electric generating technologies (*see* Table 2 above and Chart A-1 in the Cost TSD). From 2005 through 2010, annual average natural gas prices (at Henry Hub) averaged about $6.60/MMBtu. Several years later, as MATS compliance began, prices averaged roughly $2.75/MMBtu for the years 2015 through 2019. This market shift greatly changed the economics

of power plant operation for fossil fuel-fired facilities, with the electric sector surpassing the industrial sector to become the largest consumer of natural gas (38 percent of the total in 2020),[90] and gas-fired generators becoming the leading source of electric generation in the electric sector, representing 40 percent of total generation in 2020.[91]

The modeling supporting the 2011 RIA did not anticipate this major change in natural gas supply, which has clearly had a significant impact on the electric power sector and those sources covered by MATS. While we do not quantify the impact this change would have on the projected compliance costs associated with incremental changes in natural gas use and price (about 25 percent of the total projected compliance cost in the 2011 RIA), we note that any closures of covered units that occurred as a result of the changed relative economics of fuel prices would decrease the MATS-related compliance costs for the sector. These closures reduced the amount of control capacity necessary for compliance with MATS, and we estimate below a range of costs associated with the overestimation of control installations in the 2011 RIA.

Several researchers have investigated the role of relative fuel prices as a factor in decisions that were made regarding closures of coal-fired units around 2015. Generally, these studies attribute closures primarily to the decrease in natural gas prices, and they also note smaller factors such as advances in the cost and performance of renewable generating sources, lower-than-anticipated growth in electricity demand, and environmental regulations.

For example, Linn and McCormack (2019) developed a simulation model of the U.S. Eastern Interconnection that reproduced unit operation, emissions, and retirements over the

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[90] Table 4.3, *Monthly Energy Review*, EIA, April 2021, available at *https://www.eia.gov/totalenergy/data/monthly/archive/00352104.pdf*.
[91] EIA, Electricity Data Browser, Net generation, United States, all sectors, annual, available at *https://www.eia.gov/electricity/data/browser/*.

2005- 2015 period. The authors use this model to explain the relative contributions of demand, natural gas prices, wind generation, and environmental regulations, including MATS, to the changes in the share of coal in electricity generation. The results showed that lower electricity consumption and natural gas prices account for a large majority of the declines in coal plant profitability and resulting retirements. The authors found that the environmental regulations they modeled, NO_x emissions caps and MATS, played a relatively minor role in declines of coal plant profitability and retirements.

Additionally, Coglianese *et al.* (2020) developed a statistical modeling approach to enable the decomposition of changes in U.S. coal production from 2008-2016 into changes due to a variety of factors, including changes in electricity demand, natural gas prices relative to coal, renewable portfolio standards, and environmental regulations that affect coal-fired plants. The results indicated that declines in natural gas prices explained about 92 percent of the decrease in coal production between 2008 and 2016. Air regulations, including MATS, explained about 6 percent of the drop in coal production. The study attributed about 5.2 GW of coal-fired EGU retirements to MATS.

These studies both demonstrate that the decrease in natural gas prices played a significant role in closures of coal-fired EGUs. While we do not quantify the impact this change had on the projected costs included in the 2011 RIA, we note that any closures of covered units that occurred as a result of the dramatically changed relative economics of fuel prices would decrease the MATS-related compliance costs for the sector.

b. Projected Versus Observed Pollution Control Installations

The 2011 RIA reported a sector-level compliance cost of $9.6 billion annually in 2015. The majority of those costs – about 70 percent – represented the incremental annualized capital

and annual operation and maintenance (O&M) costs associated with installation and operation of pollution controls for compliance with MATS at coal steam units. Given the time that has passed, we can now compare the incremental projected pollution control capacity reported in the 2011 RIA with available information regarding actual (observed) control installations. For this proposal, therefore, the EPA has compared observed installations and costs over 2013-2016 to unit-level estimates of the control installation capacity and associated costs presented in the 2011 RIA. This analysis demonstrates, subject to the caveats and uncertainty discussed below, that the 2011 RIA likely overestimated total pollution control retrofit capacity that would occur in response to MATS and, thus, likely overestimated MATS compliance costs. For example, the analysis that follows demonstrates that fabric filter (FF) systems – which are an expensive and capital-intensive control technology – were only installed on less than one-third of the capacity anticipated in the 2011 RIA analysis.

This comparison of projected to observed control capacity installations relies on the simplifying assumption that all dry scrubbers (*e.g.*, dry FGD systems), dry sorbent injection (DSI) systems, activated carbon injection (ACI) systems, and FF systems installed during the 2013-2016 period were installed for compliance with the MATS emissions limits. This assumption is necessitated by the absence of comprehensive data on the specific reasons EGUs installed pollution control equipment. While assuming pollution controls of these types that were installed in this period are singularly attributable to MATS requirements is a reasonable assumption for this analysis, it is a highly conservative assumption given that some of the observed installations likely occurred in response to other regulations to control criteria air pollutants (*e.g.*, Cross-State Air Pollution Rule, Regional Haze, Federal implementation plans, or state implementation plans) or enforcement actions (*e.g.*, consent decrees). Because some of the

observed installations in this analysis likely resulted from non-MATS requirements, the approach potentially over-attributes the amount of pollution controls built specifically for MATS compliance, thereby leading to an overestimate of the control costs associated with MATS.

Table 3 presents the findings of this analysis in capacity terms. The total capacity projected to retrofit with each control in the 2011 RIA is reported for the base case (*i.e.*, projected future conditions absent MATS) and under MATS. The difference is presented in the 'Projected Incremental Controls' column. So, for example, in the 2011 RIA the EPA projected that there would be an incremental 20.3 GW of capacity retrofitting with dry FGD that is attributable to MATS. We compare the projected incremental controls capacity value to the observed installations capacity value. Note that we are unable to estimate the total capacity of observed upgrades to electrostatic precipitators (ESP) and scrubbers due to a lack of available data regarding such upgrades. For additional information, *see* the docketed Cost TSD.

TABLE 3. PROJECTED VS. OBSERVED CAPACITY (GIGAWATTS (GW))

Pollution Control Retrofit	Base Case	MATS	Projected Incremental Controls	Observed Installations (2013-2016)	Difference: Observed Minus Projected (2013-2016)	Percent Difference: Observed Minus Projected (2013-2016)
Dry FGD	4.6	24.8	20.3	16.0	-4.3	-21%
DSI	8.6	52.5	43.9	15.8	-28.1	-64%
ACI	0	99.3	99.3	96.1	-3.2	-3%
FF	12.7	114.7	102	31.4	-70.6	-69%
ESP Upgrade	0	33.9	33.9	N/A	N/A	N/A
Scrubber Upgrade	0	63.1	63.1	N/A	N/A	N/A

Source: Projected Controls: 2011 RIA; Observed Installations: NEEDS v.5.16.
Note: FF installations include installations specifically related to PM control, as well as installations included with dry scrubber, DSI, and some ACI retrofits in the modeling. Totals may not sum due to rounding.

This analysis demonstrates that projected incremental capacity of dry FGD, DSI, ACI, and FF was likely significantly overestimated in the 2011 RIA. The capacities of actual installed control technologies are lower, often significantly lower, than projected (and again, this analysis attributes *all* control installations of certain types during this time period to MATS, even though some portion of those installations were likely made in whole or in part due to other regulations). For example, the installed DSI capacity is about two-thirds lower than was projected. The difference between observed installed control capacities and what we projected those incremental control capacities would be translates directly into significantly lower costs than estimated. Because the vast majority of compliance costs in the 2011 RIA were related to the installation and operation of pollution controls, and because significant deployment of any higher-cost compliance strategies did not occur, the large differences observed in Table 3 suggest that the projected compliance costs were likely significantly overestimated as well. For example, approximately $2 billion was estimated to be attributable to the installation and operation of DSI controls (21 percent of the total annual projected costs of MATS), when in actuality, only one-third of those installations occurred (and some were likely attributable to regulations other than MATS).

We also conduct an analysis of the approximate costs related to the overestimate of projected incremental pollution controls. This analysis is discussed in detail in the Cost TSD. Specifically, we compared observed installations over 2013-2016 to unit-level estimates of the control installation capacity and associated costs presented in the 2011 RIA to develop a range of the potential overestimate of compliance costs related to projected control installations that did not occur.

As result of this analysis, we find that based on this one variable – the number of control technology installations – the 2011 RIA overestimated control costs by about $2.2 to $4.4 billion (or 2.7 times). If recent updates to the cost and performance assumptions for pollution controls had been reflected in the 2011 RIA modeling, the projected compliance costs would likely have been even lower (suggesting the overestimate could be greater than $4.4 billion). The EPA did not quantify advances in cost and performance of control technology between the time of the EPA's modeling and implementation of the rule due to uncertainty. We note that this may be one reason that the Andover Technology Partners' overestimate for control costs of $7 billion exceeds the EPA's range of overestimates ($2.2-4.4 billion) for the same control and operation costs. The next section helps explain some of the difference quantified above, and provides further qualitative evidence supporting the EPA's conclusion that the 2011 RIA likely significantly overestimated the compliance costs associated with meeting MATS requirements.

c. 2011 RIA Modeling Assumptions

Since promulgation of MATS, the EPA has found it necessary to update some of the modeling assumptions used in the IPM modeling that informed the RIA cost estimate, in order to capture the most recently available information and best reflect the current state of the power sector. Several of these recent updates are directly related to pollution control retrofits that were projected to be installed for MATS in the 2011 RIA. Had these updates been reflected in our modeling, it likely would have projected fewer controls needing to be installed and therefore a lower cost estimate overall.

The full suite of assumptions utilized in the IPM modeling are reported in the model documentation, which provides additional information on the assumptions discussed here as well

as all other assumptions and inputs to the model.[92] Updates specific to MATS modeling are also in the IPM 4.10 Supplemental Documentation for MATS.[93] As was included in the 2011 RIA discussion regarding uncertainty and limitations of the power sector modeling analysis (Section 3.15), the cost and emissions impact projections did not take into account the potential for advances in the capabilities of pollution control technologies or reductions in their costs over time. EPA modeling cannot anticipate in advance the full spectrum of compliance strategies that the power sector may innovate to achieve required emission reductions, and experience has shown that regulated industry often is able to comply at lower costs through innovation or efficiencies. Where possible, the EPA designs regulations to assure environmental performance while preserving flexibility for affected sources to design their own solutions for compliance. Industry will employ an array of responses, some of which regulators may not fully anticipate and will generally lead to lower costs associated with the rule than modeled in *ex ante* analysis. *See, e.g.*, section III.D of this preamble, discussing how the actual cost of the ARP was up to 70 percent less than what had been estimated.

A first example regards the assumptions of HCl removal for certain types of coal. When lignite and subbituminous coals are combusted, the chemistry of coal ash alkalinity removes HCl emissions. The 2011 RIA modeling assumed a 75 percent reduction of HCl emissions from lignite and subbituminous coals.[94] Upon subsequent review of available data, the EPA updated this assumption to 95 percent HCl removal.[95] This revised assumption regarding improved HCl

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[92] *See https://www.epa.gov/airmarkets/ipm-analysis-proposed-mercury-and-air-toxics-standards-mats*. Accessed July 23, 2021.
[93] *See https://www.epa.gov/airmarkets/documentation-supplement-base-case-v410mats*. Accessed July 23, 2021.
[94] *Id.*
[95] *See https://www.epa.gov/sites/default/files/2019-03/documents/chapter_5.pdf*. Accessed July 23, 2021.

removal from coal ash alkalinity effectively lowers uncontrolled HCl emissions rates in the projections and is a better reflection of actual removal rates observed by EGUs combusting subbituminous and/or lignite coal. This updated assumption, had it been used in the 2011 RIA modeling, would have significantly decreased the incremental capacity of acid gas controls (*e.g.*, DSI, dry FGD) that the model projected to be needed for compliance with the MATS acid gas limits.[96] The lower projection for controls would in turn have resulted in a lower cost estimate.

For a second example, the EPA updated the DSI retrofit cost methodology used in our power sector modeling. The 2011 RIA compliance cost projections assumed an SO_2 removal rate of 70 percent and a corresponding HCl removal effect of 90 percent[97] based on a technical report, developed by Sargent and Lundy in August 2010.[98] These assumptions have been updated to reflect an SO_2 removal rate of 50 percent and a corresponding HCl removal effect of 98 percent for units with FF in the EPA's recent modeling,[99] based on an updated technical report from Sargent and Lundy.[100]

These revised assumptions, which better reflect the actual cost and performance of DSI, would reduce the variable costs significantly, by about one-third at a representative plant,[101]

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[96] While we are unable to quantify precisely the impact that updating this assumption would have on the projected compliance costs, we can observe that most incremental DSI capacity (about 40 GW) would not require DSI controls in the 2011 RIA modeling, holding all else constant.
[97] *See https://www.epa.gov/sites/production/files/2015-07/documents/updates_to_epa_base_case_v4.10_ptox.pdf.* Accessed July 23, 2021.
[98] *See Dry Sorbent Injection Cost Development Methodology* at *https://www.epa.gov/sites/production/files/2015-07/documents/append5_4.pdf.* Accessed July 23, 2021.
[99] *See https://www.epa.gov/airmarkets/documentation-epa-platform-v6-november-2018-reference-case-chapter-5-emission-control.* Accessed July 23, 2021.
[100] *See Dry Sorbent Injection for SO_2/HCl Control Cost Development Methodology* at *https://www.epa.gov/sites/production/files/2018-05/documents/attachment_5-5_dsi_cost_development_methodology.pdf.* Accessed July 23, 2021.
[101] Based on a 500 MW plant with a heat rate of 9,500 Btu/kWh burning bituminous coal.

because less sorbent is required to achieve the same amount of HCl reduction. If the EPA had been able to use this new information in the 2011 RIA modeling, the projected compliance costs would have been lower, reflecting the reduced sorbent necessary to achieve the MATS emission limits. Furthermore, we note that while these modeling assumptions are based on a single sorbent (trona), alternative sorbents are available, potentially at a lower cost for some units.

A third example relates to the assumed cost of ESP upgrades. In the 2011 RIA modeling, the EPA assumed that a range of upgrades would be necessary at units with existing ESP controls in order to meet the MATS PM standard. The EPA assumed the cost of these upgrades ranged from $55/kilowatt (kW) to $100/kW (in 2009 dollars). However, new evidence suggests that many ESP upgrades were installed and are available at less than $50/kW.[102]

These examples highlight the uncertainty inherent in *ex ante* compliance cost projections, and contribute additional evidence that the projected compliance costs presented in the 2011 RIA were likely overestimated and that actual compliance costs for MATS in 2015 were likely significantly less than the $9.6 billion estimate.

d. Conclusion That the 2011 RIA Costs were Overestimated

After reviewing this suite of quantitative and qualitative updates and considering studies that were performed by outside entities, the EPA concludes that the available *ex post* evidence points to significantly lower costs of compliance for the power sector under MATS than suggested by the *ex ante* projections in the 2011 RIA. There are numerous reasons for this, and chief among them is the fact that the natural gas industry has undergone profound change in recent years. Following the promulgation of MATS, natural gas supply increased substantially,

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[102] *Analysis of PM and Hg Emissions and Controls from Coal-Fired Power Plants*. Andover Technology Partners (August 19, 2021), available in the rulemaking docket.

leading to dramatic price decreases that resulted in major shifts in the economics of fossil fuel-fired electric generating technologies. The 2011 RIA modeling did not fully anticipate this historic change in natural gas supply and the related decrease in natural gas prices. As a result of this and other fundamental changes in the industry, we see a very different pattern of control installations than was projected:[103]

- 21 percent less capacity of dry FGD than projected;
- 64 percent less capacity of DSI than projected;
- 3 percent less capacity of ACI than projected;
- 69 percent less capacity of FF than projected; and
- Likely fewer ESP and scrubber control upgrades than projected.

These controls were responsible for approximately 70 percent of the projected annual compliance costs in the 2011 RIA. Because so many projected controls were not installed, we know that the control-related costs were almost certainly significantly overestimated. By simply comparing between projected and installed controls, we now find that the projected control-related costs for 2015 of about $7 billion were likely overestimated by $2.2 to $4.4 billion, and possibly more.

In addition, we have updated some of the modeling assumptions that supported the 2011 RIA. Specifically:

- HCl emissions for EGUs burning subbituminous and lignite coals are much lower than originally modeled, reducing the number of controls necessary for compliance in the model;

[103] As discussed above, although we attributed all controls of these types to MATS in this analysis, even those controls that were installed were likely due in part or in whole for reasons other than MATS.

- DSI controls require less sorbent than originally assumed, lower the operating cost of these controls, and other lower-cost sorbents are likely available; and
- The assumed cost of ESP upgrades in the modeling was likely much higher than the actual cost of these upgrades.

While not quantified here, the advances in cost and performance of control technology between the time of the EPA's modeling and implementation of the rule would, if quantified, likely add to the $2.2 to $4.4 billion overestimate.

Furthermore, the three studies submitted to the EPA during earlier rulemakings support this finding that the 2011 RIA cost projection was significantly overestimated:

- Andover Technology Partners estimated that the actual costs of compliance with MATS were approximately $2 billion, and that the 2011 RIA may have overestimated compliance costs by approximately $7 billion.
- MJB&A estimated that the total upfront capital expenditures of pollution controls installed for compliance with the rule were overestimated in the 2011 RIA by a factor of more than eight.
- EEI, the association that represents all U.S. investor-owned electric companies, estimated cumulative costs incurred by the industry in response to MATS, and that estimate suggests an annual amount about $7 billion less than the 2011 RIA projected.

Taken together, this information indicates that the projected costs in the 2011 RIA were almost certainly significantly overestimated. We solicit comment on data resource and methods such as econometric, simulation, and event study approaches that may aid the EPA in better

characterizing the *ex post* regulatory costs of MATS for consideration before we issue the final rule.

3. Evaluation of Metrics Related to MATS Compliance

In the next four sections, we place the costs that we estimated in 2011, and which, as just explained, were likely significantly overestimated, in the context of the EGU industry and the services the EGU industry provides to society. The purpose of these comparisons is to better understand the disadvantages conferred by expending this money, both in terms of their scale and distribution, in order to weigh cost as a factor in our preferred methodology for making the appropriate determination. While we recognize the projected cost estimate from the 2011 RIA in absolute terms is perceived as a large number, our findings demonstrate that, for example, the (overestimated) projected cost estimate is less than 3 percent of the power sector's revenues from electricity sales, even when compared against data from 2019 (which had the lowest electricity sale revenues in a nearly 20 year period). As we did in 2016, we first contextualize the costs of MATS against power sector data for the years 2000 to 2011, *i.e.*, the information that was available to the Agency when we were promulgating MATS in 2012 and reaffirming the appropriate and necessary determination. For purposes of this proposal, we also expand our assessment to compare the 2011 cost estimates to the most recent years of data available regarding, for example, industry revenue and electricity prices. The intent of expanding the years of analysis is to update our assessments from the 2016 Supplemental Finding considering power sector trends with the newest information. We continue to use projections developed for the 2011 RIA for purposes of these evaluations, because as discussed in section III.B.2, we are unable to generate new, bottom-line actual cost projections. However, in section III.D, we consider these

evaluations in light of the EPA's finding that the projected costs were almost certainly significantly overestimated.

a. Compliance Costs as a Percent of Power Sector Sales

The first metric examined here (as in 2016) is a comparison of the annual compliance costs of MATS to electricity sales at the power sector-level (*i.e.*, revenues), often called a sales test. The sales test is a frequently used indicator of potential impacts from compliance costs on regulated industries.[104] Incorporating updated information from the EIA, Section 2.a and Table A-4 of the Cost TSD present the value of retail electricity sales from 2000 to 2019, as well as net generation totals for the electric power sector for the same period.

This information indicates that the $9.6 billion in annual compliance costs of MATS projected for 2015 would have represented about 2.7 percent of 2008 power sector revenues from retail electricity sales, the peak year during the 2000 to 2019 period. The $9.6 billion in projected compliance costs would constitute about 2.9 percent of 2019 sales, which was the lowest sales level observed in the post-2011 period. These projected compliance costs are a very small percentage of total EGU revenues from electricity sales in both robust or lean years, and newer data confirms the findings of the 2016 record. Moreover, if we account for the fact that the $9.6 billion figure likely significantly overestimated the actual cost of compliance, the percentage of compliance costs to revenues would be even smaller.

b. Compliance Expenditures Compared to the Power Sector's Annual Expenditures

[104] For example, the sales test is often used by the EPA when evaluating potential economic impacts of regulatory actions on small entities. In the context of a small entity analysis, an evaluation of the change in profits to owners is likely the best approach to assessing the economic burden to owners from a regulatory action. Data limitations prevent solely analyzing profit changes to EGU owners as a result of MATS in this proposal.

The next metrics we examine are a comparison of the annual capital expenditures projected in the 2011 RIA to be needed for MATS compliance to historical power sector-level overall capital expenditures, followed by a comparison of projected annual capital and production expenditures related to MATS compliance to historical power sector-level overall capital and production expenditures.

First, we evaluate capital expenditures. Capital costs represent largely irreversible investments for firms that must be paid off regardless of future economic conditions, as opposed to other important variable costs, such as fuel costs, that may vary according to economic conditions and generation needs. Section 2.b and Table A-5 of the Cost TSD present two sets of estimates for trends in annual capital expenditures by the electric power sector through 2019. The first set of information is based on data compiled by S&P Global, a private sector firm that provides data and analytical services. The second set of information is from the U.S. Census Bureau's Annual Capital Expenditures Survey. While each dataset has limitations, the estimates from each correspond to one another reasonably well.

The 2011 RIA modeling estimated the incremental capital expenditures associated with MATS compliance to be $4.2 billion for 2015. As discussed in section III.B.2, the 2011 RIA likely significantly overestimated compliance costs. This conclusion also applies to the capital cost component of the overall cost because, as detailed earlier, fewer pollution controls were installed during the 2013-2016 timeframe than were projected in the 2011 RIA. While the EPA is not able to produce an alternative capital cost estimate directly comparable to the estimates from the 2011 RIA, the analysis discussed in section III.B.2 and the Cost TSD indicated the annualized capital expenditures at units that installed controls under MATS might be as low as $0.7 billion ($3.5 billion lower than projected in 2011 RIA, or less than one-fifth).

Even using the significantly overestimated figure of $4.2 billion in our comparison shows that the projected capital expenditures associated with MATS represent a small fraction of the power sector's overall capital expenditures in recent years. Specifically, the $4.2 billion estimate represents about 3.6 or 3.7 percent of 2019 (*i.e.*, most recent) power sector level capital expenditures based on the S&P Global and U.S. Census information, respectively. Compared against 2004 power sector level capital expenditures (*i.e.*, the 20-year low), the $4.2 billion figure represents 10.4 or 9.3 percent of sector level capital expenditures (using the two respective data sets). Additionally, the projected $4.2 billion in incremental capital costs is well within the range of annual variability associated with capital expenditures for the sector over the 2000-2019 period. During this period, based on the Census information, for example, the largest year-to-year decrease in power sector-level capital expenditures was $19.5 billion (from 2001 to 2002) and the largest year-to-year increase in power sector-level capital expenditures was $23.4 billion (from 2000 to 2001). This wide range (-$19.5 to +$23.4 billion) indicates substantial year-to-year variability in industry capital expenditures, and the projected $4.2 billion increase in capital expenditures in 2015 projected under MATS falls well within this variability. Similar results are found using the S&P Global information. If a $4.2 billion increase in capital expenditures in 2015 projected under MATS falls well within the variability of historical trends, then a capital expenditure of less than $4.2 billion would also fall within this variability.

Next, in order to provide additional perspective to the projected cost information, we look at a broader set of costs faced by industry, including both capital and production expenditures together. Section 2.b and Table A-6 of the Cost TSD present two sets of estimates through 2019 for trends in annual total (capital and production) expenditures by the electric power sector using

the same two data sets as above, which we then compare with the projected annual total expenditures required by MATS.

We find that even the overestimated $9.6 billion compliance cost projection from the 2011 RIA represents a small fraction of the power sector's annual capital and production expenditures compared to historical data, and is well within annual variability in total costs over the 2000 to 2011 and the 2012 to 2019 periods. Compared to 2008 data (*i.e.*, the historic high for total industry expenditures), the projected $9.6 billion estimate represents about 4.2 to 4.3 percent of total expenditures. The MATS projected compliance cost represents 6.2 to 6.6 percent of total expenditures in 2003 (which was the lowest year for total industry expenditures during the studied time period). Additionally, the EPA notes that, similar to the capital expenditures analysis set forth in the 2015 Proposal, the projected $9.6 billion in incremental capital plus production costs is well within the range of annual variability in costs in general over the 2000 to 2019 period. For example, during this period, the largest year-to-year decrease in power sector-level capital and production expenditures ranged from $30.5 billion to $32.8 billion. The largest year-to-year increase in power sector-level capital and production expenditures in this period ranged from $27.5 billion to $28.7 billion. If a $9.6 billion increase in expenditures falls well within the variability of historical trends, then an expenditure substantially less than $9.6 billion would also fall within this variability.

c. Impact on Retail Price of Electricity

We are cognizant that, for an industry like the power sector, costs and disadvantages to regulation are not solely absorbed by regulated sources. Many firms in the industry are assured cost-recovery for expenditures, so there is considerable potential for EGUs to pass through the costs of compliance to consumers via increases in retail electricity prices. This is especially true

given that the demand for electricity is not particularly price-responsive. That is, because people are dependent on electricity for daily living, they are not likely to reduce their consumption of electricity even when the price goes up but will instead pay the higher price, thus absorbing the costs of compliance incurred by the industry. Notably, average retail electricity prices have fallen since the promulgation of MATS.

While we analyze these aspects of cost separately, control costs and electricity prices are not separate economic indicators. Electricity price increases are generally related to increases in the capital and operating expenditures by the power sector. Therefore, the electricity price impacts and the associated increase in electricity bills by consumers are not costs that are additional to the compliance costs described earlier in this section. In fact, to the extent the compliance costs are passed on to electricity consumers, the costs to the EGU owners in the power sector are reduced. Therefore, in order to further assess the disadvantages to regulation, in this case to consumers of electricity in all sectors (residential, commercial, industrial, transportation, and other sectors), we evaluate as we did in 2016 the projected effect MATS was anticipated to have on retail electricity prices, as measured against the variations in electricity prices from year to year. For this proposal, we expanded that analysis using updated data from the EIA, as presented in section 2.c and Table A-7 of the Cost TSD.

Looking at 2000-2019 data, we find that the projected 0.3 cents per kilowatt-hour projected increase in national average retail electricity price under MATS is well within the range of annual variability over the 2000-2019 period. During that time period, the largest year-to-year decrease in national average retail electricity price was -0.2 cents per kilowatt-hour (from 2001 to 2002) and the largest year-to-year increase was 0.5 cents per kilowatt-hour (from 2005 to 2006). For the newer data analyzed, we also found that average retail electricity prices have

generally decreased since 2011, from 9.33 cents per kilowatt-hour in 2011 to 8.68 cents per kilowatt-hour in 2019, or by nearly 7 percent.

After considering the potential impacts of MATS on retail electricity prices, the EPA concludes that the projected increase in electricity prices is within the historical range. In addition, any increase in electricity prices would not be additive to the overall compliance costs of MATS. Rather, such price impacts would in part reflect the ability of many EGUs to pass their costs on to consumers, thereby reducing the share of MATS compliance costs borne by owners of EGUs. Given the relationship between compliance costs and electricity prices, we would also therefore expect the significant overestimate of compliance costs reflected in the $9.6 billion figure to translate into overestimates in our projections for electricity price increases. Therefore, incorporating this newer data into our analysis, we find that MATS did not result in increases in electricity prices for American consumers that were outside the range of normal year-to-year variability, and during the period when MATS was implemented, electricity prices generally decreased.

d. Impact on Power Sector Generating Capacity

We recognize that the power sector plays a role of critical importance to the American public. A potential disadvantage to regulation that we consider to be a relevant factor in our consideration under CAA section 112(n)(1)(A) is how such regulation would impact the provision of adequate and reliable electricity throughout the country.[105] Therefore, we analyzed, as part of the 2012 record, projected net changes in generation capacity under MATS, as

[105] The EPA generally uses the term "reliability" to refer to the ability to deliver the resources to the projected electricity loads so the overall power grid remains stable, and the term "resource adequacy" generally refers to the provision of adequate generating resources to meet projected load and generating reserve requirements in each region.

compared to the base case, that is, what expected generation capacity would have been absent the rule.[106] We also conducted an analysis of the impacts of projected retirements on electric reliability. *Id.* And finally, in parallel with finalizing MATS, the EPA's Office of Enforcement and Compliance Assurance issued a policy memorandum describing an approach for units that were reliability critical that could demonstrate a need to operate in noncompliance with MATS for up to a year.[107]

Our analysis indicated that the vast majority of the generation capacity in the power sector directly affected by the requirements of MATS would remain operational following MATS. Specifically, our model projected that operational capacity with MATS in place would be reduced by less than 1 percent nationwide. *See* Resource Adequacy and Reliability TSD at 2. With respect to reliability, our modeling indicated that coal retirements would be distributed throughout the power grid, and that there would only be small impacts at the regional level, and that in those regions, we anticipated small decreases in overall adequacy of resources and robust remaining reserve margins. *Id.* These analyses therefore found that the power sector would be able to continue to provide adequate and reliable electricity even with regulation of the EGU sector for HAP.

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[106] U.S. EPA. 2011. *Resource Adequacy and Reliability in the Integrated Planning Model Projections for the MATS Rule* (Resource Adequacy and Reliability TSD), *http://www3.epa.gov/ttn/atw/utility/revised_resource_adequacy_tsd.pdf*, Docket ID Item No. EPA-HQ-OAR-2009-0234-19997.

[107] U.S. EPA. 2011. *The Environmental Protection Agency's Enforcement Response Policy For Use of Clean Air Act Section 113(a) Administrative Orders In Relation To Electric Reliability And The Mercury and Air Toxics Standard, https://www.epa.gov/sites/default/files/documents/mats-erp.pdf*, Docket ID Item No. EPA-HQ-OAR-2009-0234-20577.

Additionally, since MATS was promulgated, the EPA has not been made aware of reliability or resource adequacy problems attributable to MATS. As noted, the EPA's enforcement office concurrently issued a policy memorandum to work with sources that faced demonstrated reliability concerns, and five administrative orders were issued in connection with the policy.[108] We think this small number of sources obtaining relief due to their reliability critical status provides some confirmation of the EPA's projections that regulation would not cause widespread resource and reliability problems.

4. Other Cost Considerations

We also propose to reaffirm our previous findings regarding the costs of mercury controls, consistent with the instruction from the statute to study the availability and cost of such controls in CAA section 112(n)(1)(B). 80 FR 75036-37 (December 1, 2015). We similarly propose to reaffirm our previous records and findings regarding the cost of controls for other HAP emissions from EGUs, and the cost of implementing the utility-specific ARP, which Congress wrote into the 1990 CAA Amendments and implementation of which Congress anticipated could result in reductions in HAP emissions. *Id.* With respect to the costs of technology for control of mercury and non-mercury HAP, the record evidence shows that in 2012 controls were available and routinely used and that control costs had declined considerably over time. *Id.* at 75037-38. With regard to the ARP, industry largely complied with that rule by switching to lower-sulfur coal, and subsequently the actual costs of compliance were substantially lower than projected. Though the reasons for discrepancies between projected and actual costs are different for MATS, as discussed in section III.B.2, the newer information

[108] *https://www.epa.gov/enforcement/enforcement-response-policy-mercury-and-air-toxics-standard-mats*.

examined as part of this proposal demonstrates that the projected cost estimates for MATS were also likely significantly overestimated.

5. Summary of Consideration of Cost of Regulating EGUs for HAP

In this section, the EPA noted several studies performed by outside entities suggesting that costs of MATS may have been overestimated in the 2011 RIA. We discussed the dramatic impacts to the power sector over the last 10 years due to increasing supplies and decreasing price of natural gas and renewables, and we conducted a suite of quantitative and qualitative updates to the information available in the 2011 RIA. Based on this information, we propose to conclude that the available *ex post* evidence points to a power sector that incurred significantly lower costs of compliance obligations under MATS than anticipated based on the *ex ante* projections when the rule was finalized in 2012. This overestimate was significant – for just one part of the original compliance cost estimate, the EPA was able to quantify a range of at least $2.2 to $4.4 billion in projected costs related to the installation, operation, and maintenance of controls which were not expended by industry. This projected overestimation is limited to these costs; it does not account for other ways in which the rule's costs were likely overestimated, such as advances in control technologies that made control applications less expensive or more efficient at reducing emissions. The other studies conducted by stakeholders asserted there were even greater differences between projected and actual costs of MATS.

We next examined the 2011 projected costs, which were almost certainly significantly overestimated, in the context of the EGU industry and the services the EGU industry provides to society. The purpose of these comparisons was to better understand the disadvantages imposed by these costs, in order to weigh cost as a factor in our preferred methodology for making the appropriate determination. Even though the cost estimates we used in this analysis were almost

certainly significantly overestimated, we noted they were relatively small when placed in the context of the industry's revenues and expenditures, and well within historical variations.

Based on the 2011 RIA, the total projected cost of the MATS rule to the power sector in 2015 represented between 2.7 and 3.0 percent of annual electricity sales when compared to years from 2000 to 2019, a small fraction of the value of overall sales (and even smaller when one takes into account that the 2011 RIA projections were likely significantly overestimated). Looking at capital expenditures, the EPA demonstrated that the projected MATS capital expenditures in 2015 represented between 3.6 and 10.4 percent of total annual power sector capital expenditures when compared to years surrounding the finalization of the MATS rule. Such an investment by the power sector would comprise a small percentage of the sector's historical annual capital expenditures on an absolute basis and also would fall within the range of historical variability in such capital expenditures. Similarly, the EPA demonstrated that the projected capital and operating expenditures in 2015 represented between 4.3 and 6.2 percent of total annual power sector capital and operating expenditures over 2000 to 2019, and is well within the substantial range of annual variability. This proposal's analysis indicating that the far fewer controls were installed than the EPA had projected would be required is particularly relevant to considering our findings as to this metric; with the overestimation of capital expenditures in mind, actual investments by the power sector to comply with MATS would have comprised an even smaller percentage of historical annual capital expenditures.

With respect to impacts on the wider American public, the EPA examined impacts on average retail electricity prices and found the modest increases – which, like overall compliance costs, are also likely to have been significantly overestimated – to be within the range of historical variability. Experience has also shown that national average retail electricity prices in

years after MATS promulgation have declined. Finally, previous analysis indicated that the vast majority of the generation capacity in the power sector would remain operational and that the power sector would be able to continue to provide adequate and reliable electricity after implementation of the rule, and we have seen no evidence to contradict those findings.

The EPA proposes that each of these analyses are appropriate bases for evaluating the disadvantages to society conferred by the MATS-related projected compliance expenditures. As we note above, even though the projected costs we use in this analysis are almost certainly significantly overestimated, we find that they are still relatively small when placed in the context of the economics of the industry, and well within historical variations. We solicit comments on all aspects of this proposed consideration of costs.

C. *Revocation of the 2020 Final Action*

We are proposing to revoke the 2020 Final Action because we find that the framework used to consider cost in 2020, which centered the Agency's mandated determination under CAA section 112(n)(1)(A) on a comparison of costs to monetized HAP benefits, was an approach ill-suited to making the appropriate and necessary determination in the context of CAA section 112(n)(1)(A) specifically and the CAA section 112 program generally. Moreover, the statutory text and legislative history do not support a conclusion that the 2020 framework is required under CAA section 112(n)(1)(A), and we exercise our discretion to adopt a different approach. We also disagree with the conclusions presented in the 2020 Final Action as to the 2016 Supplemental Finding's two approaches.

The 2020 Final Action established the following framework for making the appropriate and necessary determination. It stated:

> "The Administrator has concluded that the following procedure provides the appropriate method under which the EPA should proceed to determine whether it

> is appropriate and necessary to regulate EGUs under CAA section 112(n)(1)(A). First, the EPA compares the monetized costs of regulation against the subset of HAP benefits that could be monetized. . . . Second, the EPA considers whether unquantified HAP benefits may alter that outcome. . . . Third, the EPA considers whether it is appropriate, notwithstanding the above, to determine that it is "appropriate and necessary" to regulate EGUs under CAA section 112(n)(1)(A) out of consideration for the PM co-benefits that result from such regulation." 85 FR 31302 (May 22, 2020).

Applying the first part of the framework, the Agency noted that the costs of regulation estimated in the 2011 RIA were disproportionately higher–by three orders of magnitude–than the monetized HAP benefits, and concluded "[t]hat does not demonstrate 'appropriate and necessary.'" *Id.* Under the framework's second inquiry, the EPA determined that the unquantified HAP benefits, even if monetized, were unlikely to alter its conclusion under the first part of the framework. *Id.*; *see also* 85 FR 31304 (noting that "valuing HAP-related morbidity outcomes would not likely result in estimated economic values similar to those attributed to avoiding premature deaths"). Finally, applying the third part of its framework, the EPA noted that nearly all of the monetized benefits of MATS as reflected in the 2011 RIA were derived from PM benefits. *See* 85 FR 31302-03 (May 22, 2020). The EPA then posited that, "[h]ad the HAP-specific benefits of MATS been closer to the costs of regulation, a different question might have arisen as to whether the Administrator could find that co-benefits legally form part of the justification for determination that regulation of EGUs under CAA section 112(d) is appropriate and necessary." *See* 85 FR 31303 (May 22, 2020). However, because of the factual scenario presented in the record, the Agency in the 2020 Final Action stated that "[t]he EPA does not need to, and does not, determine whether that additional step would be appropriate . . . given that the monetized and unquantified HAP-specific benefits do not come close to a level that would support the prior determination." *Id.* In conclusion, the EPA stated that "[u]nder the interpretation of CAA section 112(n)(1)(A) that the EPA adopts in this action, HAP benefits, as

compared to costs, must be the primary question in making the 'appropriate and necessary' determination." *Id.*

We note that the three-step framework employed by the 2020 Final Action is not a BCA conforming to recognized principles (*see*, *e.g.*, OMB Circular A-4, EPA Economic Guidelines). BCA is a specific tool developed by economists to assess total society-wide benefits and costs, to determine the economic efficiency of a given action. Instead of conforming to this comprehensive approach, the three-step framework focused primarily on comparing the rule's total costs to a very small subset of HAP benefits that could be monetized. The Agency gave secondary weight to the vast majority of the benefits of regulating HAP emissions from stationary sources that cannot be quantified, and completely ignored the non-HAP monetized benefits directly attributable to the MATS rule.

We propose to find that this three-step framework is an unsuitable approach to making the appropriate and necessary determination under CAA section 112(n)(1)(A) because it places undue primacy on those HAP benefits that have been monetized, and fails to consider critical aspects of the inquiry posed to the EPA by Congress in CAA section 112(n)(1). The 2020 three-step framework also did not in any meaningful way grapple with the bases upon which the EPA had relied to design the 2016 preferred approach, as discussed above, including the broad statutory purpose of CAA section 112 to reduce the volume of HAP emissions with the goal of reducing the risk from HAP emissions to a level that is protective of even the most exposed and most sensitive subpopulations; the fact that we rarely can fully characterize or quantify risks, much less benefits, at a nationwide level; and the fact that except for one of the many health endpoints for only one of the many HAP emitted from EGUs, the EPA lacked the information necessary to monetize any post-control benefit of reductions in HAP emissions. The sole

rationale provided in the 2020 Final Action for rejecting the relevance of the statute's clear purpose as evinced in the broader CAA section 112 program and reflected in the provisions of CAA section 112(n)(1) was that CAA section 112(n)(1)(A) is a separate provision and threshold determination. *See* 85 FR 31293-94 (May 22, 2020). But we do not think it is sensible to view the statute's direction to the EPA to make a separate determination as to EGUs as an invitation to disregard the statutory factors of CAA section 112(n)(1) and the greater statutory context in which that determination exists, and we do not think that the 2020 Final Action provided an adequately reasoned basis for abandoning the interpretation and assessment provided in the 2016 Supplemental Finding. And in any event, we believe the methodology we propose today is better suited to making the statutory finding than the 2020 framework.

In the 2020 rulemaking, the EPA did not explain its rationale for its decision to anchor the appropriate and necessary determination at step one as a comparison between the monetized costs of regulation and *monetized* HAP specific benefits. Rather, the proposed and final rules repeatedly state that the "primary" inquiry in the determination should be a comparison of costs and HAP benefits, but did not explain why only *monetized* HAP benefits should be given primacy. *See, e.g.*, 85 FR 31286, 31288, 31303 (May 22, 2020). Given the Agency's recognition of the broad grant of discretion inherent in the phrase "appropriate and necessary," *see* 81 FR 24430-31 (April 25, 2016), its acknowledgement of Congress' "particularized focus on reducing HAP emissions and addressing public health and environmental risks from those emissions" in CAA section 112, *see* 85 FR 31299 (May 22, 2020), and its knowledge and recognition that the dollar value of one of its points of comparison represented but a small subset of the advantages of regulation, *see* 85 FR 31302 (May 22, 2020), we now believe it was inappropriate to adopt a framework that first and foremost compared dollar value to dollar value. Nothing in the CAA

required the Agency's decision in 2020 to hinge its framework on monetized HAP benefits. The consideration of the non-monetized benefits of MATS *(i.e.*, dozens of endpoints, including virtually all of the HAP benefits associated with this rule) occurred only at step two, where the Agency considered whether the unquantified benefits, if monetized, were "likely to overcome the imbalance between the monetized HAP benefits and compliance costs in the record." *See* 85 FR 31296 (May 22, 2020). This approach discounts the vast array of adverse health and environmental impacts associated with HAP emissions from coal- and oil-fired EGUs that have been enumerated by the EPA[109] and discounts the social value (benefit) of avoiding those impacts through regulation, simply because the Agency cannot assign a dollar value to those impacts. Further, the three-step framework gave no consideration to the important statutory objective of protecting the most at-risk subpopulations. As noted above, in CAA section 112(n)(1)(C) Congress directed the EPA to establish threshold levels of exposure under which no adverse effect to human health would be expected to occur, even considering exposures of sensitive populations, and throughout CAA section 112, Congress placed special emphasis on regulating HAP from sources to levels that would be protective of those individuals most exposed to HAP emissions and most sensitive to those exposures. The rigid and narrow approach to making the appropriate and necessary determination in the 2020 Final Action is at odds with the text and purpose of CAA section 112, and is certainly not required under the express terms of CAA section 112 or CAA section 112(n)(1)(A).

Commenters on the 2019 Proposal objected strenuously to the Agency's revised framework for making the appropriate and necessary determination, arguing that the 2019

[109] *See, e.g.*, 65 FR 79829-30 (December 20, 2000); 76 FR 24983-85, 24993-97, 24999-25001, 25003-14, 25015-19 (May 3, 2011).

Proposal's interpretation "fails to meaningfully address factors that are 'centrally relevant' to the inquiry of whether it is appropriate and necessary to regulate HAP from EGUs," and that the Agency's new interpretation must fall because the EPA failed to provide a reasoned explanation for its change in policy, as required by *Motor Vehicle Mfrs. Ass'n of United States, Inc. v. State Farm Mut. Automobile Ins. Co.*, 463 U.S. 29 (1983), and *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502 (2009). *See* 85 FR 31294 (May 22, 2020). Among the factors that commenters argued had been inadequately addressed under the new framework were the "hazards to public health reasonably anticipated to occur" that had not been monetized; the non-monetizable benefits of HAP regulation such as preservation of tribal social practices; the latency, persistence in the environment, and toxicity of HAP as recognized by Congress; and the distributional impacts on particular communities and individuals most impacted by HAP emitted from power plants. In responses to these comments, the EPA claimed that it was not "disregarding" or "dismissing" the concerns raised by the commenters, but rather simply weighing them differently, and explained that the Administration's changed priorities provided the "reasoned basis" for its changed interpretation. *See* 85 FR 31296-97 (May 22, 2020).

Agencies do have broad discretion to re-evaluate policies and change their "view of what is in the public interest," *State Farm*, 463 U.S. at 57, but such re-evaluations must still adhere to principles of reasoned decision-making. The 2020 Final Action did not aver that the concerns identified by commenters were factors that the statute does not instruct the Agency to consider in making its appropriate and necessary determination. Instead, the EPA stated that it was permitted to pick its decisional framework and admitted that its decisional framework might undervalue certain factors. For example, with respect to commenters' concerns that the revised appropriate and necessary framework did not adequately account for adverse impacts on tribal culture or

undue concentration of public health risks on certain population subgroups or individuals, the EPA stated,

> "In a cost-benefit comparison, the overall amount of the benefits stays the same no matter what the distribution of those benefits is. The EPA, therefore, believes it is reasonable to conclude that those factors to which the EPA previously gave significant weight–including qualitative benefits, and distributional concerns and impacts on minorities–will not be given the same weight in a comparison of benefits and costs for this action under CAA section 112(n)(1)(A)." 85 FR 31297 (May 22, 2020).

The decisional framework in the 2020 Final Action, however, did not give "less weight" to these factors – it gave them none. In both the selection and application of its framework, the EPA in the 2020 Final Action effectively ignored these factors altogether, and we do not agree that the inability to monetize a factor should render it unimportant. *Cf. Am. Trucking Ass'ns, Inc. v. EPA*, 175 F.3d 1027, 1052–53 (D.C. Cir. 1999), reversed in part on other grounds in *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457 (2001) (holding that the EPA was not permitted to ignore information "because the . . . benefits are difficult, if not impossible, to quantify reliably and because there is 'no convincing basis for concluding that any such effects . . . would be significant'"); *Pub. Citizen v. Fed. Motor Carrier Safety Admin.*, 374 F.3d 1209, 1219 (D.C. Cir. 2004) ("The mere fact that the magnitude of . . . effects is *uncertain* is no justification for *disregarding* the effect entirely.") (emphasis in original). The mere mention and summary dismissal of factors does not constitute meaningful consideration of those factors.

In the 2020 Final Action, like the 2016 Supplemental Finding before it, the EPA maintained that there is more than one permissible way to interpret the Agency's obligation to consider cost in the appropriate and necessary determination. Given the Agency's knowledge of the significant risks and often irreversible impacts of HAP exposure on vulnerable populations like developing fetuses, the disproportionate impact of EGU HAP emissions on communities

who subsist on freshwater fish due to cultural practices and/or economic necessity, and the record of data demonstrating risks to public health amassed over decades, and, perhaps more importantly, the overwhelming quantity of advantages to regulation that could not be monetized, we do not think that selecting a framework that compared first and foremost monetized HAP benefits with costs was appropriate. And even if the framework ultimately addressed the statutorily relevant factors because at the second step the EPA stated that it was considering non-monetized HAP benefits, we think that the application of that second step fell short. The secondary consideration of non-monetized HAP benefits in the three-step framework only considered post-control HAP-related impacts of regulation insofar as the EPA speculated about what the monetized value of those benefits might be (*see* 85 FR 31296 (May 22, 2020), asserting that monetized value of avoiding morbidity effects such as neurobehavioral impacts is "small" compared to monetized value associated with avoided deaths). The Agency did not, at this second step, grapple with the existing risk analyses, including those stemming from the statutorily mandated studies in CAA section 112(n)(1). Those analyses demonstrated substantial public health and environmental hazards, even if the hazards were not translated into post-control monetized benefits. *See White Stallion*, 748 F.3d at 1245. The Agency also did not explain why other attributes of risk – such as impacts on vulnerable populations and the reality that HAP pollution from EGUs is not distributed equally across the population but disproportionately impacts some individuals and communities far more than others – were unimportant, stating only that the selected framework did not accommodate consideration of those factors.

As noted, the Agency did not point to anything in the CAA as supporting the use of its three-step framework. This is in stark contrast to the 2016 Supplemental Finding rulemaking, in which the EPA examined CAA section 112(n)(1)(A) and the other section 112(n)(1) provisions,

and the rest of CAA section 112 generally, and D.C. Circuit case law on CAA cost considerations to inform the EPA's interpretation of CAA section 112(n)(1)(A). *See* 80 FR 75030 (December 1, 2015); 2015 Legal Memorandum. In the 2020 Final Action, the EPA merely asserted that a comparison of benefits to costs is "a traditional and commonplace way to assess costs" and claimed that the Supreme Court's holding in *Entergy Corp. v. Riverkeeper*, 556 U.S. 208 (2009) supported the EPA's 2020 position that, absent an unambiguous prohibition to use a BCA, an agency may generally rely on a BCA as a reasonable way to consider cost. *See* 85 FR 31293 (May 22, 2020). The 2020 Final Action also pointed out "many references comparing" costs and benefits from the *Michigan* decision, including: "EPA refused to consider whether the costs of its decision outweighed the benefits" (576 U.S. at 743); "[o]ne would not say that it is rational, never mind 'appropriate,' to impose billions of dollars in economic costs in return for a few dollars in health or environmental benefits" (*Id.* at 752); and "[n]o regulation is 'appropriate' if it does more harm than good" (*Id.*).

But while we agree that a comparison of benefits to costs is a traditional way to assess costs, the 2020 framework was *not* a BCA. There is no economic theory or guidance of which we are aware that endorses the version of BCA presented in the 2020 Final Action, in which total costs are compared against a small subset of total benefits. *See* section III.E for further discussion. Moreover, general support for weighing costs and benefits does not justify placing undue weight on monetized HAP benefits, with secondary consideration for all other benefits, and only valuing those other benefits to the extent of their speculative monetized effects. As noted in Justice Breyer's concurrence in *Entergy Corp.*, the EPA has the ability "to describe environmental benefits in non-monetized terms and to evaluate both costs and benefits in accordance with its expert judgment and scientific knowledge," and to engage in this balancing

outside of "formal cost-benefit proceedings and futile attempts at comprehensive monetization." 556 U.S. at 235 (Breyer, J., concurring). Benefits – the advantages of regulation – can encompass outcomes that are not or cannot be expressed in terms of dollars and cents, just as the Court found that "'cost' includes more than the expense of complying with regulations; any disadvantage could be termed a cost." *Michigan*, 576 U.S. at 752. And the Court faulted the EPA's interpretation for "preclud[ing] the Agency from considering *any* type of cost – including, for instance, harms that regulation might do to human health or the environment. . . . No regulation is 'appropriate' if it does significantly more harm than good." *Id.* The constricted view of benefits that the Agency adopted in 2020 was ill-suited to the statutory inquiry as interpreted in *Michigan*.

The primary basis in the 2020 action upon which the EPA relied to find that the 2016 preferred approach was flawed was that the preferred approach failed to "satisf[y] the Agency's obligation under CAA section 112(n)(1)(A) as interpreted by the Supreme Court in *Michigan*." *See* 84 FR 2674 (February 7, 2019). The 2019 Proposal claimed that the chief flaw of the preferred approach was the Agency's failure to "meaningfully consider cost within the context of a regulation's benefits," asserting that the *Michigan* Court contemplated that a proper consideration of cost would be relative to benefits. *See* 84 FR 2675 (February 7, 2019). But that is not an accurate characterization of the 2016 preferred approach, wherein the Agency weighed the existing record from 2012 demonstrating that HAP emissions from EGUs pose a number of identified hazards to both public health and the environment remaining after imposition of the ARP and other CAA requirements against the cost of MATS. *See* 81 FR 24420 (April 25, 2016) ("After evaluating cost reasonableness using several different metrics, the Administrator has, in accordance with her statutory duty under CAA section 112(n)(1)(A), weighed cost against the

previously identified advantages of regulating HAP emissions from EGUs – including the agency's prior conclusions about the significant hazards to public health and the environment associated with such emissions and the volume of HAP that would be reduced by regulation of EGUs under CAA section 112."). The 2020 Final Action further stated that the preferred approach was an "unreasonable" interpretation of CAA section 112(n)(1)(A) and impermissibly de-emphasized the importance of the cost consideration in the appropriate and necessary determination. *See* 85 FR 31292 (May 22, 2020). It is a decisional framework which rests primarily upon a comparison of the costs of a regulation and the small subset of HAP benefits which could be monetized that does not "meaningfully consider[s] cost within the context of a regulation's benefits," because such a narrow approach relegates as secondary (and in application appeared to ignore altogether) the vast majority of that rule's HAP benefits and other advantages. We therefore propose to revoke the 2020 three-step approach and determination because we do not think it is a suitable way to assess the advantages and disadvantages of regulation under CAA section 112(n)(1)(A) and in applying it, the Agency failed to meaningfully address key facts in the existing record. Even if the Agency's selection of the 2020 framework could be considered a permissible interpretation of the broad "appropriate and necessary" determination in CAA section 112(n)(1)(A), we exercise our discretion under the statute and as described in *Michigan*, to approach the determination differently.

D. The Administrator's Proposed Preferred Framework and Proposed Conclusion

The EPA is proposing a preferred, totality-of-the-circumstances approach as a reasonable way to "pay attention to the advantages *and* disadvantages of [our] decision," *Michigan*, 576 U.S. at 753, in determining whether it is appropriate to regulate coal- and oil-fired EGUs under section 112 of the CAA. This approach, including which factors we consider and how much

weight we give them, is informed by Congress' design of CAA section 112(n)(1) specifically, and CAA section 112 generally.

Specifically, under this approach we first consider and weigh the advantages of reducing EGU HAP via regulation. We focus on the public health advantages of reducing HAP emissions because in CAA section 112(n)(1)(A), Congress specifically directed the EPA to regulate EGUs under CAA section 112 after considering the results of the "study of hazards to public health reasonably anticipated to occur as a result of emissions" by EGUs. We also consider the other studies commissioned by Congress in CAA sections 112(n)(1)(B) and (C) and the types of information the statute directed the EPA to examine under those provisions – the rate and mass of EGU mercury emissions, the health and environmental effects of such emissions, and the threshold level of mercury concentrations in fish tissue which may be consumed (even by sensitive populations) without adverse effects to public health.[110] We place considerable weight on the factors addressed in the studies required in the other provisions of CAA section 112(n)(1) because that provision is titled "Electric utility steam generating units," so it is reasonable to conclude that the information in those studies is important and relevant to a determination of whether HAP emissions from EGUs should be regulated under CAA section 112.[111] *See Michigan*, 576 U.S. at 753-54 (citing CAA sections 112(n)(1)(B) and (C), its caption, and the additional studies required under those subparagraphs as relevant statutory context for the appropriate and necessary determination).

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[110] CAA section 112(n)(1)(B) also directs the EPA to study available technologies for controlling mercury and the cost of such controls, and we consider those in our assessment of cost.

[111] The statute directed the EPA to complete all three CAA section 112(n)(1) studies within 4 years of the 1990 Amendments, expressing a sense of urgency with regard to HAP emissions from EGUs on par with addressing HAP emissions from other stationary sources. *See* CAA section 112(e) (establishing schedules for setting standards on listed source categories as expeditiously as practicable, but no later than between 2-10 years).

Notably, the studies of CAA section 112(n)(1) place importance on the same considerations that are expressed in the terms and overall structure of CAA section 112. For example, CAA section 112(n)(1)(A) and section 112(n)(1)(B) both show interest in the amount of HAP emissions from EGUs – section 112(n)(1)(A) by requiring the EPA to estimate the risk remaining after imposition of the ARP and other CAA requirements and section 112(n)(1)(B) by requiring the EPA to study the rate and mass of mercury emissions; therefore, we believe it is reasonable to conclude that we should consider and weigh the volume of toxic pollution EGUs contributed to our air, water, and land absent regulation under CAA section 112, in total and relative to other domestic anthropogenic sources, and the potential to reduce that pollution, thus reducing its grave harms. In addition, the clear goal in CAA section 112(n)(1)(C) and elsewhere to consider risks to the most exposed and susceptible populations supports our decision to place significant weight on reducing the risks of HAP emissions from EGUs to the most sensitive members of the population (*e.g.*, developing fetuses and children), and communities that are reliant on self-caught local fish for their survival. Finally, we also consider the identified risks to the environment posed by mercury and acid-gas HAP, consistent with CAA section 112(n)(1)(B) and the general goal of CAA section 112 to address adverse environmental effects posed by HAP emissions. *See* CAA section 112(a)(7) (defining "adverse environmental effect").

We next examine the disadvantages of regulation, principally in the form of the costs incurred to capture HAP before they enter the environment. As with the advantages side of the equation, where we consider the consequences of reducing HAP emissions to human health and the environment, we consider the consequences of these expenditures for the electricity generating sector and society. We therefore consider compliance costs comprehensively, placing them in the context of the effect those expenditures have on the economics of power generation

more broadly, the reliability of electricity, and the cost of electricity to consumers. These metrics are relevant to our weighing exercise because they give us a more complete picture of the disadvantages to society imposed by this regulation, and because our conclusion might change depending on how this burden affects the ability of the industry to thrive and provide reliable, affordable electricity to the benefit of all Americans. Consistent with CAA section 112(n)(1)(B), we further consider relevant control costs for EGUs and the relationship of control costs expected and experienced under the ARP and MATS.

Below, consistent with this framework, we consider and weigh the advantages to regulation against the costs of doing so, giving particular weight to our examination of the public health hazards we reasonably anticipate to occur as a result of HAP emissions from EGUs, and the risks posed by those emissions to exposed and vulnerable populations. We note as well that had we found regulation under CAA section 112 to impose significant barriers to provision of affordable and reliable electricity to the American public, this would have weighed heavily in our decision.

We acknowledge, as we recognized in the 2016 preferred approach, that this approach to making the appropriate and necessary determination is an exercise in judgment, and that "[r]easonable people, and different decision-makers, can arrive at different conclusions under the same statutory provision," (81 FR 24431; April 25, 2016), but this type of weighing of factors and circumstances is an inherent part of regulatory decision-making. As noted in then-Judge Kavanaugh's dissent in *White Stallion*, "All regulations involve tradeoffs, and . . . Congress has assigned EPA, not the courts, to make many discretionary calls to protect both our country's environment and its productive capacity." 748 F.3d at 1266 (noting as well that "if EPA had decided, in an exercise of its judgment, that it was 'appropriate' to regulate electric utilities under

the MACT program because the benefits outweigh the costs, that decision would be reviewed under a deferential arbitrary and capricious standard of review"). Bright-line tests and thresholds are not required under the CAA's instruction to determine whether regulation is "appropriate and necessary," nor have courts interpreted broad provisions similar to CAA section 112(n)(1)(A) in such manner. In *Catawba Cty. v. EPA*, the D.C. Circuit held that "[a]n agency is free to adopt a totality-of-the-circumstances test to implement a statute that confers broad authority, even if that test lacks a definite 'threshold' or 'clear line of demarcation to define an open-ended term.'" 571 F.3d 20, 37 (D.C. Cir. 2009).

In undertaking this analysis, we are cognizant that, while the Agency has been studying the science underlying this determination for decades, the understanding of risks, health, and environmental impacts associated with toxic air pollution continues to evolve. In this notice, we explained the additional information that has become available to the Agency since we performed our national risk assessments, and explained why, despite the certainty of the science demonstrating substantial health risks, we are unable at this time to quantify or monetize many of the effects associated with reducing HAP emissions from EGUs.[112] We continue to think it is appropriate to give substantial weight to these public health impacts, even where we lack information to precisely quantify or monetize those impacts. As the D.C. Circuit stated in *Ethyl Corp. v. EPA*,

> "Where a statute is precautionary in nature, the evidence difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge, the regulations designed to protect public health, and the decision that of an expert administrator, we will not demand rigorous step-by-step proof of cause and effect. . . . [I]n such cases, the Administrator may assess risks. . . . The Administrator may apply his expertise to draw conclusions from suspected, but not completely

[112] Unquantified effects include additional neurodevelopmental and cardiovascular effects from exposure to methylmercury, ecosystem effects, health risks from exposure to non-mercury HAP, and effects in EJ relevant subpopulations that face disproportionally high risks.

> substantiated, relationships between facts, from trends among facts, from theoretical projections from imperfect data, from probative preliminary data not yet certifiable as 'fact,' and the like."

541 F.2d 1, 28 (D.C. Cir. 1976). *See also Lead Industries Ass'n v. EPA*, 647 F.2d 1130, 1155 (D.C. Cir. 1980) ("[R]equiring EPA to wait until it can conclusively demonstrate that a particular effect is adverse to health before it acts is inconsistent with both the [Clean Air] Act's precautionary and preventive orientation and the nature of the Administrator's statutory responsibilities.").

The EPA is not alone in needing to make difficult judgments about whether a regulation that has a substantial economic impact is "worth it," in the face of uncertainty such as when the advantages of the regulation are hard to quantify in monetary terms. The Transportation Security Administration (TSA), when determining whether to require Advanced Imaging Technology at certain domestic airports, faced assertions that the high cost of widespread deployment of this type of screening was "not worth the cost." TSA acknowledged that it did not "provide monetized benefits" or "degree of benefits" to justify the use of the screening, but noted that the agency "uses a risk-based approach . . . in order to try to minimize risk to commercial air travel." *See* 81 FR 11364, 11394 (March 3, 2016). The agency pointed out that it could not consider "only the most easily quantifiable impacts of a terrorist attack, such as the direct cost of an airplane crashing," but rather that it had an obligation to "pursue the most effective security measures reasonably available so that the vulnerability of commercial air travel to terrorist attacks is reduced," noting that some commenters were failing to consider the more difficult to quantify aspects of the benefits of avoiding terrorist attacks, such as "substantial indirect effects and social costs (such as fear) that are harder to measure but which must also be considered by TSA when deciding whether an investment in security is cost-beneficial." *Id.*

In reviewing Agency decisions like these, courts do "not to substitute [their] judgment[s] for that of the agenc[ies]," *State Farm*, 463 U.S. at 43 (1983), and "[t]his is especially true when the agency is called upon to weigh the costs and benefits of alternative policies," *Center for Auto Safety v. Peck*, 751 F.2d 1336, 1342 (D.C. Cir. 1985). *See also United Church of Christ v. FCC*, 707 F.2d 1413, 1440 (D.C. Cir. 1983) ("[C]ost benefit analyses epitomize the types of decisions that are most appropriately entrusted to the expertise of an agency."). Agencies are entitled to this deference even where, or perhaps particularly where, costs or benefits can be difficult to quantify. For example, in *Consumer Elecs. Ass'n v. FCC*, the D.C. Circuit upheld the FCC's mandate to require digital tuners, finding reasonable the Commission's identification of benefits, that is, "principally speeding the congressionally-mandated conversion to DTV and reclaiming the analog spectrum," coupled with the FCC's "adequate[] estimate[of] the long-range costs of the digital tuner mandate within a range sufficient for the task at hand . . . and [its finding of] the estimated costs to consumers to be 'within an acceptable range.'" 347 F.3d 291, 303-04 (D.C. Cir. 2003) ("We will not here second-guess the Commission's weighing of costs and benefits.").

Similarly, the Food and Drug Administration, in weighing the costs and benefits of deeming electronic cigarettes to be "tobacco products," described the benefits qualitatively, "'potentially coming from' . . . premarket review [*i.e.*, the statutory consequence of deeming], which will result in fewer harmful or additive products from reaching the market than would be the case in the absence of the rule; youth access restrictions and prohibitions on free samples, which can be expected to constrain youth access to tobacco products and curb rising uptake; health warning statements, which will help consumers understand and appreciate the risks of using tobacco products; prohibitions against false or misleading claims and unsubstantiated modified risk claims; and other changes [such as monitoring and ingredient listings]." *Nicopure*

Labs, LLC v. FDA, 266 F. Supp. 3d 360, 403-404 (D.D.C. 2017), *aff'd*, 944 F.3d 267 (D.C. Cir. 2019). Plaintiffs challenging the rule claimed that because the FDA had not quantified the benefits of the rule, it "cannot realistically determine that a rule's benefits justify its costs," because "it does not have . . . a general grasp of the rule's benefits." *Id.* at 406. The court disagreed, finding the agency's statement of benefits to have "provided substantial detail on the benefits of the rule, and the reasons why quantification was not possible" and in any case agreeing with the agency that there was no obligation to quantify benefits in any particular way. *Id.*

We think the inquiry posed to the Agency by CAA section 112(n)(1)(A) has similarities to these other decisions, in which agencies tasked with protecting and serving the American public elected to take actions that would impose significant costs in order to achieve important benefits that could not be precisely quantified or were in some cases uncertain – protection from terrorist attacks, speeding the advancement of digital technology, and subjecting a new product to marketing and safety regulation. In those cases, the framework for decision-making was to make a judgment after a weighing of advantages against disadvantages, considering qualitative factors as well as quantified metrics. Here, we employ a similar totality-of-the-circumstances approach to the CAA section 112(n)(1)(A) inquiry as to whether it is appropriate to regulate HAP emissions from EGUs.

Earlier sections of this preamble (sections III.A. and III.B.) discuss in detail the EPA's evaluation of the public health and environmental advantages of regulating HAP from U.S. EGUs and the reasons it is not possible to quantify or monetize most of those advantages, as well as the EPA's comprehensive assessment of the costs of doing so. We will not in this section repeat every detail and data point, but we incorporate all of that analysis here and highlight only

a few of the considerations that weighed heavily in our application of the preferred totality-of-the-circumstances approach.

Under our preferred approach, we first consider the public health advantages to reducing HAP from EGUs, and the other focuses for study identified by Congress in CAA section 112(n)(1). As noted, we give particular weight in our determination to the information related to the statutory factors identified for the EPA's consideration by the studies – namely, the hazards to public health reasonably anticipated to occur as a result of EGU HAP emissions (112(n)(1)(A)), the rate and mass of mercury emissions from EGUs (112(n)(1)(B)), the health and environmental effects of such emissions (112(n)(1)(B)), and the levels of mercury exposure below which adverse human health effects are not expected to occur as well as the mercury concentrations in the tissue of fish which may be consumed (including by sensitive populations) without adverse effects to public health (112(n)(1)(C)).

The statutorily mandated studies are the foundation for the Agency's finding that HAP emissions from U.S. EGUs represent a clear hazard to public health and the environment, but as documented in section III.A., the EPA has continued to amass an extensive body of evidence related to the original study topics that only furthers the conclusions drawn in the earlier studies. As discussed in section III.A, the EPA completed a national-scale risk assessment focused on mercury emissions from U.S. EGUs as part of the 2011 Final Mercury TSD. That assessment specifically examined risk associated with mercury released from U.S. EGUs that deposits to watersheds within the continental U.S., bioaccumulates in fish as methylmercury, and is consumed when fish are eaten by female subsistence fishers of child-bearing age and other freshwater self-caught fish consumers. We focused on the female subsistence fisher subpopulation because there is increased risk for *in utero* exposure and adverse outcomes in

children born to female subsistence fishers with elevated exposure to methylmercury.[113] Our analysis estimated that 29 percent of the watersheds studied would lead to exposures exceeding the methylmercury RfD for this population, based on *in utero* effects, due in part to the contribution of domestic EGU emissions of mercury. We also found that deposition of mercury emissions from U.S. EGUs alone led to potential exposures that exceed the RfD in up to 10 percent of modeled watersheds.

We have also examined impacts of prenatal methylmercury exposure on unborn children of recreational anglers consuming self-caught fish from inland freshwater lakes, streams, and rivers, and found significant IQ loss in the affected population of children. Our analysis, which we recognized did not cover consumption of recreationally caught seafood from estuaries, coastal waters, and the deep ocean, nevertheless indicated significant health harm from methylmercury exposure. Methylmercury exposure also leads to adverse neurodevelopmental effects such as performance on neurobehavioral tests, particularly on tests of attention, fine motor function, language, and visual spatial ability. *See* section III.A.2.a.

The population that has been of greatest concern with respect to methylmercury exposure is women of childbearing age because the developing fetus is the most sensitive to the effects of methylmercury. *See* 85 FR 24995 (May 3, 2011). In the Mercury Study, the EPA estimated that, at the time of the study, 7 percent of women of childbearing age in the continental U.S. (or about 4 million women) were exposed to methylmercury at levels that exceeded the RfD and that about 1 percent of women of childbearing age (or about 580,000 women) had methylmercury exposures three to four times the RfD. *See* 65 FR 79827 (December 20, 2000).

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[113] The NAS Study had also highlighted this population as one of particular concern due to the regular and frequent consumption of relatively large quantities of fish. *See* 65 FR 79830 (December 20, 2000).

We also performed a new bounding analysis for this proposal that focuses on the potential for IQ points lost in children exposed *in utero* through maternal fish consumption by the population of general U.S. fish consumers (section III.A.3.d).

Another important human health impact documented by the EPA over the last 2 decades includes cardiovascular impacts of exposure to methylmercury – including altered blood-pressure and heart-rate variability in children as a result of infant exposure in the womb and higher risk of acute MI, coronary heart disease, and cardiovascular heart disease in adults, due to dietary exposure. Studies that have become available more recently led the EPA to perform new quantitative screening analyses (as described in section III.A.3) to estimate the incidence of MI (heart attack) mortality that may be linked to U.S. EGU mercury emissions. The new analyses performed include an extension of the original watershed-level subsistence fisher methylmercury risk assessment to evaluate the potential for elevated MI-mortality risk among subsistence fishers (section III.A.3.b; 2021 Risk TSD) and a separate risk assessment examining elevated MI mortality among all adults that explores potential risks associated with exposure of the general U.S. population to methylmercury from domestic EGUs through commercially-sourced fish consumption (section III.A.3.c; 2021 Risk TSD). The updated subsistence fisher analysis estimated that up to 10 percent of modeled watersheds are associated with exposures linked to increased risk of MI mortality, but for some populations such as low-income Black subsistence fishers active in the Southeast, that number is approximately 25 percent of the watersheds modeled. The bounding analysis results estimating MI-mortality attributable to U.S. EGU-sourced mercury for the general U.S. population range from 5 to 91 excess deaths annually. As noted, we give significant weight to these findings and analyses examining public health impacts associated with methylmercury, given the statutory focus in CAA section 112(n)(1)(B) and

112(n)(1)(C) on adverse effects to public health from EGU mercury emissions and the directive to develop an RfD ("threshold level of mercury exposure below which adverse human health effects are not expected to occur"), and in particular one that is designed to assess "mercury concentrations in the tissue of fish which may be consumed (including consumption by sensitive populations)." *See* CAA section 112(n)(1)(C).

Because of CAA section 112(n)(1)(A)'s broader focus on hazards to public health from all HAP, not just mercury, we also give considerable weight to health effects associated with non-mercury HAP exposure (*see* section III.A.2.b for further detail), including chronic health disorders such as irritation of the lung, skin, and mucus membranes; decreased pulmonary function, pneumonia, or lung damage; detrimental effects on the central nervous system; damage to the kidneys; and alimentary effects such as nausea and vomiting). The 2011 Non-Hg HAP Assessment, performed as part of the EPA's 2012 reaffirmation of the appropriate and necessary determination, expanded on the original CAA section 112(n)(1)(A) Utility Study by examining further public health hazards reasonably anticipated to occur from EGU HAP emissions after imposition of other CAA requirements. This study included a refined chronic inhalation risk assessment that was designed to assess how many coal- and oil-fired EGUs had cancer and non-cancer risks associated with them, and indicated that absent regulation, a number of EGUs posed cancer risks to the American public (*see* section III.A.2.b).

As discussed in section II.B, the statutory design of CAA section 112 quickly secured dramatic reductions in the volume of HAP emissions from stationary sources. CAA section 112(n)(1)(B) also directs the EPA to study, in the context of the Mercury Study, the "rate and mass" of mercury emissions. We therefore think it is reasonable to consider, in assessing the advantages to regulating HAP emissions from EGUs, what the volume of emissions was from

that sector prior to regulation – as an absolute number and relative to other sources – and what the expected volume of emissions would be with CAA section 112(d) standards in place. Prior to the EPA's promulgation of MATS in 2012, the EPA estimated that in 2016, without MATS, coal-fired U.S. EGUs above 25 MW would emit 29 tons of mercury per year. While these mercury emissions from U.S. EGUs represented a decrease from 1990 and 2005 levels (46 tons and 53 tons, respectively), they still represented nearly half of all anthropogenic mercury emissions in 2011 (29 out of 64 tons total). Considered on a proportional basis, the relative contribution of U.S. EGUs to all domestic anthropogenic mercury emissions was also stark. The EGU sector emitted more than six times as much mercury as any other sector (the next highest being 4.6 tons). *See* Table 3 at 76 FR 25002 (May 3, 2011). Prior to MATS, U.S. EGUs were estimated to emit the majority of HCl and HF nationally, and were the predominant source of emissions nationally for many metal HAP as well, including antimony, arsenic, chromium, cobalt, and selenium. *Id.* at 25005-06. In 2012, the EPA projected that MATS would result in an 88 percent reduction in hydrogen chloride emissions, a 75 percent reduction in mercury emissions, and a 19 percent reduction in PM emissions (a surrogate for non-mercury metal HAP) from coal-fired units greater than 25 MW in 2015 alone. *See* 77 FR 9424 (February 16, 2012). In fact, actual emission reductions since MATS implementation have been even more substantial. In 2017, by which point all sources were required to have complied with MATS, the EPA estimated that acid gas HAP emissions from EGUs had been reduced by 96 percent, mercury emissions had been reduced by 86 percent, and non-mercury metal HAP emissions had been reduced by 81 percent compared to 2010 levels. *See* 84 FR 2689 (February 7, 2019). Retaining the substantial reductions in the volume of toxic pollution entering our air, water, and land, from

this large fleet of domestic sources reduces the substantial risk associated with this pollution faced by all Americans.

Even though reducing HAP from EGUs would benefit all Americans by reducing risk and hazards associated with toxic air pollution, it is worth noting that the impacts of EGU HAP pollution in the U.S. have not been borne equally nationwide. Certain communities and individuals have historically borne greater risk from exposure to HAP emissions from EGUs prior to MATS, as demonstrated by the EPA's risk analyses. The individuals and communities that have been most impacted have shouldered a disproportionate burden for the energy produced by the power sector, which in turn benefits everyone – *i.e.*, these communities are subject to a greater share of the externalities of HAP pollution that is generated by EGUs producing power for everyone. A clear example of these disproportionately impacted populations are subsistence fishers who live near U.S. EGUs experiencing increased risk due to U.S. EGU mercury deposition at the watersheds where they are active (2011 Final Mercury TSD). CAA section 112(n)(1)(C) directed the EPA to examine risks to public health experienced by sensitive populations as a result of the consumption of mercury concentrations in fish tissue, which we think includes fetuses and communities that are reliant on local fish for their survival, and CAA section 112 more generally is drafted in order to be protective of small cohorts of highly exposed and susceptible populations. We therefore weigh heavily the importance of reducing risks to particularly impacted populations, including those who consume large amounts of self-caught fish reflecting cultural practice and/or economic necessity, including tribal populations, specific ethnic communities and low-income populations including Black persons living in the southeastern U.S.

Consistent with CAA section 112(n)(1)(B) and the general goal of CAA section 112 to reduce risks posed by HAP to the environment, we also consider the ecological effects of methylmercury and acid gas HAP (*see* section III.A.2.c). Scientific studies have consistently found evidence of adverse impacts of methylmercury on fish-eating birds and mammals, and insect-eating birds. These harmful effects can include slower growth and development, reduced reproduction, and premature mortality. Adverse environmental impacts of emissions of acid gas HAP, in particular HCl, include acidification of terrestrial and aquatic ecosystems. In the EPA's recent *Integrated Science Assessment for Oxides of Nitrogen, Oxides of Sulfur and Particulate Matter – Ecological Criteria* (2020), we concluded that the body of evidence is sufficient to infer a causal relationship between acidifying deposition and adverse changes in freshwater biota like plankton, invertebrates, fish, and other organisms. Adverse effects on those animals can include physiological impairment, loss of species, changes in community composition, and biodiversity. Because EGUs contribute to mercury deposition in the U.S., we conclude that EGUs are contributing to the identified adverse environmental effects, and consider the beneficial impacts of mitigating those effects by regulating EGUs.

We turn next in our application of the preferred approach to the consideration of the disadvantages of regulation, which in this case we measure primarily in terms of the costs of that regulation. As discussed in section III.B, for purposes of this preferred totality-of-the-circumstances approach, we start with the sector-level estimate developed in the 2011 RIA. Given the complex, interconnected nature of the power sector, we think it is appropriate to consider this estimate, which represents the incremental costs to the entire power sector to generate electricity, not just the compliance costs projected to be borne by regulated EGUs. We explain in section III.B that while a precise *ex post* estimate of this sector-level figure is not

possible, we update those aspects of the cost estimate where we can credibly do so (*see* section III.B.2), and our consideration of the cost of regulation therefore takes into account the fact that new analyses performed as part of this proposal demonstrate that the 2011 RIA cost estimate was almost certainly significantly overestimated. We propose to conclude that regulation is appropriate and necessary under either cost estimate.

As with the benefits side of the ledger, where we look comprehensively at the effects of reducing the volume of HAP, we also comprehensively assess costs in an attempt to evaluate the economic impacts of the regulation as a whole. We situate the cost of the regulation in the context of the economics of power generation, as we did in 2016, because we think examining the costs of the rule relative to three sector-wide metrics provides a useful way to evaluate the disadvantages of expending these compliance costs to this sector beyond a single monetary value. For each of these metrics, we use our 2011 estimate of compliance costs, which, as is discussed in section III.B.2 and the Cost TSD, was likely to have been significantly overestimated by a figure in the billions of dollars. We first evaluate the 2011 projected annual compliance costs of MATS as a percent of annual power sector sales, also known as a "sales test." A sales test is a frequently used indicator of potential impacts from compliance costs on regulated industries, and the EPA's analysis showed that projected 2015 compliance costs, based on the 2011 estimate, represented between 2.7 – 3.5 percent of power sector revenues from historical annual retail electricity sales. *See* section III.B.3; Cost TSD; 80 FR 75033 (December 1, 2015). We also examine the annual capital expenditures that were expected for MATS compliance as compared to the power sector's historical annual capital expenditures. We conclude that projected incremental annual capital expenditures of MATS would be a small percentage of 2011 power sector-level capital expenditures, and well within the range of

historical year-to-year variability on industry capital expenditures. *Id.* Finally, we consider the annual operating or production expenses in addition to capital expenditures because we were encouraged during the 2016 rulemaking to use this broader metric of power industry costs to provide perspective on the cost of MATS relative to total capital and operational expenditures by the industry historically. Consistent with our other findings, we conclude that, even when using the likely overestimated cost of MATS based on the 2011 RIA, the total capital and operational expenditures required by MATS are in the range of about 5 percent of total historical capital and operational expenditures by the power sector during the period of 2000-2011. *See* section III.B.3; Cost TSD; 81 FR 24425 (April 25, 2016). In this proposal, we re-analyze all of these metrics using updated data to reflect more recent information (as of 2019), and took into consideration the fact that the 2011 RIA cost estimate was almost certainly significantly overestimated. All of this new analysis further supports our findings as to the cost of MATS relative to other power sector economics based on the record available to the Agency at the time we were making the threshold determination (*i.e.*, the 2012 record).

Consistent with the *Michigan* Court's instruction to consider all advantages and disadvantages of regulation, we also assess, as we did in 2016, disadvantages to regulation that would flow to the greater American public. Specifically, we examine whether regulation of EGUs would adversely impact the provision of reliable, affordable electricity to the American public, because had regulation been anticipated to have such an effect, it would have weighed heavily on our decision as to whether it was appropriate to require such regulation. The CAA tasks the EPA with the purpose of protecting and enhancing air quality in the U.S., but directs that in doing so we promote public health and welfare *and* the productive capacity of the U.S. population. CAA section 101(b)(1). As noted, we also think examining these potential impacts is

consistent with the "broad and all-encompassing" nature of the term "appropriate," as characterized by the Supreme Court. *Michigan*, 576 U.S. at 752. We were particularly interested in examining the expected impact of MATS implementation on the retail price of electricity, because in electricity markets, utility expenditures can be fully or partially passed to consumers. It was therefore reasonable to assume that the cost of MATS could result in increased retail electricity prices for consumers, although we emphasize, as we did in 2016, that the electricity price impacts examined under this metric do not reflect *additional* compliance costs on top of the estimate produced in the 2011 RIA but rather reflect the passing on of a share of those costs to consumers (and ultimately reducing the costs EGU owners would otherwise bear). However, even though the impacts on electricity prices are reflected in the total cost estimate to the sector as a whole, we think, for the reasons stated above, that electricity price impacts are worthy of special attention because of the potential effect on the American public.

We therefore estimate the percent increase in retail electricity prices projected to result from MATS compared to historical levels of variation in electricity prices. *See* section III.B.3; 80 FR 75035 (December 1, 2015). We estimate that retail electricity prices for 2015 would increase by about 0.3 cents per kilowatt-hour, or 3.1 percent with MATS in place. Between 2000 and 2011, the largest annual year-to-year decrease in retail electricity price was -0.2 cents per kilowatt-hour and the largest year-to-year increase during that period was +0.5 cents per kilowatt-hour. The projected 0.3 cents increase due to MATS was therefore well within normal historical fluctuations. *Id.* As with the other metrics examined, as the increase in retail electricity prices due to MATS was within the normal range of historical variability, a substantially lower estimate for impacts on electricity prices would only further support the EPA's determination. We also note in section III.B.3 that the year-to-year retail electricity price changes in the new

information we examined (*i.e.*, years 2011-2019) were within the same ranges observed during the 2000-2011 period, and that in fact, during that period when MATS was implemented, retail electricity prices have generally decreased (9.3 cents per kilowatt-hour in 2011 to 8.7 cents per kilowatt-hour in 2019). Consistent with these observed trends in retail electricity prices, as discussed in section III.B.2 and further below, our *ex post* analysis of MATS indicates that the projected compliance costs in the 2011 RIA – and, as a corollary, the projected increases in retail electricity prices – were likely significantly overestimated. Certainly, we have observed nothing in the data that suggests the regulation of HAP from EGUs resulted in increases in retail electricity prices for the American public that would warrant substantial concern in our weighing of this factor.

Similar to our reasoning for examining impacts on electricity prices for American consumers, in assessing the potential disadvantages to regulation, we elected to also look at whether the power sector would be able to continue to provide reliable electricity to all Americans after the imposition of MATS. We think this examination naturally fits into our assessment of whether regulation is "appropriate," because had MATS interfered with the provision of reliable electricity to the American public, that would be a significant disadvantage to regulation to weigh in our analysis. In examining this factor, we looked at both resource adequacy and reliability – that is, the provision of generating resources to meet projected load and the maintenance of adequate reserve requirements for each region (resource adequacy) and the sector's ability to deliver the resources to the projected electricity loads so that the overall power grid remains stable (reliability). *See* section III.B.3; U.S. EPA 2011, Resource Adequacy and Reliability TSD; 80 FR 75036 (December 1, 2015). Our analysis indicated that the power sector would have adequate and reliable generating capacity, while maintaining reserve margins

over a 3-year MATS compliance period. *Id.* We did not in this proposal update the Resource Adequacy and Reliability Study conducted in 2011, but we note that the EPA, as a primary regulator of EGUs, is keenly aware of adequacy and reliability concerns in the power sector and in particular the relationship of those concerns to environmental regulation. We have not seen evidence in the last decade to suggest that the implementation of MATS caused power sector adequacy and reliability problems, and only a handful of sources obtained administrative orders under the enforcement policy issued with MATS to provide relief to reliability critical units that could not comply with the rule by 2016.

In addition to the cost analyses described above, the EPA revisited its prior records examining the costs of mercury controls consistent with the requirement in CAA section 112(n)(1)(B), the cost of controls for other HAP emissions from EGUs, and the cost of implementing the utility-specific ARP, which Congress wrote into the 1990 CAA Amendments and implementation of which Congress anticipated could result in reductions in HAP emissions. 80 FR 75036-37 (December 1, 2015). The ARP, like MATS, was expected to have a significant financial impact on the power sector, with projections of its cost between $6 billion to $9 billion per year (in 2000 dollars), based on the expectation that many utilities would elect to install FGD scrubbers in order to comply with the ARP. *Id.* at 75037. The actual costs of compliance were much less (up to 70 percent lower than initial estimates), in large part because of the utilities' choice to comply with the ARP by switching to low sulfur coal instead of installing scrubbers.[114] This choice also resulted in far fewer reductions in HAP emissions than would have occurred if more EGUs had installed SO_2 scrubbers. We believe the considerable reduction in the

[114] U.S. EPA Clean Air Markets Div., 2011, *National Acid Precipitation Assessment Program Report to Congress 2011: An Integrated Assessment*, National Science and Technology Council, Washington, DC.

implementation cost of the ARP is important because of the economic benefit that accrued from delaying the large capital costs of controls by almost 25 years. With respect to the costs of technology for control of mercury and non-mercury HAP, the record evidence shows that in 2012 controls were available and routinely used and that control costs had declined considerably over time. *Id.* at 75037-38. We also note that, as explained at length in section III.B.2, the actual compliance costs of MATS, with respect to capital and operating expenditures associated with installing and operating controls, were significantly lower than what we projected at the time of the rule. In addition, the newer information examined as part of this proposal demonstrates that actual control costs were much lower than we projected, which weighs further in favor of a conclusion that it is appropriate to impose those costs in order to garner the advantages of regulation.

Our review of the record and application of the preferred totality-of-the-circumstances approach has demonstrated that we have, over the last 2 decades, amassed a voluminous and scientifically rigorous body of evidence documenting the significant hazards to public health associated with HAP emissions from EGUs, particularly to certain vulnerable populations that bear greater risk from these emissions than the general public. We have looked at the volume of emissions coming from these sources and what the impact of regulation would be on that volume. We examined the cost of regulation to industry (even using an estimate of cost that we know to be higher than what was expended), and the potential adverse impacts that could be felt by the American public via increased electricity prices and access to reliable electricity. And, consistent with the statute, we have also considered adverse impacts of EGU pollution on the environment as well as availability of controls and the costs of those controls.

Even based solely on the record available to us at the time we issued the regulation and made the threshold determination in 2012, we find that the benefits of regulation are manifold, and they address serious risks to vulnerable populations that remained after the implementation of the ARP and other controls imposed upon the power sector that were required under the CAA. We have placed considerable weight on these benefits, given the statutory directive to do so in CAA section 112(n)(1)(A) and Congress' clear purpose in amending CAA section 112 in 1990. In contrast, the costs, while large in absolute terms, were shown in our analyses to be within the range of other expenditures and commensurate with revenues generated by the sector, and our analysis demonstrated that these expenditures would not and did not have any significant impacts on electricity prices or reliability. After considering and weighing all of these facts and circumstances, in an exercise of his discretion under the Act, the Administrator proposes to conclude that the substantial benefits of reducing HAP from EGUs, which accrue in particular to the most vulnerable members of society, are worth the costs. Consequently, we propose to find after weighing the totality of the circumstances, that regulation of HAP from EGUs is appropriate after considering cost.

The newer information examined as part of this proposal regarding both benefits and costs is directionally consistent with all of the findings the EPA has made in the 2016 administrative record. The robust and long-standing scientific foundation regarding the adverse health and environmental risks from mercury and other HAP is fundamentally unchanged since the comprehensive studies that Congress mandated in the CAA were completed decades ago. But in this proposal, we completed screening level risk assessments, informed by newer meta-analyses of the dose-response relationship between methylmercury and cardiovascular disease, which indicate that a segment of the American public is at increased risk of prematurely dying by

heart attack due to methylmercury exposure with as many as 91 deaths per year (and possibly more) being attributable to mercury emissions from EGUs.[115] Further, analyses show that some populations (*e.g.*, low-income Blacks in the Southeast and certain tribal communities engaging in subsistence fishing activity) likely bear a disproportionately higher risk from EGU HAP emissions than the general populace.

The new cost information analyzed by the EPA, discussed in section III.B, indicates that the cost projection used in the 2016 Supplemental Finding (*i.e.*, the 2011 RIA cost estimate) likely significantly overestimated the actual costs of compliance of MATS. Specifically, the EGU sector installed far fewer controls to comply with the HAP emissions standards than projected; certain modeling assumptions, if updated with newer information, would have resulted in a lower cost estimate; unexpected advancements in technology occurred; and the country experienced a dramatic increase in the availability of comparatively inexpensive natural gas. All of these factors likely resulted in a lower actual cost of compliance than the EPA's projected estimates in 2011. We therefore find that when we consider information available to the Agency after implementation of the rule, our conclusion that it was appropriate to regulate this sector for HAP is further strengthened. The costs projected in the 2011 RIA were almost certainly overestimated by an amount in the billions of dollars.

We note as well that during prior rulemaking processes related to the appropriate and necessary determination, stakeholders suggested that undermining the threshold finding in order to pave the way to rescinding MATS would have grave economic and health consequences. Utilities reported that they rely upon the mandated status of MATS in order to recoup

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[115] This estimate of premature mortality is for the EGU sector after imposition of the ARP and other CAA requirements, but before MATS implementation.

expenditures already made to comply with the rule before Public Utility Commission proceedings.[116] States asserted that they rely upon the Federal protections achieved by the rule in state implementation planning and other regulatory efforts.[117] And other industries, such as pollution control companies, have made business decisions based on the existence of MATS.[118] We think these reliance interests, nearly all of which are aligned, also weigh in favor of retaining the appropriate and necessary determination, particularly given the fact that a significant portion of compliance costs have already been spent.

Finally, while we focus on the HAP benefits, we note that the *Michigan* court directed that "any disadvantage could be termed a cost." *Michigan*, at 752. The corollary is that any advantage could be termed a benefit. And so, while it is not necessary to our conclusion that regulation is appropriate, we also consider, under our totality-of-the-circumstances approach, whether there are additional advantages or disadvantages to the specific controls imposed under MATS. Specifically, we note that because the controls required to reduce HAP from U.S. EGUs

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[116] *See, e.g.,* Comment Letter from Edison Electric Institute, Docket ID Item No. EPA-HQ-OAR-2018-0794-2267; Comment Letter from Edison Electric Institute, NRECA, American Public Power Association, The Clean Energy Group, Class of '85 Regulatory Response Group, Large Public Power Council, Global Energy Institute, International Brotherhood of Electrical Workers, International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers & Helpers, and the Laborers' International Union of North America, Docket ID Item No. EPA-HQ-OAR-2018-0794-0577.

[117] *See, e.g.,* Comment Letter from Attorneys General of Massachusetts, California, Connecticut, Delaware, Illinois, Iowa, Maine, Maryland, Michigan, Minnesota, Nevada, New Jersey, New Mexico, New York, North Carolina, Oregon, Rhode Island, Vermont, Virginia, Washington, and the District of Columbia, the Maryland Department of the Environment, the City Solicitor of Baltimore, the Corporation Counsels of Chicago and New York City, the County Attorney of the County of Erie, NY, and the County Counsel for the County of Santa Clara, CA, Docket ID Item No. EPA-HQ-OAR-2018-0794-1175.

[118] *See, e.g.,* Comment Letter from ADA Carbon Solutions, LLC, Docket ID Item No. EPA-HQ-OAR-2018-0794-0794; Comment Letter from Advanced Emissions Solutions, Inc., Docket ID Item No. EPA-HQ-OAR-2018-0794-1181; Comment Letter from Exelon Corporation, Docket ID Item No. EPA-HQ-OAR-2018-0794-1158.

resulted in substantial reductions in co-emitted pollutants, including direct $PM_{2.5}$ as well as SO_2 and NOx, which are both precursors to ozone and fine particle formation, the Administrator's proposed conclusion is further supported by the ramifications of the regulatory requirements in MATS for these pollutants. We propose that the benefits associated with such reductions may be appropriate to consider where the framework for making the CAA section 112(n)(1)(A) determination is a totality-of-the-circumstances approach, and we take comment on that approach. Therefore, while we conclude that the benefits associated with regulating HAP alone outweigh the costs without consideration of non-HAP benefits, we also propose that, to the extent we consider benefits attributable to reductions in co-emitted pollutants as a concomitant advantage, these benefits act to confirm that regulation is appropriate under a totality-of-the-circumstances approach. Specifically, we note that reductions in co-emissions of direct $PM_{2.5}$, SO_2 and NO_X will have substantial health benefits in the form of decreased risk of premature mortality among adults, and reduced incidence of lung cancer, new onset asthma, exacerbated asthma, and other respiratory and cardiovascular diseases. In the 2011 RIA, the EPA estimated the number and value of avoided $PM_{2.5}$-related impacts, including 4,200 to 11,000 premature deaths, 4,700 nonfatal heart attacks, 2,600 hospitalizations for respiratory and cardiovascular diseases, 540,000 lost work days, and 3.2 million days when adults restrict normal activities because of respiratory symptoms exacerbated by $PM_{2.5}$. We also estimated substantial additional health improvements for children from reductions in upper and lower respiratory illnesses, acute bronchitis, and asthma attacks. In addition, we estimated the benefit of reductions in CO_2 emissions under MATS. Although the EPA only partially monetized the benefits associated with these reductions in co-emitted pollutants in the 2011 RIA, the Agency estimated that – due in particular to the strong causal relationship between $PM_{2.5}$ and premature mortality – these

reductions could result in as much as $90 billion (in 2016 dollars) in additional public health benefits annually. Therefore, if these non-HAP benefits are considered in the totality-of-the-circumstances approach, we take note of the fact that regulating EGUs for HAP emissions results in substantial other health benefits accruing to the American public by virtue of regulating HAP from EGUs.

E. The Administrator's Proposed Benefit-Cost Analysis Approach and Proposed Conclusion

In addition to the preferred approach, we separately put forward an alternative approach, as we did in 2016, to support a determination that it is appropriate and necessary to regulate HAP from EGUs when looking at the results of a formal BCA. The formal BCA we conducted for purposes of meeting Executive Order 12866 using established BCA practices also demonstrates that the benefits estimated for MATS far exceed the estimated costs, as reported in the 2011 RIA.[119] In its net benefits projection, the 2011 RIA monetized only one post control benefit from regulating HAP emissions from EGUs because the Agency did not and does not have the information necessary to monetize the many other benefits associated with reducing HAP emissions from EGUs. *See* section III.A.4. However, the 2011 RIA properly accounted for all benefits by discussing qualitatively those that could not be quantified and/or monetized. While some of the impacts on particularly impacted populations – such as the children of recreational anglers experiencing IQ loss – were reflected in the net benefits calculation, that accounting does not really grapple with the equitable question of whether a subset of Americans should continue to bear disproportionate health risks in order to avoid the increased cost of controlling HAP from

[119] We use the term "formal benefit-cost analysis" to refer to an economic analysis that attempts to quantify all significant consequences of an action in monetary terms in order to determine whether an action increases economic efficiency. Assuming that all consequences can be monetized, actions with positive net benefits (*i.e.*, benefits exceed costs) improve economic efficiency.

EGUs. We continue to prefer a totality-of-the-circumstances approach to making the determination under CAA section 112(n)(1)(A), but we think that if a BCA is to be used, it should, consistent with economic theory and principles, account for all costs and all benefits.

BCA has been part of executive branch rulemaking for decades. Over the last 50 years, Presidents have issued Executive Orders directing agencies to conduct these analyses as part of the rulemaking development process. Executive Order 12866, currently in effect, requires a quantification of benefits and costs to the extent feasible for any regulatory action that is likely to result in a rule that may have an annual effect on the economy of $100 million or more or adversely affect in a material way certain facets of society. Executive Order 12866, at section 3(f)(1).

The EPA performed a formal BCA to comport with Executive Order 12866 as part of the 2012 MATS rulemaking process (referred to herein as the 2011 RIA). In the 2016 Supplemental Finding, the EPA relied on the BCA it had performed for Executive Order 12866 purposes as an alternative basis upon which to make the appropriate and necessary determination. That BCA, which reflected in its net benefits calculation only certain categories of benefits that could be confidently monetized, estimated that the final MATS would yield annual *net* monetized benefits (in 2007 dollars) of between $37 billion to $90 billion using a 3-percent discount rate and $33 billion to $81 billion using a 7-percent discount rate. *See* 80 FR 75040 (December 1, 2015). These estimates included the portion of the HAP benefits described in section III.A that could be monetized at the time, along with additional health benefits associated with the controls necessary to control the HAP emissions from U.S. EGUs. Specifically, as noted, the net benefits estimates included only one of the many HAP benefits associated with reduction of HAP. Nonetheless, the monetized benefits of MATS outweighed the estimated $9.6 billion in annual

monetized costs by between 3-to-1 or 9-to-1 depending on the benefit estimate and discount rate used. The implementation of control technologies to reduce HAP emissions from EGU sources also led to reductions in emissions of SO_2, direct $PM_{2.5}$, as well as other precursors to $PM_{2.5}$ and ozone. In the 2011 RIA, the EPA did not quantify the benefits associated with ozone reductions resulting from the emissions controls under MATS, but we did include estimates of the projected benefits associated with reductions in $PM_{2.5}$. These benefits were quite substantial and had a large economic value. Newer scientific studies strengthen our understanding of the link between $PM_{2.5}$ exposure to a variety of health problems, including: premature death, lung cancer, non-fatal heart attacks, new onset asthma, irregular heartbeat, aggravated asthma, decreased lung function, and respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing. Furthermore, since the RIA was completed in 2011, the EPA has updated its conclusions about how $PM_{2.5}$ emissions can adversely affect the environment through acidic deposition, materials damage, visibility impairment, and exacerbating climate change (EPA, 2019).[120] In its most recent review of the effects of ozone pollution, the EPA concluded that ozone is associated with a separate but similarly significant set of adverse outcomes including respiratory-related premature death, increased frequency of asthma attacks, aggravated lung disease, and damage to vegetation (EPA, 2020).[121]

BCAs are a useful tool to "estimate the *total* costs and benefits to society of an activity or program," and "can be thought of as an accounting framework of the overall social welfare of a

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[120] U.S. EPA. *Integrated Science Assessment (ISA) for Particulate Matter* (Final Report, Dec 2019). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-19/188, 2019.
[121] U.S. EPA. *Integrated Science Assessment (ISA) for Ozone and Related Photochemical Oxidants* (Final Report, Apr 2020). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-20/012, 2020.

program." EPA Economic Guidelines, Appendix A, A-6 (emphasis in original).[122] In a BCA, "[t]he favorable effects of a regulation are the benefits, and the foregone opportunities or losses in utility are the costs. Subtracting the total costs from the total monetized benefits provides an estimate of the regulation's net benefits to society." *Id.* Importantly, however, "[t]he key to performing BCA lies in the ability to measure both benefits and costs in monetary terms so that they are comparable." *Id.*; *see also* OMB Circular A-4 ("A distinctive feature of BCA is that both benefits and costs are expressed as monetary units, which allows you to evaluate different regulatory options with a variety of attributes using a common measure.").[123]

In the 2020 Final Action, the EPA rescinded the 2016 alternative approach on the basis that it was "fundamentally flawed" because it applied "a formal cost-benefit analysis" to the CAA section 112(n)(1)(A) determination. The Agency's objection at the time to the use of "a formal cost-benefit analysis" in the context of this determination was that doing so "implied that an equal weight was given to the non-HAP co-benefit emission reductions and the HAP-specific benefits of the regulation." *See* 85 FR 31299 (May 22, 2020). The Agency concluded that it was not appropriate to use a formal BCA in this situation because "to give equal weight to the monetized $PM_{2.5}$ co-benefits would permit those benefits to become the driver of the regulatory determination, which the EPA believes would not be appropriate." *Id.* The EPA reiterated in the 2020 Final Action that "HAP benefits, as compared to costs, must be the primary question in

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[122] U.S. EPA. 2014. *Guidelines for Preparing Economic Analyses*. EPA-240-R-10-001. National Center for Environmental Economics, Office of Policy. Washington, DC. December. Available at *https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses,* accessed July 23, 2021. Docket ID Item No. EPA-HQ-OAR-2009-0234-20503.

[123] U.S. OMB. 2003. *Circular A-4 Guidance to Federal Agencies on Preparation of Regulatory Analysis*. Available at *https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf,* accessed July 23, 2021.

making the 'appropriate and necessary' determination" and "the massive disparity between co-benefits and HAP benefits on this record would mean that that alternative approach clearly elevated co-benefits beyond their permissible role." *Id.* at 31303. "To be valid, the EPA's analytical approach to [CAA section 112(n)(1)(A)] must recognize Congress' particular concern about risks associated with HAP and the benefits that would accrue from reducing those risks." *Id.* at 31301.

We agree that the analytical framework for the appropriate and necessary determination should first and foremost be one that is focused on "Congress' particular concern about risks associated with HAP and the benefits that would accrue from reducing those risks." *Id.* It is for this reason, as discussed in section III.C of this preamble, that we propose to revoke the analytical framework advanced for the appropriate and necessary determination by the 2020 Final Action, as being insufficiently attentive to the public health advantages of regulation. However, if the decisional framework is going to be one that considers advantages to regulation primarily in terms of potential monetized outcomes (*see* 85 FR 31296-97; May 22, 2020), a formal BCA that estimates net outcomes (*i.e.*, by comparing total losses and gains) and conforms to established economic best practices and accounts for *all* of the effects of the rule that can be quantified should be used.[124]

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[124] In addition, CAA section 112(n)(1)(A) directs the EPA to evaluate the hazards to public health from EGU HAP emissions that a reasonably anticipated "after imposition of the other requirements of the [CAA]." The direction to consider the impacts of non-CAA section 112 requirements on HAP emissions from EGUs demonstrates that Congress understood that criteria pollutant controls would achieve HAP reductions. Given this understanding, it is reasonable for the EPA to consider the consequent criteria pollutant reductions attributable to CAA section 112 standards if a BCA is used to evaluate cost in the context of the appropriate finding. Furthermore, CAA section 112 legislative history not specifically directed at EGUs also supports the consideration of criteria pollutant benefits attributable to the regulation of HAP emissions. Specifically, the Senate report for the 1990 CAA amendments states: "When establishing

Consistent with scientific principles underlying BCA, both OMB Circular A-4 and the EPA's Guidelines for Preparation of Economic Analyses direct the Agency to include all benefits in a BCA. Per Circular A-4, OMB instructs "Your analysis should look beyond the direct benefits and direct costs of your rulemaking and consider any important ancillary benefits and countervailing risks. An ancillary benefit is a favorable impact of the rule that is typically unrelated or secondary to the statutory purpose of the rulemaking." Circular A-4 at 26. Similarly, the Guidelines state, "An economic analysis of regulatory or policy options should present all identifiable costs and benefits that are incremental to the regulation or policy under consideration. These should include directly intended effects and associated costs, as well as ancillary (or co-) benefits and costs." Guidelines at 11-2. As discussed in prior MATS rulemakings (*see, e.g.*, 80 FR 75041; December 1, 2015), installing control technologies and implementing the compliance strategies necessary to reduce the HAP emissions directly regulated by the MATS rule also results in reductions in the emissions of other pollutants such as directly emitted $PM_{2.5}$ and SO_2 (a $PM_{2.5}$ precursor). A particularly cost-effective control of emissions of particulate-bound mercury and non-mercury metal HAP is through the use of PM control devices that indiscriminately collect PM along with the metal HAP, which are predominately present as particles. Similarly, emissions of the acid gas HAP are reduced by acid gas controls that are also effective at reducing emissions of SO_2 (also an acid gas, but not a HAP). *Id.* While these $PM_{2.5}$ and SO_2 emission reductions are not the objective of the MATS

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technology-based [MACT] standards under this subsection, the Administrator may consider the benefits which result from control of air pollutants that are not listed but the emissions of which are, nevertheless, reduced by control technologies or practices necessary to meet the prescribed limitation." A Legislative History of the Clean Air Act Amendments of 1990 (CAA Legislative History), Vol. 5, pp. 8512 (CAA Amendments of 1989; p. 172; Report of the Committee on Environment and Public Works S. 1630).

rule, the reductions are, in fact, a direct consequence of regulating the HAP emissions from EGUs. Specifically, controls on direct $PM_{2.5}$ emissions are required to reduce non-mercury metal HAP, while SO_2 emissions reductions come from controls needed to reduce acid gas emissions from power plants.

However, we recognize that there are significant reasons to question whether a formal BCA is the best way to interpret the Agency's mandate in CAA section 112(n)(1)(A), and we take comment on whether the Agency should continue to rely on this alternative basis for making its determination. We have consistently taken the position that a formal BCA is not required under CAA section 112(n)(1)(A). *See* 80 FR 75039 (December 1, 2015). As set forth above, in *Michigan*, the Supreme Court declined to hold that CAA section 112(n)(1)(A) required such an assessment, stating, "We need not and do not hold that the law unambiguously required the Agency, when making this preliminary estimate, to conduct a formal cost-benefit analysis in which each advantage and disadvantage is assigned a monetary value." *Michigan*, 576 U.S. at 759. However, the Court did note that "[c]onsideration of cost reflects the understanding that reasonable regulation ordinarily requires paying attention to the advantages *and* disadvantages of agency decisions." *Id.* at 2707. Moreover, in finding the EPA's decision not to consider cost irrational, the Court suggested that unintended disadvantages of a regulation could be considered costs as well, implying that such disadvantages should be accounted for. *Id.* at 2707 ("The Government concedes that if the Agency were to find that emissions from power plants do damage to human health, but that the technologies needed to eliminate these emissions do even more damage to human health, it would still deem regulation appropriate. No regulation is 'appropriate' if it does significantly more harm than good.").

In the 2015 Proposal, we identified several policy reasons for preferring to apply a totality-of-the-circumstances approach to weighing costs and benefits over using a formal BCA as our decisional framework under CAA section 112(n)(1)(A). *See* 80 FR 75025 (December 1, 2015). We recognized that benefits like those associated with reduction of HAP can be difficult to monetize, and this incomplete quantitative characterization of the positive consequences can underestimate the monetary value of net benefits. *See* 80 FR 75039 (December 1, 2015). This is well-established in the economic literature. As noted in OMB Circular A-4, "[w]here all benefits and costs can be expressed as monetary units, BCA provides decision makers with a clear indication of the most efficient alternative." Circular A-4 at 2. However, "[w]hen important benefits and costs cannot be expressed in monetary units, BCA is less useful, and it can even be misleading, because the calculation of net benefits in such cases does not provide a full evaluation of all relevant benefits and costs." Circular A-4 at 10. The EPA's Guidelines for Preparation of Economic Analyses also recognizes the limitations of BCA, noting that "[m]ost important, [BCA] requires assigning monetized values to non-market benefits and costs. In practice it can be very difficult or even impossible to quantify gains and losses in monetary terms (*e.g.*, the loss of a species, intangible effects)." Guidelines, Appendix A at A-7.

We also pointed out in the 2015 Proposal that national level BCAs may not account for important distributional effects, such as impacts to the most exposed and most sensitive individuals in a population. *See* 80 FR 75040 (December 1, 2015). These distributional effects and equity considerations are often considered outside of (or supplementary to) analyses like BCAs that evaluate whether actions improve economic efficiency (*i.e.*, increase net benefits). For example, children near a facility emitting substantial amounts of lead are at significantly greater risk of neurocognitive effects (including lost IQ) and other adverse health effects. One

perspective on the costs and benefits of controlling lead pollution would be to aggregate those costs and benefits across society, as in a BCA net benefits calculation. However, neither costs nor benefits are spread uniformly across society and failing to take account of that can overlook significant health risks for sensitive subpopulations, such as children exposed to lead pollution. Similarly, in the context of this determination, where we have found disproportionate risk for certain highly exposed or sensitive populations, such considerations are also particularly relevant. *See* section II.B; section III.A.

We note too that OMB Circular A-4 highlights the special challenges associated with the valuation of health outcomes for children and infants, because it is "rarely feasible to measure a child's willingness to pay for health improvement" and market valuations such as increased "wage premiums demanded by workers to accept hazardous jobs are not readily transferred to rules that accomplish health gains for children." Circular A-4 at 31. We take comment on whether a BCA, on its own, is an appropriate tool to make a determination of whether to regulate under CAA section 112(n)(1)(A), given that it may not meaningfully capture all the societal interests the statute intends the EPA to consider. *See* Guidelines, Appendix A at A-7 ("In some cases a policy may be considered desirable even if the benefits do not outweigh the costs, particularly if there are ethical or equity concerns.").

With those caveats, we propose to reaffirm using a BCA approach, based on the 2011 RIA performed as part of the original MATS rulemaking, as another way to make the CAA section 112(n)(1)(A) determination of whether it is appropriate to regulate HAP emissions from EGUs.

Applying the alternative approach, based on the 2011 RIA, we propose to find that it is appropriate to regulate EGUs for HAP under CAA section 112(n)(1)(A). In the 2011 RIA, the

total benefits of MATS were estimated to vastly exceed the total costs of the regulation. As we found when applying the 2016 alternative approach, the formal BCA that the EPA performed for the 2012 MATS Final Rule estimated that the final MATS rule would yield annual monetized total benefits (in 2007 dollars) of between $37 billion to $90 billion using a 3-percent discount rate and between $33 billion to $81 billion using a 7-percent discount rate; this compares to projected annual compliance costs of $9.6 billion. This estimate of benefits was limited to those health outcomes the EPA was able to monetize. Despite the fact that these estimates captured only a portion of the benefits of the rule, excluding many important HAP and criteria pollutant-related endpoints which the Agency was unable to monetize (*see* section III.A.4) and instead discussed qualitatively in the 2011 RIA, it was clear that MATS was projected to generate overwhelmingly net positive effects on society. We continue to think that the BCA approach independently supports the conclusion that regulation of HAP emissions from EGUs is appropriate.

Although as discussed in section III.B.2 it was not possible for the EPA to update the entire comprehensive cost estimate found in the 2011 RIA, we think the new information presented in sections III.A and III.B directionally supports the net benefits calculation of the 2016 alternative approach. That is, we have attempted to quantify additional risks, including risks of premature death from heart attacks that result from exposure to methylmercury associated with domestic EGU emissions, and we believe the 2011 RIA's projected cost was almost certainly significantly overestimated. Therefore, we propose that if BCA is a reasonable tool to use in the context of the EPA's determination under CAA section 112(n)(1)(A), newer data collected since 2011 overwhelmingly support an affirmative determination. Further, that both analytical approaches to addressing the inquiry posed by *Michigan* lead to the same result

reinforces the reasonableness of the EPA's ultimate decision that it is appropriate and necessary to regulate HAP emissions from EGUs after considering cost.

In this proposal, the EPA has re-examined the extensive record, amassed over 2 decades, identifying the advantages of regulating HAP from EGUs and evaluating the costs of doing so. We have, for purposes of this proposal, also updated information on both benefits and costs. Of note, we find that new scientific literature indicates that methylmercury exposure from EGUs, absent regulation, poses cardiovascular and neurodevelopmental risks to all Americans and particularly those most exposed to this pollution. With respect to costs, we explain the combination of factors that occurred since the promulgation of MATS that leads us to believe that the projected, sector-level $9.6 billion estimate of the cost of compliance of the rule in 2015 was almost certainly significantly overestimated. We propose two different approaches to considering all of this information, applying first a totality-of-the-circumstances methodology weighing of benefits and costs and focusing particularly on those factors that we were instructed by the statute to study under CAA section 112(n)(1), and next using a formal benefit-cost approach consistent with established guidance and economic principles. Under either approach, whether looking at only the information available at the time of our initial decision to regulate or at all currently available information, we propose to conclude that it remains appropriate and necessary to regulate EGUs for HAP. Substantial emission reductions have occurred after implementation of MATS, the emission limits established pursuant to the Agency's 2012 affirmative appropriate and necessary determination, and these limits provide the only Federal guarantee of these emission reductions from EGUs, which, absent regulation, were the largest domestic anthropogenic source of a number of HAP. Finalizing this affirmative threshold determination would provide important certainty about the future of MATS for regulated

industry, states, other stakeholders, and the American public. We take comment on the information relied upon in this proposal and the EPA's proposed approaches to considering that information for this determination.

IV. Summary of Cost, Environmental, and Economic Impacts

The EPA estimates that there are 557 existing EGUs located at 265 facilities that are subject to the MATS rule. Because the EPA is not proposing any amendments to the MATS rule, there would not be any cost, environmental, or economic impacts as a result of the proposed action.

V. Request for Comments and for Information to Assist with Review of the 2020 RTR

On January 20, 2021, President Biden signed Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis" (86 FR 7037; January 25, 2021). That order, among other things, instructs the EPA to consider publishing a proposed rule suspending, revising, or rescinding the May 22, 2020 final action, "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units–Reconsideration of Supplemental Finding and Residual Risk and Technology Review." The 2020 Final Action contained two distinct, but related, final actions – (1) a reconsideration of the 2016 Supplemental Finding and (2) the RTR. This notice fulfills the Agency's obligation to address the first action. We solicit comments on all aspects of this proposed action.

Separate from this proposal, the EPA has initiated a review of the RTR, taking into account the latest information available on the experience of EGUs in complying with MATS and implementing measures to reduce HAP emissions. As previously noted, since MATS was promulgated in 2012, power sector emissions of mercury, acid gas HAP, and non-mercury metal

HAP have decreased by about 86 percent, 96 percent, and 81 percent, respectively, as compared to 2010 emissions levels (Table 4 at 84 FR 2689, February 7, 2019). While EGUs remain the largest domestic emitter of mercury (and other HAP), their emissions and contribution to total mercury in the environment is significantly less now than before MATS implementation. The EPA is seeking input into how both of these facts should factor into its review of the RTR.

In this notice, the EPA is soliciting information to allow for a more thorough review of the 2020 MATS RTR. The EPA is soliciting broadly for any data or information – including risk-related information – that will assist in the review of the RTR. The EPA is also soliciting specifically for any information on performance or cost of new or additional control technologies, improved methods of operation, or other practices and technologies that may result in cost-effective reductions of HAP emissions from coal- or oil-fired EGUs. In addition, the EPA is interested in receiving information on improvements or upgrades to existing controls that may result in cost-effective reductions of HAP emissions from coal- or oil-fired EGUs. The EPA also seeks information on the cost or performance of technologies and practices relating to monitoring of HAP emissions, and control of HAP emissions during startup and shutdown events, that could result in cost-effective reductions in HAP or assure improved operation of existing controls. We are seeking input from all interested stakeholders, including states, owners of EGUs, technology vendors and developers, and communities impacted by the emissions from EGUs.

VI. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at *https://www.epa.gov/laws-regulations/laws-and-executive-orders*.

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is a significant regulatory action that was submitted to OMB for review under Executive Order 12866. Any changes made in response to OMB recommendations have been documented in the docket. The EPA does not project any incremental costs or benefits associated with this action because it does not impose standards or other requirements on affected sources.

B. Paperwork Reduction Act (PRA)

This action does not impose any new information collection burden under the PRA. OMB has previously approved the information collection activities contained in the existing regulations and has assigned OMB control number 2060-0567. This action does not impose an information collection burden because the EPA is not proposing any changes to the information collection requirements.

C. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. This action will not impose any requirements on small entities. The EPA does not project any incremental costs or benefits associated with this action because it does not impose standards or other requirements on affected sources.

D. Unfunded Mandates Reform Act (UMRA)

This action does not contain an unfunded mandate of $100 million or more as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local, or tribal governments or the private sector.

E. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

This action does not have tribal implications as specified in Executive Order 13175. The executive order defines tribal implications as "actions that have substantial direct effects on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes." Revocation of the 2020 determination that it is not appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs under CAA section 112 and reaffirmation of the 2016 Supplemental Finding that it remains appropriate and necessary to regulate HAP emissions from EGUs after considering cost would not have a substantial direct effect on one or more tribes, change the relationship between the Federal Government and tribes, or affect the distribution of power and responsibilities between the Federal Government and Indian tribes. Thus, Executive Order 13175 does not apply to this action.

G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks

This action is not subject to Executive Order 13045 because it is not economically significant as defined in Executive Order 12866, and because this action does not impose new regulatory requirements that might present a disproportionate risk to children. This action reaffirms the 2016 Supplemental Finding that it is appropriate and necessary to regulate HAP emissions from U.S. EGUs, but does not impose control requirements, which were implemented through MATS (77 FR 9304; February 16, 2012). While this action does not impose or change

any standards or other requirements, it addresses the underpinning for the HAP emission standards in MATS. The EPA believes the reductions in HAP emissions achieved under MATS have provided and will continue to provide significant benefits to children in the form of improved neurodevelopment and respiratory health and reduced risk of adverse outcomes. Analyses supporting the 2012 MATS Final Rule estimated substantial health improvements for children in 2016 in the form of 130,000 fewer asthma attacks, 3,100 fewer emergency room visits due to asthma, 6,300 fewer cases of acute bronchitis, and approximately 140,000 fewer cases of upper and lower respiratory illness. *See* 77 FR 9441 (February 16, 2012). Reaffirming the appropriate and necessary determination assures those benefits will continue to accrue among children.

H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This action is not a "significant energy action" because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. This action is not anticipated to have impacts on emissions, costs, or energy supply decisions for the affected electric utility industry as it does not impose standards or other requirements on affected sources.

I. National Technology Transfer and Advancement Act (NTTAA)

This action does not involve technical standards.

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

The EPA believes that this action will not have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, and/or indigenous peoples, as specified in Executive Order 12898 (59 FR 7629; February 16, 1994),

because it does not impose standards or other requirements on affected sources and is limited in scope to only consider whether it is appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs. While this action does not impose or modify any standards or other requirements, it provides the underpinning for the emission standards regulating HAP from EGUs. As documented in both the NAS Study and Mercury Study, fish and seafood consumption is the primary route of human exposure to methylmercury originating from U.S. EGUs, with populations engaged in subsistence-levels of consumption being of particular concern. As shown in section III.A.5 of this preamble, certain minority, low-income, and indigenous populations are more likely to experience elevated exposures, thus higher health risks relative of the general population due to subsistence fishing. Furthermore, subpopulations with the higher exposure tend to overlap with those subpopulations that are particularly vulnerability to small changes in health risk because of other social determinants of health (*e.g.*, lack of access to health care and access to strong schooling), thereby compounding the implications of the implications of mercury exposure. Reaffirming the appropriate and necessary determination assures that the reduction in risks achieved by MATS continue.

Michael S. Regan,

Administrator.

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/31/2022 9:14:07 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]; DeLuca, Isabel [DeLuca.Isabel@epa.gov]; Millett, John [Millett.John@epa.gov]; Iglesias, Amber [Iglesias.Amber@epa.gov]; Chang, Alice [Chang.Alice@epa.gov]; Culligan, Kevin [Culligan.Kevin@epa.gov]
Subject: Fwd: Signed: NESHAP: Coal- and Oil-Fired Electric Utility Steam Generating Units – Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding (SAN 6716.2)
Attachments: image001.jpg; MATS Finding 2060-AV12 Proposed Rule_20220126_Review.admin.docx

FYI

Begin forwarded message:

From: "Wachter, Eric" <Wachter.Eric@epa.gov>
Date: January 31, 2022 at 3:44:13 PM EST
To: "Pritchard, Eileen" <Pritchard.Eileen@epa.gov>
Cc: "Hamilton, Lindsay" <Hamilton.Lindsay@epa.gov>, "Campbell, Ann" <Campbell.Ann@epa.gov>, "Hooper, Daniel" <hooper.daniel@epa.gov>, "Gaines, Cynthia" <Gaines.Cynthia@epa.gov>, "Grantham, Nancy" <Grantham.Nancy@epa.gov>
Subject: Signed: NESHAP: Coal- and Oil-Fired Electric Utility Steam Generating Units – Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding (SAN 6716.2)

Hi, Eileen,
Please see the attached digitally signed by the Administrator today.
Thank you,
Eric

Eric E. Wachter
Director
Office of the Executive Secretariat
(202) 564-1878 (o)
(202) 913-3252 (m)
he/him/his

Message

From: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Sent: 2/1/2022 2:21:57 AM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Paul Billings [Paul.Billings@lung.org]; Enobakhare, Rosemary [Enobakhare.Rosemary@epa.gov]; Levy, Maxwell [Levy.Maxwell@epa.gov]; Profeta, Timothy [Profeta.Timothy@epa.gov]; Tsirigotis, Peter [Tsirigotis.Peter@epa.gov]; Culligan, Kevin [Culligan.Kevin@epa.gov]
Subject: RE: MATS proposal and RIA etc?
Attachments: Fact Sheet_MATS AN Proposed Rule.pdf; MATS Finding 2060-AV12 Proposed Rule.pdf

With thanks to Kevin, please find the NPRM and fact sheet attached. Best,

Tomás

From: Carbonell, Tomas
Sent: Monday, January 31, 2022 8:19 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Paul Billings <Paul.Billings@lung.org>; Enobakhare, Rosemary <Enobakhare.Rosemary@epa.gov>; Levy, Maxwell <Levy.Maxwell@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: MATS proposal and RIA etc?

Hi Paul, thanks for reaching out. I don't think the NPRM and accompanying materials are posted yet. Here are a few points you can use in communications around the proposal:

- Controlling emissions of hazardous air pollutants from power plants improves public health for all Americans by reducing fatal heart attacks, reducing cancer risks, avoiding neurodevelopmental delays in children. These public health improvements are especially important for children and particularly vulnerable segments of the population such as indigenous communities, low-income communities, and people of color who regularly consume the fish they catch.
- When EPA promulgated MATS in 2011, the agency estimated that this vital health protection would avoid up to 11,000 premature deaths, 4,700 heart attacks, and 130,000 asthma attacks each year – with total health benefits valued at up to $90 billion per year.
- MATS, along with significant changes in the power sector, has been extremely effective in keeping hazardous air pollutants from power plants out of the air. Between 2010 and 2017 mercury emissions from power plants within the U.S. were reduced by 86%, non-mercury metal emissions were reduced by 81%, and acid gas emissions were reduced by 96%.
- A close examination of the costs of the MATS rule is an important piece of the A&N finding. Since MATS was implemented, more information has become available about the actual costs of the rule. Today's proposal finds that these emission reductions were achieved at far lower cost than EPA originally projected in 2011. EPA's analysis of the costs of MATS estimates that the Agency's 2011 cost assessment likely overestimated the costs of installing and operating controls by as much as $4.4 billion per year.

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Monday, January 31, 2022 6:22 PM
To: Paul Billings <Paul.Billings@lung.org>; Enobakhare, Rosemary <Enobakhare.Rosemary@epa.gov>; Levy, Maxwell <Levy.Maxwell@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: MATS proposal and RIA etc?

Despite what I said yesterday, we did not do an RIA for this action since we were simply re-affirming the foundation of standards already on the books. Kevin/Tomas – Can one of you please send Paul the final version of what the two of you iterated on last night and this AM? Thanks.

Joseph Goffman

Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Paul Billings <Paul.Billings@lung.org>
Sent: Monday, January 31, 2022 6:18 PM
To: Enobakhare, Rosemary <Enobakhare.Rosemary@epa.gov>; Levy, Maxwell <Levy.Maxwell@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>
Subject: MATS proposal and RIA etc?

Hello
I can't find the MATS NRPM, RIA, factsheet or other materials on the EPA.gov website.
Can you send me a link or send me pdf copies?

Thanks
Paul

Paul Billings
National Senior Vice President | Public Policy
American Lung Association
1331 Pennsylvania Ave NW #1425 | Washington DC 20004
D: 202-785-3988
Lung HelpLine: 1-800-LUNGUSA
Lung.org | Paul.Billings@Lung.org
Pronouns: He/Him/His

FACT SHEET
Mercury and Air Toxics Standards for Power Plants:
Proposed Reaffirmation of the Appropriate and Necessary Finding

- On January 31, 2022, the Environmental Protection Agency (EPA) proposed to reaffirm that it remains appropriate and necessary to regulate hazardous air pollutants (HAP), including mercury, from power plants after considering cost.
    - This action revokes a 2020 finding that it was not appropriate and necessary to regulate coal- and oil-fired power plants under Clean Air Act (CAA) section 112, which covers toxic air pollutants.
- EPA reviewed the 2020 finding and considered updated information on both the public health burden associated with HAP emissions from coal- and oil-fired power plants as well as the costs associated with reducing those emissions under the Mercury and Air Toxics Standards (MATS).
- After weighing the public risks posed by these emissions to all Americans and to particularly exposed and sensitive populations, against the costs of reducing this harmful pollution, EPA proposes to conclude that it remains appropriate and necessary to regulate these emissions.
- Today's proposed action, if finalized, would ensure that coal- and oil-fired power plants continue to control emissions of hazardous air pollution and that the agency properly interprets the CAA to protect the public from hazardous air emissions.
    - EPA is not proposing to change the status of coal- and oil-fired power plants as affected source categories for regulation under section 112 of the CAA, so the existing emissions standards for MATS would remain in effect and unchanged.
- The review that led to this action was directed by President Biden's January 20, 2021, Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis."
    - This Executive Order directed EPA to review and consider publishing a proposed action to suspend, revise, or rescind the May 22, 2020, final action known as the MATS Supplemental Finding and Residual Risk and Technology Review (RTR).
- Executive Order 13990 also directed EPA to re-evaluate the MATS Risk and Technology Review.
    - EPA is soliciting information on the cost and performance of new or improved technologies that control HAP emissions, improved methods of operation, and risk-related information to further inform the Agency's re-evaluation of the MATS RTR.
    - EPA will issue a separate action based on the Agency's assessment of the RTR.
- Prior to MATS, power plants were the largest domestic source of mercury and other air toxic pollutants such as hydrogen chloride and selenium. They were also among the largest domestic contributors of arsenic, chromium, cobalt, nickel, hydrogen cyanide, beryllium, and cadmium. These sources also emitted significant amounts of sulfur dioxide, nitrogen oxides, and particulates.
- EPA finalized MATS in 2012 and required sources to meet emissions reduction standards by 2016. The rule, along with significant changes in the power sector, has been extremely effective in keeping hazardous air pollutants from power plants out of the air. Between

2010 and 2017 mercury emissions from power plants within the U.S. were reduced by 86%, non-mercury metal emissions were reduced by 81%, and acid gases emissions were reduced by 96%.

- Controlling HAP emissions from power plants improves public health for all Americans by reducing fatal heart attacks, reducing cancer risks, avoiding neurodevelopmental delays in children, and by helping to restore certain ecosystems people and businesses value. These public health improvements are especially important for children and particularly vulnerable segments of the population such as indigenous communities, low-income communities, and people of color who regularly consume the fish they catch.

BACKGROUND

- On April 12, 2012, EPA re-affirmed its 2000 finding that it is appropriate and necessary to regulate coal- and oil-fired EGUs for HAP and promulgated National Emission Standards for Hazardous Air Pollutants for that source category, commonly known as the Mercury and Air Toxics Standards or MATS.
- In 2015, the U.S. Supreme Court, in *Michigan v. EPA*, held that the Agency had erred by not taking cost into consideration when making its determination that regulation of HAP emissions from coal- and oil-fired EGUs under section 112 of the CAA is appropriate and necessary.
- On April 25, 2016, EPA issued a supplemental finding in response to the *Michigan* decision and found that, after a consideration of costs, it remained appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs.
- On May 22, 2020, EPA reversed that determination, finding that, after weighing the costs of compliance against certain benefits of regulation, it is not appropriate and necessary to regulate coal- and oil-fired EGUs under section 112 of the CAA.
- The May 22, 2020, final action also included a RTR of MATS.

PUBLIC HEARING AND COMMENT

- EPA will hold a virtual public hearing for this proposed action. Further details will be announced at https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards.
- EPA will accept comment on the proposal for 60 days after publication in the *Federal Register*.
- Comments, identified by Docket ID No. EPA-HQ-OAR-2018-0794, may be submitted by one of the following methods:
    - Go to https://www.regulations.gov/ and follow the online instructions for submitting comments.
    - Send comments by email to a-and-r-docket@epa.gov, Attention Docket ID No. EPA-HQ-OAR-2018-0794 in the subject line of the message.
- Out of an abundance of caution for members of the public and our staff, the EPA Docket Center and Reading Room are closed to the public, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform.

- We encourage the public to submit comments via https://www.regulations.gov/ or email, as there may be a delay in processing mail and faxes. Hand deliveries and couriers may be received by scheduled appointment only.
- For further information on EPA Docket Center services and their current status, please visit us online at https://www.epa.gov/dockets.

FOR MORE INFORMATION

- Interested parties can download a copy of the proposed rule from EPA's website at the following address: https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards.
- Today's action and other background information are also available electronically at https://www.regulations.gov/, EPA's electronic public docket and comment system.

The EPA Administrator, Michael S. Regan, signed the following notice on 1/31/2022, and EPA is submitting it for publication in the *Federal Register* (FR). While we have taken steps to ensure the accuracy of this Internet version of the rule, it is not the official version of the rule for purposes of compliance. Please refer to the official version in a forthcoming FR publication, which will appear on the Government Printing Office's govinfo website (https://www.govinfo.gov/app/collection/fr) and on Regulations.gov (https://www.regulations.gov) in Docket No. EPA-HQ-OAR-2018-0794. Once the official version of this document is published in the FR, this version will be removed from the Internet and replaced with a link to the official version.

6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 63

[EPA-HQ-OAR-2018-0794; FRL-6716.2-01-OAR]

RIN 2060-AV12

National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units – Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding; Notice of Proposed Rulemaking

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The EPA is proposing to revoke a May 22, 2020 finding that it is not appropriate and necessary to regulate coal- and oil-fired electric utility steam generating units (EGUs) under Clean Air Act (CAA) section 112, and to reaffirm the Agency's April 25, 2016 finding that it remains appropriate and necessary to regulate hazardous air pollutant (HAP) emissions from EGUs after considering cost. The Agency is also reviewing another part of the May 22, 2020 action, a residual risk and technology review (RTR) of MATS. Accordingly, in addition to soliciting comments on all aspects of this proposal, the EPA is soliciting information on the performance and cost of new or improved technologies that control HAP emissions, improved methods of operation, and risk-related information to further inform the Agency's review of the MATS RTR as directed by Executive Order 13990.

DATES: Comments must be received on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

Public hearing: The EPA will hold a virtual public hearing on **[INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. See **SUPPLEMENTARY INFORMATION** for information on the hearing.

ADDRESSES: You may send comments, identified by Docket ID No. EPA-HQ-OAR-2018-0794, by any of the following methods:

- Federal eRulemaking Portal: *https://www.regulations.gov/* (our preferred method). Follow the online instructions for submitting comments.
- Email: *a-and-r-docket@epa.gov*. Include Docket ID No. EPA-HQ-OAR-2018-0794 in the subject line of the message.
- Fax: (202) 566-9744. Attention Docket ID No. EPA-HQ-OAR-2018-0794.
- Mail: U.S. Environmental Protection Agency, EPA Docket Center, Docket ID No. EPA-HQ-OAR-2018-0794, Mail Code 28221T, 1200 Pennsylvania Avenue, NW, Washington, DC 20460.
- Hand/Courier Delivery: EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004. The Docket Center's hours of operation are 8:30 a.m. – 4:30 p.m., Monday – Friday (except Federal holidays).

Instructions: All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to *https://www.regulations.gov/*, including any personal information provided. For detailed instructions on sending comments and additional information on the rulemaking process, see the **SUPPLEMENTARY INFORMATION** section of this document. Out of an abundance of caution for members of the public and our staff, the EPA Docket Center and Reading Room are closed to the public, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will

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continue to provide remote customer service via email, phone, and webform. We encourage the public to submit comments via *https://www.regulations.gov/* or email, as there may be a delay in processing mail and faxes. Hand deliveries and couriers may be received by scheduled appointment only. For further information on EPA Docket Center services and the current status, please visit us online at *https://www.epa.gov/dockets*.

FOR FURTHER INFORMATION CONTACT: For questions about this proposed action, contact Melanie King, Sector Policies and Programs Division (D243-01), Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-2469; and email address: *king.melanie@epa.gov*.

SUPPLEMENTARY INFORMATION:

The EPA is proposing to revoke a May 22, 2020 finding that it is not appropriate and necessary to regulate coal- and oil-fired EGUs under CAA section 112, and to reaffirm the Agency's April 25, 2016 finding that it remains appropriate and necessary to regulate HAP emissions from EGUs after considering cost. The 2016 finding was made in response to the U.S. Supreme Court's 2015 *Michigan v. EPA* decision, where the Court held that the Agency had erred by not taking cost into consideration when taking action on February 16, 2012, to affirm a 2000 EPA determination that it was appropriate and necessary to regulate HAP emissions from EGUs. In the same 2012 action, the EPA also promulgated National Emission Standards for Hazardous Air Pollutants (NESHAP) for coal- and oil-fired EGUs, commonly known as the Mercury and Air Toxics Standards or MATS.

Based on a re-evaluation of the administrative record and the statute, the EPA proposes to conclude that the framework applied in the May 22, 2020 finding was ill-suited to assessing and comparing the full range of benefits to costs, and the EPA concludes that, after applying a more

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suitable framework, the 2020 determination should be withdrawn. For reasons explained in this notice, the EPA further proposes to reaffirm that it is appropriate and necessary to regulate HAP emissions from EGUs after weighing the volume of pollution that would be reduced through regulation, the public health risks and harms posed by these emissions, the impacts of this pollution on particularly exposed and sensitive populations, the availability of effective controls, and the costs of reducing this harmful pollution including the effects of control costs on the EGU industry and its ability to provide reliable and affordable electricity. This notice also presents information and analysis that has become available since the 2016 finding, pertaining to the health risks of mercury emissions and the costs of reducing HAP emissions, that lend further support for this determination.

The review that led to this proposal is consistent with the direction in Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis," signed by President Biden on January 20, 2021. In response to the Executive Order, the Agency is also reviewing another part of the May 22, 2020 action, a RTR of MATS. Accordingly, in addition to soliciting comments on all aspects of this proposal, the EPA is soliciting information on the performance and cost of new or improved technologies that control HAP emissions, improved methods of operation, and risk-related information to further inform the Agency's review of the MATS RTR as directed by the Executive Order. Results of the EPA's review of the RTR will be presented in a separate action.

Participation in virtual public hearing. Please note that the EPA is deviating from its typical approach for public hearings because the President has declared a national emergency. Due to the current Centers for Disease Control and Prevention (CDC) recommendations, as well

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as state and local orders for social distancing to limit the spread of COVID-19, the EPA cannot hold in-person public meetings at this time.

The virtual public hearing will be held via teleconference on **[INSERT DATE 15 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** and will convene at 10:00 a.m. Eastern Time (ET) and will conclude at 7:00 p.m. ET. The EPA may close a session 15 minutes after the last pre-registered speaker has testified if there are no additional speakers. For information or questions about the public hearing, please contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov*. The EPA will announce further details at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*.

The EPA will begin pre-registering speakers for the hearing no later than 1 business day following publication of this document in the *Federal Register*. The EPA will accept registrations on an individual basis. To register to speak at the virtual hearing, please use the online registration form available at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards* or contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov*. The last day to pre-register to speak at the hearing will be **[INSERT DATE 9 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Prior to the hearing, the EPA will post a general agenda that will list pre-registered speakers in approximate order at: *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*.

The EPA will make every effort to follow the schedule as closely as possible on the day of the hearing; however, please plan for the hearings to run either ahead of schedule or behind schedule.

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Each commenter will have 5 minutes to provide oral testimony. The EPA encourages commenters to provide the EPA with a copy of their oral testimony electronically (via email) by emailing it to *king.melanie@epa.gov*. The EPA also recommends submitting the text of your oral testimony as written comments to the rulemaking docket.

The EPA may ask clarifying questions during the oral presentations but will not respond to the presentations at that time. Written statements and supporting information submitted during the comment period will be considered with the same weight as oral testimony and supporting information presented at the public hearing.

Please note that any updates made to any aspect of the hearing will be posted online at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*. While the EPA expects the hearing to go forward as set forth above, please monitor our website or contact the public hearing team at (888) 372-8699 or by email at *SPPDpublichearing@epa.gov* to determine if there are any updates. The EPA does not intend to publish a document in the *Federal Register* announcing updates.

If you require the services of a translator or a special accommodation such as audio description, please pre-register for the hearing with the public hearing team and describe your needs by **[INSERT DATE 7 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. The EPA may not be able to arrange accommodations without advanced notice.

Docket. The EPA has established a docket for this rulemaking under Docket ID No. EPA-HQ-OAR-2018-0794.[1] All documents in the docket are listed in *https://www.regulations.gov/*.

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[1] As explained in a memorandum to the docket, the docket for this action includes the documents and information, in whatever form, in Docket ID Nos. EPA-HQ-OAR-2009-0234 (National Emission Standards for Hazardous Air Pollutants for Coal- and Oil-fired Electric Utility Steam Generating Units), EPA-HQ-OAR-2002-0056 (National Emission Standards for Hazardous Air

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Although listed, some information is not publicly available, *e.g.*, Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy. With the exception of such material, publicly available docket materials are available electronically in *https://www.regulations.gov/*.

Instructions. Direct your comments to Docket ID No. EPA-HQ-OAR-2018-0794. The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *https://www.regulations.gov/*, including any personal information provided, unless the comment includes information claimed to be CBI or other information whose disclosure is restricted by statute. Do not submit electronically any information that you consider to be CBI or other information whose disclosure is restricted by statute. This type of information should be submitted by mail as discussed below.

The EPA may publish any comment received to its public docket. Multimedia submissions (audio, video, *etc.*) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.*, on the Web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit *https://www.epa.gov/dockets/commenting-epa-dockets*.

Pollutants for Utility Air Toxics; Clean Air Mercury Rule (CAMR)), and Legacy Docket ID No. A-92-55 (Electric Utility Hazardous Air Pollutant Emission Study). *See* memorandum titled *Incorporation by reference of Docket Number EPA-HQ-OAR-2009-0234, Docket Number EPA-HQ-OAR-2002-0056, and Docket Number A-92-55 into Docket Number EPA-HQ-OAR-2018-0794* (Docket ID Item No. EPA-HQ-OAR-2018-0794-0005).

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The *https://www.regulations.gov/* website allows you to submit your comment anonymously, which means the EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to the EPA without going through *https://www.regulations.gov/*, your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, the EPA recommends that you include your name and other contact information in the body of your comment and with any digital storage media you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, the EPA may not be able to consider your comment. Electronic files should not include special characters or any form of encryption and be free of any defects or viruses. For additional information about the EPA's public docket, visit the EPA Docket Center homepage at *https://www.epa.gov/dockets*.

The EPA is temporarily suspending its Docket Center and Reading Room for public visitors, with limited exceptions, to reduce the risk of transmitting COVID-19. Our Docket Center staff will continue to provide remote customer service via email, phone, and webform. We encourage the public to submit comments via *https://www.regulations.gov/* as there may be a delay in processing mail and faxes. Hand deliveries or couriers will be received by scheduled appointment only. For further information and updates on EPA Docket Center services, please visit us online at *https://www.epa.gov/dockets*.

The EPA continues to carefully and continuously monitor information from the CDC, local area health departments, and our Federal partners so that we can respond rapidly as conditions change regarding COVID-19.

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Submitting CBI. Do not submit information containing CBI to the EPA through *https://www.regulations.gov/* or email. Clearly mark the part or all of the information that you claim to be CBI. For CBI information on any digital storage media that you mail to the EPA, mark the outside of the digital storage media as CBI and then identify electronically within the digital storage media the specific information that is claimed as CBI. In addition to one complete version of the comments that includes information claimed as CBI, you must submit a copy of the comments that does not contain the information claimed as CBI directly to the public docket through the procedures outlined in *Instructions* above. If you submit any digital storage media that does not contain CBI, mark the outside of the digital storage media clearly that it does not contain CBI. Information not marked as CBI will be included in the public docket and the EPA's electronic public docket without prior notice. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 Code of Federal Regulations (CFR) part 2. Send or deliver information identified as CBI only to the following address: OAQPS Document Control Officer (C404-02), OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention Docket ID No. EPA-HQ-OAR-2018-0794. Note that written comments containing CBI and submitted by mail may be delayed and no hand deliveries will be accepted.

Preamble acronyms and abbreviations. We use multiple acronyms and terms in this preamble. While this list may not be exhaustive, to ease the reading of this preamble and for reference purposes, the EPA defines the following terms and acronyms here:

ACI	activated carbon injection
ATSDR	Agency for Toxic Substances and Disease Registry
ARP	Acid Rain Program
BCA	benefit-cost analysis
CAA	Clean Air Act

CAAA	Clean Air Act Amendments of 1990
CAMR	Clean Air Mercury Rule
CBI	Confidential Business Information
CFR	Code of Federal Regulations
CVD	cardiovascular disease
DSI	dry sorbent injection
EGU	electric utility steam generating unit
EIA	Energy Information Administration
EPA	Environmental Protection Agency
ESP	electrostatic precipitator
FF	fabric filter
FGD	flue gas desulfurization
FR	*Federal Register*
GW	gigawatt
HAP	hazardous air pollutant(s)
HCl	hydrogen chloride
HF	hydrogen fluoride
IHD	ischemic heart disease
IPM	Integrated Planning Model
IRIS	Integrated Risk Information System
kW	kilowatt
MACT	maximum achievable control technology
MATS	Mercury and Air Toxics Standards
MI	myocardial infarction
MIR	maximum individual risk
MW	megawatt
NAS	National Academy of Sciences
NESHAP	national emission standards for hazardous air pollutants
OMB	Office of Management and Budget
O&M	operation and maintenance
PM	particulate matter
PUFA	polyunsaturated fatty acid
RfD	reference dose
RIA	regulatory impact analysis
RTR	residual risk and technology review
SCR	selective catalytic reduction
SO_2	sulfur dioxide
TSD	technical support document

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tpy tons per year

Organization of this document. The information in this preamble is organized as follows:

I. General Information
A. Executive Summary
B. Does this action apply to me?
C. Where can I get a copy of this document and other related information?
II. Background
A. Regulatory History
B. Statutory Background
III. Proposed Determination Under CAA Section 112(n)(1)(A)
A. Public Health Hazards Associated with Emissions From EGUs
B. Consideration of Cost of Regulating EGUs for HAP
C. Revocation of the 2020 Final Action
D. The Administrator's Proposed Preferred Framework and Proposed Conclusion
E. The Administrator's Proposed Benefit-Cost Analysis Approach and Proposed Conclusion
IV. Summary of Cost, Environmental, and Economic Impacts
V. Request for Comments and for Information to Assist with Review of the 2020 RTR
VI. Statutory and Executive Order Reviews
A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review
B. Paperwork Reduction Act (PRA)
C. Regulatory Flexibility Act (RFA)
D. Unfunded Mandates Reform Act (UMRA)
E. Executive Order 13132: Federalism
F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments
G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks
H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use
I. National Technology Transfer and Advancement Act (NTTAA)
J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

I. General Information

A. Executive Summary

On January 20, 2021, President Biden signed Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis" (86 FR 7037, January 25, 2021). The Executive Order, among other things, instructs the EPA to review the

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2020 final action titled, "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units–Reconsideration of Supplemental Finding and Residual Risk and Technology Review" (85 FR 31286; May 22, 2020) (2020 Final Action) and consider publishing a notice of proposed rulemaking suspending, revising, or rescinding that action. Consistent with the Executive Order, the EPA has undertaken a careful review of the 2020 Final Action, in which the EPA reconsidered its April 25, 2016 supplemental finding (81 FR 24420) (2016 Supplemental Finding). Based on that review, the Agency proposes to find that the decisional framework for making the appropriate and necessary determination under CAA section 112(n)(1)(A) that was applied in the 2020 Final Action was unsuitable because it failed to adequately account for statutorily relevant factors. Therefore, we propose to revoke the May 2020 determination that it is not appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs under section 112 of the CAA. We further propose to reaffirm our earlier determinations – made in 2000 (65 FR 79825; December 20, 2000) (2000 Determination), 2012 (77 FR 9304; February 16, 2012) (2012 MATS Final Rule), and 2016 – that it is appropriate and necessary to regulate coal- and oil-fired EGUs under section 112 of the CAA.

In 1990, frustrated with the EPA's pace in identifying and regulating HAP, Congress radically transformed its treatment of that pollution. It rewrote section 112 of the CAA to require the EPA to swiftly regulate 187 HAP with technology-based standards that would require all major sources (defined by the quantity of pollution a facility has the potential to emit) to meet the levels of reduction achieved in practice by the best-performing similar sources. EGUs were the one major source category excluded from automatic application of these new standards. EGUs were treated differently primarily because the 1990 Amendments to the CAA (1990 Amendments) included the Acid Rain Program (ARP), which imposed criteria pollution

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reduction requirements on EGUs. Congress recognized that the controls necessary to comply with this and other requirements of the 1990 Amendments might reduce HAP emissions from EGUs as well. Therefore, under CAA section 112(n)(1)(A), Congress directed the EPA to regulate EGUs if, after considering a study of "the hazards to public health reasonably anticipated to occur as a result of [HAP] emissions by [EGUs] … after imposition of the [Acid Rain Program and other] requirements of this chapter," the EPA concluded that it "is appropriate and necessary" to do so. *See* CAA section 112(n)(1)(A).

The EPA completed that study in 1998 and, in 2000, concluded that it is appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs. *See* 65 FR 79825 (December 20, 2000). The EPA reaffirmed that conclusion in 2012, explaining that the other requirements of the CAA, in particular the ARP, did not lead to the HAP emission reductions that had been anticipated because many EGUs switched to lower-sulfur coal rather than deploy pollution controls that may have also reduced emissions of HAP. Indeed, the statute contemplated that the EPA would be conducting the required study within 3 years of the 1990 Amendments; but when the EPA re-examined public health hazards remaining after imposition of the Act's requirements in 2012, the Agency accounted for over 20 years of CAA regulation, and EGUs still remained one of the largest sources of HAP pollution. Specifically, in 2012, the EPA concluded that EGUs were the largest domestic source of emissions of mercury, hydrogen fluoride (HF), hydrogen chloride (HCl), and selenium; and among the largest domestic contributors of emissions of arsenic, chromium, cobalt, nickel, hydrogen cyanide, beryllium, and cadmium. The EPA further found that a significant majority of EGUs were located at facilities that emitted above the statutory threshold set for major sources (*e.g.*, 10 tons per year (tpy) of any one HAP or 25 tpy or more of any combination of HAP). *See* 77 FR 9304 (February 16,

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2012). In 2012, the EPA also established limits for emissions of HAP from coal- and oil-fired EGUs. *Id.*

Many aspects of the EPA's appropriate and necessary determination and the CAA section 112 regulations were challenged in the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit), and all challenges were denied and the finding and standards upheld in full in *White Stallion Energy Center v. EPA*, 748 F.3d 1222 (2014). The Supreme Court granted review on a single issue and, in *Michigan v. EPA*, 576 U.S. 743 (2015), the Court held that the EPA erred when it failed to consider the costs of its regulation in determining that it is appropriate and necessary to regulate HAP emissions from EGUs, and remanded that determination to the D.C. Circuit for further proceedings. Following *Michigan*, in 2016 the EPA issued a Supplemental Finding that it is appropriate and necessary to regulate EGU HAP after considering the costs of such regulation. *See* 81 FR 24420 (April 25, 2016). In 2020, the Agency reversed that determination.[2] In this action, we conclude that the methodology we applied in 2020 is ill-suited to the appropriate and necessary determination because, among other reasons, it did not give adequate weight to the significant volume of HAP emissions from EGUs and the attendant risks remaining after imposition of the other requirements of the CAA, including many adverse health and environmental effects of EGU HAP emissions that cannot be quantified or monetized. We propose, therefore, to revoke the 2020 Final Action.

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[2] The 2020 Final Action, while reversing the 2016 Supplemental Finding as to the EPA's determination that it was "appropriate" to regulate HAP from EGUs, did not rescind the Agency's prior determination that it was necessary to regulate. *See* 84 FR 2674 (February 7, 2019). Instead, the 2020 rulemaking stated that its rescission was based on the appropriate prong alone: "CAA section 112(n)(1)(A) requires the EPA to determine that both the appropriate *and* necessary prongs are met. Therefore, if the EPA finds that either prong is not satisfied, it cannot make an affirmative appropriate and necessary finding. The EPA's reexamination of its determination . . . focuses on the first prong of that analysis." *Id.*

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We further propose to affirm, once again, that it is appropriate and necessary to regulate coal- and oil-fired EGUs under CAA section 112. We first examine the benefits or advantages of regulation, including new information on the risks posed by EGU HAP. We then examine the costs or disadvantages of regulation, including both the costs of compliance (which we explain we significantly overestimated in 2012) and how those costs affect the industry and the public. We then weigh these benefits and costs to reach the conclusion that it is appropriate and necessary to regulate using two alternative methodologies.

Our preferred methodology, as it was in the 2016 Supplemental Finding, is to consider all of the impacts of the regulation – both costs and benefits to society – using a totality-of the-circumstances approach rooted in the *Michigan* court's direction to "pay[] attention to the advantages *and* disadvantages of [our] decision[]." 576 U.S. at 753; *see id.* at 752 ("In particular, 'appropriate' is 'the classic broad all-encompassing term that naturally includes consideration of all relevant factors."). To help determine the relevant factors to weigh, we look to CAA section 112(n)(1)(A), the other provisions of CAA section 112(n)(1), and to the statutory design of CAA section 112.

Initially, we consider the human health advantages of reducing HAP emissions from EGUs because in CAA section 112(n)(1)(A) Congress directed the EPA to make the appropriate and necessary determination after considering the results of a "study of the hazards to public health reasonably anticipated to occur as a result of [HAP] emissions" from EGUs. *See* CAA section 112(n)(1)(A). We consider all of the advantages of reducing emissions of HAP (*i.e.*, the risks posed by HAP) regardless of whether those advantages can be quantified or monetized, and we explain why almost none of those advantages can be monetized. Consistent with CAA section 112(n)(1)(B)'s direction to examine the rate and mass of mercury emissions, and the

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design of CAA section 112, which required swift reduction of the volume of HAP emissions based on an assumption of risk, we conclude that we should place substantial weight on reducing the large volume of HAP emissions from EGUs – both in absolute terms and relative to other source categories – that, absent MATS, was entering our air, water, and land, thus reducing the risk of grave harms that can occur as a result of exposure to HAP. Also consistent with the statutory design of CAA section 112, in considering the advantages of HAP reductions, we consider the distribution of those benefits, and the statute's clear goal in CAA section 112(n)(1)(C) and other provisions of CAA section 112 to protect the most exposed and susceptible populations, such as communities that are reliant on local fish for their survival, and developing fetuses. We think it is highly relevant that while EGUs generate power for all, and EGU HAP pollution poses risks to all Americans exposed to such HAP, a smaller set of Americans who live near EGUs face a disproportionate risk of being significantly harmed by toxic pollution. Finally, we also consider the identified risks to the environment posed by mercury and acid-gas HAP, consistent with CAA section 112(n)(1)(B) and the general goal of CAA section 112 to reduce risks posed by HAP to the environment.

We next weigh those advantages against the disadvantages of regulation, principally in the form of the costs incurred to control HAP before they are emitted into the environment. Consistent with the statutory design, we consider those costs comprehensively, examining them in the context of the effect of those expenditures on the economics of power generation more broadly, the reliability of electricity, and the cost of electricity to consumers. These metrics are relevant to our weighing exercise because they give us a more complete picture of the disadvantages to producers and consumers of electricity imposed by this regulation, and because our conclusion might change depending on how this burden affects the ability of the industry to

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thrive and to provide reliable, affordable electricity to the benefit of all Americans. These metrics are relevant measures for evaluating costs to the utility sector in part because they are the types of metrics considered by the owners and operators of EGUs themselves. *See* 81 FR 24428 (April 25, 2016). Per CAA section 112(n)(1)(B), we further consider the availability and cost of control technologies, including the relationship of that factor to controls installed under the ARP.

As explained in detail in this document, we ultimately propose to conclude that, weighing the risks posed by HAP emissions from EGUs against the costs of reducing that pollution on the industry and society as a whole, it is worthwhile (*i.e.*, "appropriate") to regulate those emissions to protect all Americans, and in particular the most vulnerable populations, from the inherent risks posed by exposure to HAP emitted by coal- and oil-fired EGUs. We propose to find that this is true whether we are looking at the record in 2016 (*i.e.*, information available as of the time of the 2012 threshold finding and rulemaking) or at the updated record in 2021, in which we quantify additional risks posed by HAP emissions from EGUs and conclude that the actual cost of complying with MATS was almost certainly significantly less than the EPA's projected estimate in the 2011 RIA, primarily because fewer pollution controls were installed than projected and because the unexpected increases in natural gas supply led to a dramatic decrease in the price of natural gas.

In the 2016 Supplemental Finding we did not consider non-HAP health benefits that occur by virtue of controlling HAP from EGUs as a relevant factor for our consideration under the preferred approach. However, because the Supreme Court in *Michigan* directed us to consider health and environmental effects beyond those posed by HAP, "including, for instance, harms that regulation might do to human health or the environment," and stressed that "[n]o regulation is 'appropriate' if it does significantly more harm than good," 576 U.S. at 752, we

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take comment on whether it is reasonable to also consider the advantages associated with non-HAP emission reductions that result from the application of HAP controls as part of our totality-of-the-circumstances approach. In the 2012 MATS Final Rule, we found that regulating EGUs for HAP resulted in substantial health benefits accruing from coincidental reductions in particulate matter (PM) pollution and its precursors. We also projected that regulating EGUs for HAP would similarly result in an improvement in ozone pollution. While we propose to reach the conclusion that HAP regulation is appropriate even absent consideration of these additional benefits, adding these advantages to the weighing inquiry would provide further support for our proposed conclusion that the advantages of regulation outweigh the disadvantages.

We recognize, as we did in 2016, that our preferred, totality-of-the-circumstances approach to making the appropriate and necessary determination is an exercise in judgment, and that "[r]easonable people, and different decision-makers, can arrive at different conclusions under the same statutory provision" (81 FR 24431; April 25, 2016). However, this type of weighing of factors and circumstances is an inherent part of regulatory decision-making, and we think it is a reasonable approach where the factors the statute identifies as important to consider cannot be quantified or monetized.

Next, we turn to our alternative approach of a formal benefit-cost analysis (BCA). This approach independently supports the determination that it is appropriate to regulate EGU HAP. Based on the 2011 Regulatory Impacts Analysis (2011 RIA)[3] performed as part of the 2012 MATS Final Rule, the total net benefits of MATS were overwhelming even though the EPA was only able to monetize one of the many benefits of reducing HAP emissions from EGUs. Like the

[3] U.S. EPA. 2011. *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards.* EPA-452/R-11-011. Available at: *https://www3.epa.gov/ttn/ecas/docs/ria/utilities_ria_final-mats_2011-12.pdf.*

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preferred approach, this conclusion is further supported by newer information on the risks posed by HAP emissions from EGUs as well as the actual costs of implementing MATS, which almost certainly were significantly lower than estimated in the 2011 RIA.

Our proposal is organized as follows. In section II.A of this preamble, we provide as background the regulatory and procedural history leading up to this proposal. We also detail, in preamble section II.B, the statutory design of HAP regulation that Congress added to the CAA in 1990 in the face of the EPA's failure to make meaningful progress in regulating HAP emissions from stationary sources. In particular, we point out that many provisions of CAA section 112 demonstrate the value Congress placed on reducing the volume of HAP emissions from stationary sources as much as possible and quickly, with a particular focus on reducing HAP related risks to the most exposed and most sensitive members of the public. This background assists in identifying the relevant statutory factors to weigh in considering the advantages and disadvantages of HAP regulation.

Against this backdrop, we propose to revoke the 2020 Final Action and reaffirm the 2016 determination that it remains appropriate to regulate HAP emissions from EGUs after a consideration of cost. Specifically, in section III.A of this preamble, we review the long-standing and extensive body of evidence, as well as new mercury-related risk analyses performed since 2016, identifying substantial risks to human health and the environment from HAP emissions from coal- and oil-fired EGUs that support a conclusion that regulating HAP emissions from EGUs is appropriate. In preamble section III.B, we analyze information regarding how the power sector elected to comply with MATS, and how our 2012 projections for the cost of regulation almost certainly overestimated the actual costs of the regulation by a significant amount. In preamble section III.C, we explain our reasons for revoking the 2020 Final Action, which

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applied an ill-suited framework for evaluating cost because it gave little to no weight to the statutory concern with reducing the volume of and risks from HAP emissions to protect even the most exposed and most vulnerable members of the public. In section III.D of this preamble, we describe and apply our preferred, totality-of-the-circumstances approach, giving particular weight to the factors identified in CAA section 112(n)(1) and 112 more generally. We propose to conclude that after considering all of the relevant factors and weighing the advantages of regulation against the cost of doing so, it is appropriate and necessary to regulate EGUs under CAA section 112. In section III.E of this preamble, we propose an alternative formal benefit-cost approach for making the appropriate and necessary determination. Under this approach, we propose to conclude that it remains appropriate to regulate HAP emissions from EGUs after considering cost because the BCA issued with the MATS rule indicated that the total net benefits of MATS were overwhelming even though the EPA was only able to monetize one of many statutorily identified benefits of regulating HAP emissions from EGUs. The new information examined by the EPA with respect to updated science and cost information only strengthens our conclusions under either of these methodologies. Section IV of this preamble notes that because this proposal reaffirms prior determinations and does not impact implementation of MATS, this action, if finalized, would not change those standards.

Finally, in preamble section V, in addition to soliciting comments on all aspects of this proposed action, we separately seek comment on any data or information that will assist in the EPA's ongoing review of the RTR that the Agency completed for MATS in 2020.

B. Does this action apply to me?

The source category that is the subject of this proposal is Coal- and Oil-Fired EGUs regulated by NESHAP under 40 CFR 63, subpart UUUUU, commonly known as MATS. The

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North American Industry Classification System (NAICS) codes for the Coal- and Oil-Fired EGU source category are 221112, 221122, and 921150. This list of NAICS codes is not intended to be exhaustive, but rather provides a guide for readers regarding the entities that this proposed action is likely to affect.

C. Where can I get a copy of this document and other related information?

In addition to being available in the docket, an electronic copy of this action is available on the Internet. Following signature by the EPA Administrator, the EPA will post a copy of this proposed action at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*. Following publication in the *Federal Register*, the EPA will post the *Federal Register* version of the proposal and key technical documents at this same website.

II. Background

A. Regulatory History

In the 1990 Amendments, Congress substantially modified CAA section 112 to address hazardous air pollutant emissions from stationary sources. CAA section 112(b)(1) sets forth a list of 187 identified HAP, and CAA sections 112(b)(2) and (3) give the EPA the authority to add or remove pollutants from the list. CAA section 112(a)(1) and (2) specify the two types of sources to be addressed: major sources and area sources. A major source is any stationary source or group of stationary sources at a single location and under common control that emits or has the potential to emit, considering controls, 10 tpy or more of any HAP or 25 tpy or more of any combination of HAP. CAA section 112(a)(1). Any stationary source of HAP that is not a major source is an area source.[4] CAA section 112(a)(2). All major source categories, besides EGUs,

[4] The statute includes a separate definition of "EGU" that includes both major and area source power plant facilities. CAA section 112(a)(8).

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and certain area source categories, were required to be included on an initial published list of sources subject to regulation under CAA section 112. *See* CAA sections 112(a)(1) and (c)(1). The EPA is required to promulgate emission standards under CAA section 112(d) for every source category on the CAA section 112(c)(1) list.

The general CAA section 112(c) process for listing source categories does not apply to EGUs. Instead, Congress enacted a special provision, CAA section 112(n)(1)(A), which establishes a separate process by which the EPA determines whether to add EGUs to the CAA section 112(c) list of source categories that must be regulated under CAA section 112. Because EGUs were subject to other CAA requirements under the 1990 Amendments, most importantly the ARP, CAA section 112(n)(1)(A) directs the EPA to conduct a study to evaluate the hazards to public health that are reasonably anticipated to occur as a result of the HAP emissions from EGUs "after imposition of the requirements of this chapter." *See* CAA section 112(n)(1)(A); *see also Michigan v. EPA*, 576 U.S. at 748 ("Quite apart from the hazardous-air-pollutants program, the Clean Air Act Amendments of 1990 subjected power plants to various regulatory requirements. The parties agree that these requirements were expected to have the collateral effect of reducing power plants' emissions of hazardous air pollutants, although the extent of the reduction was unclear."). The provision directs that the EPA shall regulate EGUs under CAA section 112 if the Administrator determines, after considering the results of the study, that such regulation is "appropriate and necessary." CAA section 112(n)(1)(A), therefore, sets a unique process by which the Administrator is to determine whether to add EGUs to the CAA section 112(c) list of sources that must be subject to regulation under CAA section 112.

The study required under CAA section 112(n)(1)(A) is one of three studies commissioned by Congress under CAA section 112(n)(1), a subsection entitled "Electric utility steam

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generating units." The first, which, as noted, the EPA was required to consider before making the appropriate and necessary determination, was completed in 1998 and was entitled the *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units–Final Report to Congress* (Utility Study).[5] The Utility Study contained an analysis of HAP emissions from EGUs, an assessment of the hazards and risks due to inhalation exposures to these emitted pollutants, and a multipathway (inhalation plus non-inhalation exposures) risk assessment for mercury and a subset of other relevant HAP. The study indicated that mercury was the HAP of greatest concern to public health from coal- and oil-fired EGUs. The study also concluded that numerous control strategies were available to reduce HAP emissions from this source category. The second study commissioned by Congress under CAA section 112(n)(1)(B), the Mercury Study Report to Congress (Mercury Study),[6] was released in 1997. Under this provision, the statute tasked the EPA with focusing exclusively on mercury, but directed the Agency to look at other stationary sources of mercury emission in addition to EGUs, the rate and mass of emissions coming from those sources, available technologies for controlling mercury and the costs of such technologies, and a broader scope of impacts including environmental effects. As in the Utility Study, the EPA confirmed that mercury is highly toxic, persistent, and bioaccumulates in food chains. Fish consumption is the primary pathway for human exposure to mercury, which can lead to higher risks in certain populations. The third study, required under CAA section 112(n)(1)(C), directed the National Institute of Environmental Health Sciences (NIEHS) to conduct a study to determine the threshold level of mercury exposure below which adverse human health effects were not expected to occur (NIEHS Study). The statute required that the study include a

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[5] U.S. EPA. *Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress*. EPA–453/R–98–004a. February 1998.
[6] U.S. EPA. 1997. *Mercury Study Report to Congress*. EPA–452/R–97–003 December 1997.

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threshold for mercury concentrations in the tissue of fish that could be consumed, even by sensitive populations, without adverse effects to public health. NIEHS submitted the required study to Congress in 1995.[7] *See* 76 FR 24982 (May 3, 2011). Later, after submission of the CAA section 112(n)(1) reports and as part of the fiscal year 1999 appropriations, Congress further directed the EPA to fund the National Academy of Sciences (NAS) to perform an independent evaluation of the data related to the health impacts of methylmercury, and, similar to the CAA section 112(n)(1)(C) inquiry, specifically to advise the EPA as to the appropriate reference dose (RfD) for methylmercury. Congress also indicated in the 1999 conference report directing the EPA to fund the NAS Study, that the EPA should not make the appropriate and necessary regulatory determination until the EPA had reviewed the results of the NAS Study. *See* H.R. Conf. Rep. No. 105-769, at 281-282 (1998). This last study, completed by the NAS in 2000, was entitled Toxicological Effects of Methylmercury (NAS Study),[8] and it presented a rigorous peer-review of the EPA's RfD for methylmercury. Based on the results of these studies and other available information, the EPA determined on December 20, 2000, pursuant to CAA section 112(n)(1)(A), that it is appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs and added such units to the CAA section 112(c) list of source categories that must be regulated under CAA section 112. *See* 65 FR 79825 (December 20, 2000) (2000 Determination).[9]

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[7] National Institute of Environmental Health Sciences (NIEHS) Report on Mercury; available in the rulemaking docket at EPA-HQ-OAR-2009-0234-3053.

[8] National Research Council (NAS). 2000. *Toxicological Effects of Methylmercury*. Committee on the Toxicological Effects of Methylmercury, Board on Environmental Studies and Toxicology, National Research Council. Many of the peer-reviewed articles cited in this section are publications originally cited in the NAS report.

[9] In the same 2000 action, the EPA Administrator found that regulation of HAP emissions from natural gas-fired EGUs is not appropriate or necessary because the impacts due to HAP emissions from such units are negligible. *See* 65 FR 79831 (December 20, 2000).

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In 2005, the EPA revised the original 2000 Determination and concluded that it was neither appropriate nor necessary to regulate EGUs under CAA section 112 in part because the EPA concluded it could address risks from EGU HAP emissions under a different provision of the statute. *See* 70 FR 15994 (March 29, 2005) (2005 Revision). Based on that determination, the EPA removed coal- and oil-fired EGUs from the CAA section 112(c) list of source categories to be regulated under CAA section 112. In a separate but related 2005 action, the EPA also promulgated the Clean Air Mercury Rule (CAMR), which established CAA section 111 standards of performance for mercury emissions from EGUs. *See* 70 FR 28605 (May 18, 2005). Both the 2005 Revision and the CAMR were vacated by the D.C. Circuit in 2008. *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008). The D.C. Circuit held that the EPA failed to comply with the requirements of CAA section 112(c)(9) for delisting source categories, and consequently also vacated the CAA section 111 performance standards promulgated in CAMR, without addressing the merits of those standards. *Id.* at 582-84.

Subsequent to the *New Jersey* decision, the EPA conducted additional technical analyses, including peer-reviewed risk assessments on human health effects associated with mercury (2011 Final Mercury TSD)[10] and non-mercury metal HAP emissions from EGUs (2011 Non-Hg HAP Assessment)[11]. Those analyses, which focused on populations with higher fish consumption (*e.g.*, subsistence fishers) and residents living near the facilities who experienced increased

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[10] U.S. EPA. 2011. *Revised Technical Support Document: National-Scale Assessment of Mercury Risk to Populations with High Consumption of Self-caught Freshwater Fish in Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units.* Office of Air Quality Planning and Standards. December 2011. EPA-452/R-11-009. Docket ID Item No. EPA-HQ-OAR-2009-0234-19913 (2011 Final Mercury TSD).

[11] U.S. EPA. 2011. *Supplement to the Non-Hg Case Study Chronic Inhalation Risk Assessment In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units*. Office of Air Quality Planning and Standards. November 2011. EPA-452/R-11-013. Docket ID Item No. EPA-HQ-OAR-2009-0234-19912 (2011 Non-Hg HAP Assessment).

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exposure to HAP through inhalation, found that mercury and non-mercury HAP emissions from EGUs remain a public health hazard and that EGUs were the largest anthropogenic source of mercury emissions to the atmosphere in the U.S. Based on these findings, and other relevant information regarding the volume of HAP, environmental effects, and availability of controls, in 2012, the EPA affirmed the original 2000 Determination that it is appropriate and necessary to regulate EGUs under CAA section 112. *See* 77 FR 9304 (February 16, 2012).

In the same 2012 action, the EPA established a NESHAP, commonly referred to as MATS, that required coal- and oil-fired EGUs to meet HAP emission standards reflecting the application of the maximum achievable control technology (MACT) for all HAP emissions from EGUs.[12] MATS applies to existing and new coal- and oil-fired EGUs located at both major and area sources of HAP emissions. An EGU is a fossil fuel-fired steam generating combustion unit of more than 25 megawatts (MW) that serves a generator that produces electricity for sale. *See* CAA section 112(a)(8) (defining EGU). A unit that cogenerates steam and electricity and supplies more than one-third of its potential electric output capacity and more than 25 MW electric output to any utility power distribution system for sale is also an EGU. *Id.*

For coal-fired EGUs, MATS includes standards to limit emissions of mercury, acid gas HAP, non-mercury HAP metals (*e.g.*, nickel, lead, chromium), and organic HAP (*e.g.*, formaldehyde, dioxin/furan). Standards for HCl serve as a surrogate for the acid gas HAP, with an alternate standard for sulfur dioxide (SO_2) that may be used as a surrogate for acid gas HAP for those coal-fired EGUs with flue gas desulfurization (FGD) systems and SO_2 continuous

[12] Although the 2012 MATS Final Rule has been amended several times, the amendments are not a result of actions regarding the appropriate and necessary determination and, therefore, are not discussed in this preamble. Detail regarding those amendatory actions can be found at *https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards*.

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emissions monitoring systems that are installed and operational. Standards for filterable PM serve as a surrogate for the non-mercury HAP metals, with standards for total non-mercury HAP metals and individual non-mercury HAP metals provided as alternative equivalent standards. Work practice standards that require periodic combustion process tune-ups were established to limit formation and emissions of the organic HAP.

For oil-fired EGUs, MATS includes standards to limit emissions of HCl and HF, total HAP metals (*e.g.*, mercury, nickel, lead), and organic HAP (*e.g.*, formaldehyde, dioxin/furan). Standards for filterable PM serve as a surrogate for total HAP metals, with standards for total HAP metals and individual HAP metals provided as alternative equivalent standards. Periodic combustion process tune-up work practice standards were established to limit formation and emissions of the organic HAP.

Additional detail regarding the types of units regulated under MATS and the regulatory requirements that they are subject to can be found in 40 CFR 63, subpart UUUUU.[13] The existing source compliance date was April 16, 2015, but many existing sources were granted an additional 1-year extension of the compliance date for the installation of controls.

After MATS was promulgated, both the rule itself and many aspects of the EPA's appropriate and necessary determination were challenged in the D.C. Circuit. In *White Stallion Energy Center v. EPA*, the D.C. Circuit unanimously denied all challenges to MATS, with one exception discussed below in which the court was not unanimous. 748 F.3d 1222 (D.C. Cir. 2014). As part of its decision, the D.C. Circuit concluded that the "EPA's 'appropriate and necessary' determination in 2000, and the reaffirmation of that determination in 2012, are amply

[13] Available at *www.ecfr.gov/cgi-bin/text-idx?node=sp40.15.63.uuuuu*.

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supported by EPA's findings regarding the health effects of mercury exposure." *Id.* at 1245.[14] While joining the D.C. Circuit's conclusions as to the adequacy of the EPA's identification of public health hazards, one judge dissented on the issue of whether the EPA erred by not considering costs together with the harms of HAP pollution when making the "appropriate and necessary" determination, finding that cost was a required consideration under that determination. *Id.* at 1258-59 (Kavanaugh, J., dissenting).

The U.S. Supreme Court subsequently granted *certiorari*, directing the parties to address a single question posed by the Court itself: "Whether the Environmental Protection Agency unreasonably refused to consider cost in determining whether it is appropriate to regulate hazardous air pollutants emitted by electric utilities." *Michigan v. EPA*, 135 S. Ct. 702 (Mem.) (2014). In 2015, the U.S. Supreme Court held that "EPA interpreted [CAA section 112(n)(1)(A)] unreasonably when it deemed cost irrelevant to the decision to regulate power plants." *Michigan*, 576 U.S. at 760. In so holding, the U.S. Supreme Court found that the EPA "must consider cost–including, most importantly, cost of compliance–before deciding whether regulation is appropriate and necessary." *Id.* at 2711. It is "up to the Agency," the Court added, "to decide (as always, within the limits of reasonable interpretation) how to account for cost." *Id.* The rule was

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[14] In discussing the 2011 Final Mercury TSD, the D.C. Circuit concluded that the EPA considered the available scientific information in a rational manner, and stated:

> As explained in the technical support document (TSD) accompanying the Final Rule, EPA determined that mercury emissions posed a significant threat to public health based on an analysis of women of child-bearing age who consumed large amounts of freshwater fish. *See* [2011 Final] Mercury TSD .... The design of EPA's TSD was neither arbitrary nor capricious; the study was reviewed by EPA's independent Science Advisory Board, stated that it "support[ed] the overall design of and approach to the risk assessment" and found "that it should provide an objective, reasonable, and credible determination of potential for a public health hazard from mercury emissions emitted from U.S. EGUs." ... In addition, EPA revised the final TSD to address SAB's remaining concerns regarding EPA's data collection practices.

Id. at 1245-46.

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ultimately remanded back to the EPA to complete the required cost analysis, and the D.C. Circuit left the MATS rule in place pending the completion of that analysis. *White Stallion Energy Center v. EPA*, No. 12-1100, ECF No. 1588459 (D.C. Cir. December 15, 2015).

In response to the U.S. Supreme Court's direction, the EPA finalized a supplemental finding on April 25, 2016, that evaluated the costs of complying with MATS and concluded that the appropriate and necessary determination was still valid. The 2016 Supplemental Finding promulgated two different approaches to incorporate cost into the decision-making process for the appropriate and necessary determination. *See* 81 FR 24420 (April 25, 2016). The EPA determined that both approaches independently supported the conclusion that regulation of HAP emissions from EGUs is appropriate and necessary.

The EPA's preferred approach to incorporating cost evaluated estimated costs of compliance with MATS against several cost metrics relevant to the EGU sector (*e.g.*, historical annual revenues, annual capital expenditures, and impacts on retail electricity prices), and found that the projected costs of MATS were reasonable for the sector in comparison with historical data on those metrics. The evaluation of cost metrics that the EPA applied was consistent with approaches commonly used to evaluate environmental policy cost impacts.[15] The EPA also examined as part of its cost analysis what the impact of MATS would be on retail electricity prices and the reliability of the power grid. Using a totality-of-the-circumstances approach, the EPA weighed these supplemental findings as to cost against the existing administrative record

[15] For example, see "Economic Impact and Small Business Analysis–Mineral Wool and Wool Fiberglass RTRs and Wool Fiberglass Area Source NESHAP" (U.S. EPA, 2015; *https://www.epa.gov/sites/default/files/2020-07/documents/mwwf_eia_neshap_final_07-2015.pdf*) or "Economic Impact Analysis of Final Coke Ovens NESHAP" (U.S. EPA, 2002; *https://www.epa.gov/sites/default/files/2020-07/documents/coke-ovens_eia_neshap_final_08-2002.pdf*).

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detailing the identified hazards to public health and the environment from mercury, non-mercury metal HAP, and acid gas HAP that are listed under CAA section 112, and the other advantages to regulation. Based on that balancing, the EPA concluded under the preferred approach that it remains appropriate to regulate HAP emissions from EGUs after considering cost. *See* 81 FR 24420 (April 25, 2016) ("After evaluating cost reasonableness using several different metrics, the Administrator has, in accordance with her statutory duty under CAA section 112(n)(1)(A), weighed cost against the previously identified advantages of regulating HAP emissions from EGUs – including the agency's prior conclusions about the significant hazards to public health and the environment associated with such emissions and the volume of HAP that would be reduced by regulation of EGUs under CAA section 112.")

In a second alternative and independent approach (referred to as the alternative approach), the EPA considered the BCA in the 2011 RIA for the 2012 MATS Final Rule. *Id.* at 24421. In that analysis, even though the EPA was only able to monetize one HAP-specific endpoint, the EPA estimated that the final MATS rule would yield annual monetized net benefits (in 2007 dollars) of between $37 billion to $90 billion using a 3-percent discount rate and between $33 billion to $81 billion using a 7-percent discount rate, in comparison to the projected $9.6 billion in annual compliance costs. *See id.* at 24425. The EPA therefore determined that the alternative approach also independently supported the conclusion that regulation of HAP emissions from EGUs remains appropriate after considering cost. *Id.*

Several state and industry groups petitioned for review of the 2016 Supplemental Finding in the D.C. Circuit. *Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir. filed April 25, 2016). In April 2017, the EPA moved the D.C. Circuit to continue oral argument and hold the case in abeyance in order to give the then-new Administration an opportunity to review the 2016 action,

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and the D.C. Circuit ordered that the consolidated challenges to the 2016 Supplemental Finding be held in abeyance (*i.e.*, temporarily on hold).[16]

Accordingly, the EPA reviewed the 2016 action, and on May 22, 2020, finalized a revised response to the *Michigan* decision. *See* 85 FR 31286 (May 22, 2020). In the 2020 Final Action, after primarily comparing the projected costs of compliance to the one post control HAP emission reduction benefit that could be monetized, the EPA reconsidered its previous determination and found that it is not appropriate to regulate HAP emissions from coal- and oil-fired EGUs after a consideration of cost, thereby reversing the Agency's conclusion under CAA section 112(n)(1)(A), first made in 2000 and later affirmed in 2012 and 2016. Specifically, in its reconsideration, the Agency asserted that the 2016 Supplemental Finding considering the cost of MATS was flawed based on its assessment that neither of the two approaches to considering cost in the 2016 Supplemental Finding satisfied the EPA's obligation under CAA section 112(n)(1)(A), as that provision was interpreted by the U.S. Supreme Court in *Michigan*. Additionally, the EPA determined that, while finalizing the action would reverse the 2016 Supplemental Finding, it would not remove the Coal- and Oil-Fired EGU source category from the CAA section 112(c)(1) list, nor would it affect the existing CAA section 112(d) emissions standards regulating HAP emissions from coal- and oil-fired EGUs that were promulgated in the 2012 MATS Final Rule.[17] *See* 85 FR 31312 (May 22, 2020).

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[16] Order, *Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir. April 27, 2017), ECF No. 1672987. In response to a joint motion from the parties to govern future proceedings, the D.C. Circuit issued an order in February 2021 to continue to hold the consolidated cases in *Murray Energy Corp. v. EPA* in abeyance. Order, *Murray Energy Corp. v. EPA*, No. 16-1127 (D.C. Cir. February 25, 2021), ECF No. 1887125.

[17] This finding was based on *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008), which held that the EPA is not permitted to remove source categories from the CAA section 112(c)(1) list unless the CAA section 112(c)(9) criteria for delisting have been met.

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In the 2020 Final Action, the EPA also finalized the risk review required by CAA section 112(f)(2) and the first technology review required by CAA section 112(d)(6) for the Coal- and Oil-Fired EGU source category regulated under MATS.[18] The EPA determined that residual risks due to emissions of air toxics from the Coal- and Oil-Fired EGU source category are acceptable and that the current NESHAP provides an ample margin of safety to protect public health and to prevent an adverse environmental effect. In the technology review, the EPA did not identify any new developments in HAP emission controls to achieve further cost-effective emissions reductions. Based on the results of these reviews, the EPA found that no revisions to MATS were warranted. *See* 85 FR 31314 (May 22, 2020).

Several states, industry, public health, environmental, and civil rights groups petitioned for review of the 2020 Final Action in the D.C. Circuit. *American Academy of Pediatrics v. Regan*, No. 20-1221 and consolidated cases (D.C. Cir. filed June 19, 2020). On September 28, 2020, the D.C. Circuit granted the EPA's unopposed motion to sever from the lead case and hold in abeyance two of the petitions for review: *Westmoreland Mining Holdings LLC v. EPA*, No. 20-1160 (D.C. Cir. filed May 22, 2020) (challenging the 2020 Final Action as well as prior EPA actions related to MATS, including a challenge to the MATS CAA section 112(d) standards on the basis that the 2020 Final Action's reversal of the appropriate and necessary determination provided a "grounds arising after" for filing a petition outside the 60-day window for judicial

[18] CAA section 112(f)(2) requires the EPA to conduct a one-time review of the risks remaining after imposition of MACT standards under CAA section 112(d)(2) within 8 years of the effective date of those standards (risk review). CAA section 112(d)(6) requires the EPA to conduct a review of all CAA section 112(d) standards at least every 8 years to determine whether it is necessary to establish more stringent standards after considering, among other things, advances in technology and costs of additional control (technology review). The EPA has always conducted the first technology review at the same time it conducts the risk review and collectively the actions are known at RTRs.

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review of MATS), and *Air Alliance Houston v. EPA*, No. 20-1268 (D.C. Cir. filed July 21, 2020) (challenging only the RTR portion of the 2020 Final Action).[19]

On January 20, 2021, President Biden signed Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis." The Executive Order, among other things, instructs the EPA to review the 2020 Final Action and consider publishing a notice of proposed rulemaking suspending, revising, or rescinding that action. In February 2021, the EPA moved the D.C. Circuit to hold *American Academy of Pediatrics* and consolidated cases in abeyance, pending the Agency's review of the 2020 Final Action as prompted in Executive Order 13990, and on February 16, 2021, the D.C. Circuit granted the Agency's motion.[20]

In the meantime, the requirements of MATS have been fully implemented, resulting in significant reductions in HAP emissions from EGUs and the risks associated with those emissions. The EPA had projected that annual EGU mercury emissions would be reduced by 75 percent with MATS implementation. In fact, EGU emission reductions have been far more substantial (down to approximately 4 tons in 2017), which represents an 86 percent reduction compared to 2010 (pre-MATS) levels. *See* Table 4 at 84 FR 2689 (February 7, 2019). Acid gas HAP and non-mercury metal HAP have similarly been reduced – by 96 percent and 81 percent, respectively – as compared to 2010 levels. *Id.* MATS is the only Federal requirement that guarantees this level of HAP control from EGUs.

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[19] Order, *Westmoreland Mining Holdings LLC v. EPA*, No. 20-1160 (D.C. Cir. September 28, 2020), ECF No. 1863712.
[20] Order, *American Academy of Pediatrics v. Regan*, No. 20-1221 (D.C. Cir. February 16, 2021), ECF No. 1885509.

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The EPA is now proposing to revoke the 2020 reconsideration of the 2016 Supplemental Finding and to reaffirm once again that it is appropriate and necessary to regulate emissions of HAP from coal- and oil-fired EGUs. We will provide notice of the results of our review of the 2020 RTR in a separate future action.

B. Statutory Background

Additional statutory context is useful to help identify the relevant factors that the Administrator should weigh when making the appropriate and necessary determination.

1. Pre-1990 History of HAP Regulation

In 1970, Congress enacted CAA section 112 to address the millions of pounds of HAP emissions that were estimated to be emitted from stationary sources in the country. At that time, the CAA defined HAP as "an air pollutant to which no ambient air quality standard is applicable and which, in the judgment of the Administrator may cause, or contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness," but the statute left it to the EPA to identify and list pollutants that were HAP. Once a HAP was listed, the statute required the EPA to regulate sources of that identified HAP "at the level which in [the Administrator's] judgment provides an ample margin of safety to protect the public health from such hazardous air pollutants." CAA section 112(b)(1)(B) (pre-1990 amendments); Legislative History of the CAA Amendments of 1990 ("Legislative History"), at 3174-75, 3346 (Comm. Print 1993). The statute did not define the term "ample margin of safety" or provide a risk metric on which the EPA was to establish standards, and initially the EPA endeavored to account for costs and technological feasibility in every regulatory decision. In *Natural Resources Defense Council (NRDC) v. EPA*, 824 F.2d 1146 (D.C. Cir. 1987), the D.C. Circuit concluded that the

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CAA required that in interpreting what constitutes "safe," the EPA was prohibited from considering cost and technological feasibility. *Id.* at 1166.

The EPA subsequently issued the NESHAP for benzene in accordance with the *NRDC* holding.[21] Among other things, the Benzene NESHAP concluded that there is a rebuttable presumption that any cancer risk greater than 100-in-1 million to the most exposed individual is unacceptable, and per *NRDC*, must be addressed without consideration of cost or technological feasibility. The Benzene NESHAP further provided that, after evaluating the acceptability of cancer risks, the EPA must evaluate whether the current level of control provides an ample margin of safety for any risk greater than 1-in-1 million and, if not, the EPA will establish more stringent standards as necessary after considering cost and technological feasibility.[22]

2. Clean Air Act 1990 Amendments to Section 112

In 1990, Congress radically transformed section 112 of the CAA and its treatment of hazardous air pollution. The legislative history of the amendments indicates Congress' dissatisfaction with the EPA's slow pace addressing these pollutants under the 1970 CAA: "In theory, [hazardous air pollutants] were to be stringently controlled under the existing Clean Air Act section 112. However, . . . only seven of the hundreds of potentially hazardous air pollutants have been regulated by EPA since section 112 was enacted in 1970." H.R. Rep. No. 101-490, at

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[21] National Emissions Standards for Hazardous Air Pollutants: Benzene Emissions from Maleic Anhydride Plants, Ethylbenzene/Styrene Plants, Benzene Storage Vessels, Benzene Equipment Leaks, and Coke By-Product Recovery Plants (Benzene NESHAP). 54 FR 38044 (September 14, 1989).

[22] "In protecting public health with an ample margin of safety under section 112, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1 in 1 million and (2) limiting to no higher than approximately 1 in 10 thousand the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years." Benzene NESHAP, 54 FR 38044-5, September 14, 1989.

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315 (1990); *see also id.* at 151 (noting that in 20 years, the EPA's establishment of standards for only seven HAP covered "a small fraction of the many substances associated . . . with cancer, birth defects, neurological damage, or other serious health impacts."). Congress was concerned with how few sources had been addressed during this time. *Id.* ("[The EPA's] regulations sometimes apply only to limited sources of the relevant pollutant. For example, the original benzene standard covered just one category of sources (equipment leaks). Of the 50 toxic substances emitted by industry in the greatest volume in 1987, only one – benzene – has been regulated even partially by EPA."). Congress noted that state and local regulatory efforts to act in the face of "the absence of Federal regulations" had "produced a patchwork of differing standards," and that "[m]ost states . . . limit the scope of their program by addressing a limited number of existing sources or source categories, or by addressing existing sources only on a case-by-case basis as problem sources are identified" and that "[o]ne state exempts all existing sources from review." *Id.*

In enacting the 1990 Amendments with respect to the control of hazardous air pollution, Congress noted that "[p]ollutants controlled under [section 112] tend to be less widespread than those regulated [under other sections of the CAA], but are often associated with more serious health impacts, such as cancer, neurological disorders, and reproductive dysfunctions." *Id.* at 315. In its substantial 1990 Amendments, Congress itself listed 189 HAP (CAA section 112(b)) and set forth a statutory structure that would ensure swift regulation of a significant majority of these HAP emissions from stationary sources. Specifically, after defining major and area sources and requiring the Agency to list all major sources and many area sources of the listed pollutants (CAA section 112(c)), the new CAA section 112 required the Agency to establish technology-based emission standards for listed source categories on a prompt schedule and to revisit those

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technology-based standards every 8 years (CAA section 112(d) (emission standards); CAA section 112(e) (schedule for standards and review)). The 1990 Amendments also obligated the EPA to evaluate the residual risk within 8 years of promulgation of technology-based standards. CAA section 112(f)(2).

In setting the standards, CAA section 112(d) requires the Agency to establish technology-based standards that achieve the "maximum degree of reduction," "including a prohibition on such emissions where achievable." CAA section 112(d)(2). Congress specified that the maximum degree of reduction must be at least as stringent as the average level of control achieved in practice by the best performing sources in the category or subcategory based on emissions data available to the Agency at the time of promulgation. This technology-based approach permitted the EPA to swiftly set standards for source categories without determining the risk or cost in each specific case, as the EPA had done prior to the 1990 Amendments. In other words, this approach to regulation quickly required that all major sources and many area sources of HAP install control technologies consistent with the top performers in each category, which had the effect of obtaining immediate reductions in the volume of HAP emissions from stationary sources. The statutory requirement that sources obtain levels of emission limitation that have actually been achieved by existing sources, instead of levels that could theoretically be achieved, inherently reflects a built-in cost consideration.[23]

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[23] Congress recognized as much:

> "The Administrator may take the cost of achieving the maximum emission reduction and any non-air quality health and environmental impacts and energy requirements into account when determining the emissions limitation which is achievable for the sources in the category or subcategory. Cost considerations are reflected in the selection of emissions limitations which have been achieved in practice (rather than those which are merely theoretical) by sources of a similar type or character."

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Further, after determining the minimum stringency level of control, or MACT floor, CAA section 112(d)(2) requires the Agency to determine whether more stringent standards are achievable after considering the cost of achieving such standards and any non-air-quality health and environmental impacts and energy requirements of additional control. In doing so, the statute further specifies in CAA section 112(d)(2) that the EPA should consider requiring sources to apply measures that, among other things, "reduce the volume of, or eliminate emissions of, such pollutants . . . " (CAA section 112(d)(2)(A)), "enclose systems or processes to eliminate emissions" (CAA section 112(d)(2)(B)), and "collect, capture, or treat such pollutants when released . . ." (CAA section 112(d)(2)(C)). The 1990 Amendments also built in a regular review of new technologies and a one-time review of risks that remain after imposition of MACT standards. CAA section 112(d)(6) requires the EPA to evaluate every NESHAP no less often than every 8 years to determine whether additional control is necessary after taking into consideration "developments in practices, processes, and control technologies," without regard to risk. CAA section 112(f) requires the EPA to ensure that the risks are acceptable and that the MACT standards provide an ample margin of safety

The statutory requirement to establish technology-based standards under CAA section 112 avoided the need for the EPA to identify hazards to public health and the environment in order to justify regulation of HAP emissions from stationary sources, reflecting Congress' judgment that such emissions are inherently dangerous. *See* S. Rep. No. 101-228, at 148 ("The MACT standards are based on the performance of technology, and not on the health and environmental effects of the [HAP]."). The technology review required in CAA section

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A Legislative History of the Clean Air Act Amendments of 1990 (CAA Legislative History), Vol 5, pp. 8508 -8509 (CAA Amendments of 1989; p. 168-169; Report of the Committee on Environment and Public Works S. 1630).

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112(d)(6) further mandates that the EPA continually evaluate standards to determine if additional reductions can be obtained, without consideration of the specific risk associated with the HAP emissions that would be reduced. Notably, the CAA section 112(d)(6) review of what additional reductions may be obtained based on new technology is required *even after* the Agency has conducted the CAA section 112(f)(2) review and determined that the existing standard will protect the public with an ample margin of safety.

The statutory structure and legislative history also demonstrate Congress' concern with the many ways that HAP can harm human health and Congress' goal of protecting the most exposed and vulnerable members of society. The committee report accompanying the 1990 Amendments discussed the scientific understanding regarding HAP risk at the time, including the 1989 report on benzene performed by the EPA noted above. H.R. Rep. No. 101-490, at 315. Specifically, Congress highlighted the EPA's findings as to cancer incidence, and importantly, lifetime individual risk to the most exposed individuals. *Id.* The report also notes the limitations of the EPA's assessment: "The EPA estimates evaluated the risks caused by emissions of a single toxic air pollutant from each plant. But many facilities emit numerous toxic pollutants. The agency's risk assessments did not consider the combined or synergistic effects of exposure to multiple toxics, or the effect of exposure through indirect pathways." *Id.* Congress also noted the EPA's use of the maximum exposed individual (MEI) tool to assess risks faced by heavily exposed citizens. *Id.* The report cited particular scientific studies demonstrating that some populations are more affected than others – for example, it pointed out that "[b]ecause of their small body weight, young children and fetuses are especially vulnerable to exposure to PCB-contaminated fish. One study has found long-term learning disabilities in children who had eaten high-levels of Great Lakes fish." *Id.*

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The statutory structure confirms Congress' approach to risk and sensitive populations. As noted, the CAA section 112(f)(2) residual risk review requires the EPA to consider whether, after imposition of the CAA section 112(d)(2) MACT standard, there are remaining risks from HAP emissions that warrant more stringent standards to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect. *See* CAA section 112(f)(2)(A). Specifically, the statute requires the EPA to promulgate standards under the risk review provision if the CAA section 112(d) standard does not "reduce lifetime excess cancer risks to the individual most exposed to emissions from a source in the category or subcategory to less than one in one million." *Id.* Thus, even after the application of MACT standards, the statute directs the EPA to conduct a rulemaking if even *one* person has a risk, not a guarantee, of getting cancer. This demonstrates the statutory intent to protect even the most exposed member of the population from the harms attendant to exposure to HAP emissions.

If a residual risk rulemaking is required, as noted above, the statute incorporates the detailed rulemaking approach set forth in the Benzene NESHAP for determining whether HAP emissions from stationary sources pose an unacceptable risk and whether standards provide an ample margin of safety. *See* CAA section 112(f)(2)(B) (preserving the prior interpretation of "ample margin of safety" set forth in the Benzene NESHAP). That approach includes a rebuttable presumption that any cancer risk greater than 100-in-1 million to the most exposed person is per se unacceptable. For non-cancer chronic and acute risks, the EPA has more discretion to determine what is acceptable, but even then, the statute requires the EPA to evaluate the risks to the most exposed individual and our RfDs are developed with the goal of being protective of even sensitive members of the population. *See e.g.*, CAA section 112(n)(1)(C) (requiring, in part, the development of "a threshold for mercury concentration in the tissue of fish

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which may be consumed (including consumption by sensitive populations) without adverse effects to public health"). If risks are found to be unacceptable, the EPA must impose additional control requirements to ensure that post CAA section 112(f) risks from HAP emissions are at an acceptable level, regardless of cost and technological feasibility.

After determining whether the risks are acceptable and developing standards to achieve an acceptable level of risk if necessary, the EPA must then determine whether more stringent standards are necessary to provide an ample margin of safety to protect public health, and at this stage we must take into consideration cost, technological feasibility, uncertainties, and other relevant factors. As stated in the Benzene NESHAP, "In protecting public health with an ample margin of safety under section 112, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants by … protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1 in 1 million." *See* 54 FR 38044-45 (September 14, 1989); *see also NRDC v. EPA*, 529 F.3d 1077, 1082 (D.C. Cir. 2008) (finding that "the Benzene NESHAP standard established a maximum excess risk of 100-in-one million, while adopting the one-in-one million standard as an aspirational goal.").

The various listing and delisting provisions of CAA section 112 further demonstrate a statutory intent to reduce risk and protect the most exposed members of the population from HAP emissions. *See, e.g.,* CAA section 112(b)(2) (requiring the EPA to add pollutants to the HAP list if the EPA determines the HAP "presents, or may present" adverse human health or adverse environmental effects); *id.* at CAA section 112(b)(3)(B) (requiring the EPA to add a pollutant to the list if a petitioner shows that a substance is known to cause or "may reasonably be anticipated to cause adverse effects to human health or adverse environmental effects"); *id.* at CAA section 112(b)(3) (authorizing the EPA to delete a substance only on a showing that "the

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substance may not reasonably be anticipated to cause any adverse effects to human health or adverse environmental effects."); *id.* at CAA section 112(c)(9)(B)(i) (prohibiting the EPA from delisting a source category if even one source in the category causes a lifetime cancer risk greater than 1-in-1 million to "the individual in the population who is most exposed to emissions of such pollutants from the source."); *id.* at CAA section 7412(c)(9)(B)(i) (prohibiting the EPA from delisting a source category unless the Agency determines that the non-cancer causing HAP emitted from the source category do not "exceed a level which is adequate to protect public health with an ample margin of safety and no adverse environmental effect will result from emissions of any source" in the category); *id.* at CAA section 112(n)(1)(C) (requiring a study to determine the level of mercury in fish tissue that can be consumed by even sensitive populations without adverse effect to public health).

The deadlines for action included in the 1990 Amendments indicate that Congress wanted HAP pollution addressed quickly. The statute requires the EPA to list all major source categories within 1 year of the 1990 Amendments and to regulate those listed categories on a strict schedule that prioritizes the source categories that are known or suspected to pose the greatest risks to the public. *See* CAA sections 112(c)(1), 112(e)(1) and 112(e)(2). For area sources, where the statute provides the EPA with greater discretion to determine the sources to regulate, it also directs the Agency to collect the information necessary to make the listing decision for many area source categories and requires the Agency to act on that information by a date certain.

For example, CAA section 112(k) establishes an area source program designed to identify and list at least 30 HAP that pose the greatest threat to public health in the largest number of urban areas (urban HAP) and to list for regulation area sources that account for at least 90 percent of the area source emissions of the 30 urban HAP. *See* CAA sections 112(k) and

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112(c)(3). In addition to the urban air toxics program, CAA section 112(c)(6) directs the EPA to identify and list sufficient source categories to ensure that at least 90 percent of the aggregate emissions of seven bioaccumulative and persistent HAP, including mercury, are subject to standards pursuant to CAA sections 112(d)(2) or (d)(4). *See* CAA section 112(c)(6). Notably, these requirements were *in addition to* any controls on mercury and other CAA section 112(c)(6) HAP that would be imposed if the EPA determined it was appropriate and necessary to regulate EGUs under CAA section 112. This was despite the fact that it was known at the time of enactment that other categories with much lower emissions of mercury would have to be subject to MACT standards because of the exclusion of EGUs from CAA section 112(c)(6).

As the preceding discussion demonstrates, throughout CAA section 112 and its legislative history, Congress made clear its intent to quickly secure large reductions in the volume of HAP emissions from stationary sources because of its recognition of the hazards to public health and the environment inherent in exposure to such emissions. CAA section 112 and its legislative history also reveal Congress' understanding that fully characterizing the risks posed by HAP emissions was exceedingly difficult; thus, Congress purposefully replaced a regime that required an assessment of risk in the first instance with one that assumed that risk and directed swift and substantial reductions. The statutory design and direction also repeatedly emphasize that the EPA should regulate with the most exposed and most sensitive members of the population in mind in order to achieve an acceptable level of HAP emissions with an ample margin of safety. As explained further below, this statutory context informs the EPA's judgment as to the relevant factors to weigh in the analysis of whether regulation remains appropriate after a consideration of cost.

III. Proposed Determination Under CAA Section 112(n)(1)(A)

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In this action, the EPA is proposing to revoke the 2020 Final Action and to reaffirm the appropriate and necessary determination made in 2000, and reaffirmed in 2012 and 2016.[24] We propose to find that, under either our preferred totality-of-the-circumstances framework or our alternative formal BCA framework, the information that would have been available to the Agency as of the time of the 2012 rulemaking supports a determination that it is appropriate and necessary to regulate HAP from EGUs. We also consider new information regarding the hazards to public health and the environment and the costs of compliance with MATS that has become available since the 2016 Supplemental Finding, and find that the updated information strengthens the EPA's conclusion that it is appropriate and necessary to regulate HAP from coal- and oil-fired EGUs.

At the outset, we note that CAA section 112(n)(1)(A) is silent as to whether the EPA may consider updated information when acting on a remand of the appropriate and necessary

[24] Our proposal focuses on an analysis of the "appropriate" prong of the CAA section 112(n)(1)(A). The *Michigan* decision and subsequent EPA actions addressing that decision have been centered on supplementing the Agency's record with a consideration of the cost of regulation as part of the "appropriate" aspect of the overall determination. As noted, the 2020 Final Action, while reversing the 2016 Supplemental Finding as to the EPA's determination that it was "appropriate" to regulate HAP from EGUs, did not rescind the Agency's prior determination that it was necessary to regulate. *See* 84 FR 2674 (February 7, 2019) ("CAA section 112(n)(1)(A) requires the EPA to determine that both the appropriate *and* necessary prongs are met. Therefore, if the EPA finds that either prong is not satisfied, it cannot make an affirmative appropriate and necessary finding. The EPA's reexamination of its determination . . . focuses on the first prong of that analysis."). The "necessary" determination rested on two primary bases: 1) in 2012, the EPA determined that the hazards posed to human health and the environment by HAP emissions from EGUs would not be addressed in its future year modeling, which accounted for all CAA requirements to that point; and 2) our conclusion that the only way to ensure permanent reductions in U.S. EGU emissions of HAP and the associated risks to public health and the environment was through standards set under CAA section 112. *See* 76 FR 25017 (May 23, 2011). We therefore continue our focus in this proposal on reinstating the "appropriate" prong of the determination, leaving undisturbed the Agency's prior conclusions that regulation of HAP from EGUs is "necessary." *See* 65 FR 79830 (December 20, 2000); 76 FR 25017 (May 3, 2011); 77 FR 9363 (February 16, 2012).

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determination. CAA section 112(n)(1)(A) directs the EPA to conduct the Utility Study within 3 years, and requires the EPA to regulate EGUs if the Administrator makes a finding that it is appropriate and necessary to do so "after" considering the results of the Utility Study. Consistent with the EPA's interpretation in 2005, 2012, 2016, and 2020, we do not read this language to *require* the EPA to consider the most-up-to-date information where the Agency is compelled to revisit the determination, but nor do we interpret the provision to *preclude* consideration of new information where reasonable. *See* 70 FR 16002 (March 29, 2005); 77 FR 9310 (February 16, 2012); 81 FR 24432 (April 25, 2016); 85 FR 31306 (May 22, 2020). As such, the Agency has applied its discretion in determining when to consider new information under this provision based on the circumstances. For example, when the EPA was revisiting the determination in 2012, we noted that "[b]ecause several years had passed since the 2000 finding, the EPA performed additional technical analyses for the proposed rule, even though those analyses were not required." 77 FR 9310 (February 16, 2012).[25] Similarly, we think that it is reasonable to consider new information in the context of this proposal, given that almost a decade has passed since we last considered updated information. In this proposed reconsideration of the determination per the President's Executive Order, both the growing scientific understanding of public health risks associated with HAP emissions and a clearer picture of the cost of control technologies and the make-up of power sector generation over the last decade may inform the question of whether it is appropriate to regulate, and, in particular, help address the inquiry that the Supreme Court directed us to undertake in *Michigan.* We believe the evolving scientific information with regard to benefits and the advantage of hindsight with regard to costs warrant considering currently available information in making this determination. To the extent that our

[25] The EPA was not challenged on this interpretation in *White Stallion*.

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determination should flow from information that would have been available at the "initial decision to regulate," *Michigan*, 576 U.S. at 754, we propose conclusions here based on analyses limited to this earlier record. But we also believe it is reasonable to consider new data, and propose to find that the new information regarding both public health risks and costs bolsters the finding and supports a determination that it is appropriate and necessary to regulate EGUs for HAP.

In section III.A of this preamble, we first describe the advantages of regulation – the reduction in emissions of HAP and attendant reduction of risks to human health and the environment, including the distribution of these health benefits. We carefully document the numerous risks to public health and the environment posed by HAP emissions from EGUs. This includes information previously recognized and documented in the statutorily mandated CAA section 112(n)(1) studies, the 2000 Determination, the 2012 MATS Final Rule, and the 2016 Supplemental Finding about the nature and extent of health and environmental impacts from HAP that are emitted by EGUs, as well as additional risk analyses supported by new scientific studies. Specifically, new risk screening analyses on the connection between mercury and heart disease as well as IQ loss in children across the U.S. further supports the conclusion that HAP emissions from EGUs pose hazards to public health and the environment warranting regulating under CAA section 112. The EPA also discusses the challenges associated with fully quantifying and monetizing the human health and environmental effects associated with HAP emissions. Finally, we note that in addition to reducing the identified risks posed by HAP emissions from EGUs, regulation of such HAP emissions results in significant health and environmental co-benefits.

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We then turn in preamble section III.B. to the disadvantages of regulation – the costs associated with reducing EGU HAP emissions and other potential impacts to the sector and the economy associated with MATS. With the benefit of hindsight, we first consider whether MATS actually cost what we projected in the 2011 RIA and conclude that the projection in the 2011 RIA was almost certainly a significant overestimate of the actual costs. We then evaluate the costs estimated in the 2011 RIA against several metrics relevant to the impacts those costs have on the EGU sector and American electricity consumers (*e.g.*, historical annual revenues, annual capital and production expenditures, impacts on retail electricity prices, and impacts on resource adequacy and reliability). These analyses, based on data available in 2012 and based on updated data, all show that the costs of MATS were within the bounds of typical historical fluctuations and that the industry would be able to comply with MATS and continue to provide a reliable source of electricity without price increases that were outside the range of historical variability.

In section III.C of this preamble, we explain why the methodology used in our 2020 Finding was ill-suited to determining whether EGU HAP regulation is appropriate and necessary because it gave virtually no weight to the volume of HAP that would be reduced, and the vast majority of the benefits of reducing EGU HAP, including the reduction of risk to sensitive populations, based on the Agency's inability to quantify or monetize post-control benefits of HAP regulations.

In preamble section III.D, we explain our preferred totality-of-the-circumstances methodology that we propose to use to make the appropriate determination, and our application of that methodology. This approach looks to the statute, and particularly CAA section 112(n)(1)(A) and the other provisions in CAA section 112(n)(1), to help identify the relevant factors to weigh and what weight to afford those factors. Under that methodology we weigh the

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significant health and environmental advantages of reducing EGU HAP, and in particular the benefits to the most exposed and sensitive individuals, against the disadvantages of expending money to achieve those benefits – *i.e.*, the effects on the electric generating industry and its ability to provide reliable and affordable electricity. We ultimately propose to conclude that the advantages outweigh the disadvantages whether we look at the record from 2012 or at our new record, which includes an expanded understanding of the health risks associated with HAP emissions and finds that the costs projected in the 2011 RIA were almost certainly significantly overestimated. We further consider that, if we also account for the non-HAP benefits in our preferred totality-of-the-circumstances approach, such as the benefits (including reduced mortality) of coincidental reductions in PM and ozone that flow from the application of controls on HAP, the balance weighs even more heavily in favor of regulating HAP emissions from coal- and oil-fired EGUs.

Finally, in section III.E, we consider an alternative methodology to make the appropriate determination, using a formal BCA of MATS that was conducted consistent with economic principles. This methodology is not our preferred way to consider advantages and disadvantages for the CAA section 112(n)(1)(A) determination, because the EPA's inability to generate a monetized estimate of the full benefits of HAP reductions can lead to an underestimate of the monetary value of the net benefits of regulation. To the extent that a formal BCA is appropriate for making the CAA section 112(n)(1)(A) determination, however, that approach demonstrates that the monetized benefits of MATS outweigh the monetized costs by a considerable margin, whether we look at the 2012 record or our updated record. We therefore propose that it is appropriate to regulate EGUs for HAP applying a BCA approach as well.

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In sum, the EPA proposes to conclude that it is appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs, whether we are applying the preferred totality-of-the-circumstances methodology or the alternative formal benefit-cost approach, and whether we are considering only the administrative record as of the original EPA response on remand to *Michigan* in 2016 or based on new information made available since that time. The information and data amassed by the EPA over the decades of administrative analysis and rulemaking devoted to this topic overwhelmingly support the conclusion that the advantages of regulating HAP emissions from coal- and oil-fired EGUs outweigh the costs. The EPA requests comment on this proposed finding and on the supporting information presented in this proposal, including information related to the risks associated with HAP emissions from U.S. EGUs and the actual costs incurred by the power sector due to MATS, as well as on the preferred and alternative methodologies for reaching the proposed conclusion.

A. Public Health Hazards Associated With Emissions From EGUs

1. Overview

The administrative record for the MATS rule detailed several hazards to public health and the environment from HAP emitted by EGUs that remained after imposition of the ARP and other CAA requirements. *See* 80 FR 75028-29 (December 1, 2015). *See also* 65 FR 79825-31 (December 20, 2000); 76 FR 24976-25020 (May 3, 2011); 77 FR 9304-66 (February 16, 2012). The EPA considered all of this information again in the 2016 Supplemental Finding, noting that this sector represented a large fraction of U.S. emissions of mercury, non-mercury metal HAP, and acid gases. Specifically, the EPA found that even after imposition of the other requirements of the CAA, but absent MATS, EGUs remained the largest domestic source of mercury, HF, HCl, and selenium and among the largest domestic contributors of arsenic, chromium, cobalt,

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nickel, hydrogen cyanide, beryllium, and cadmium, and that a significant majority of EGU facilities emitted above the major source thresholds for HAP emissions.

Further, the EPA noted that the totality of risks that accrue from these emissions were significant. These hazards include potential neurodevelopmental impairment, increased cancer risks, contribution to chronic and acute health disorders, as well as adverse impacts on the environment. Specifically, the EPA pointed to results from its revised nationwide Mercury Risk Assessment (contained in the 2011 Final Mercury TSD)[26] as well as an inhalation risk assessment (2011 Non-Hg HAP Assessment) for non-mercury HAP (*i.e.*, arsenic, nickel, chromium, selenium, cadmium, HCl, HF, hydrogen cyanide, formaldehyde, benzene, acetaldehyde, manganese, and lead). The EPA estimated lifetime cancer risks for inhabitants near some coal- and oil-fired EGUs to exceed 1-in-1 million[27] and noted that this case-study-based estimate likely underestimated the true maximum risks for the EGU source category. *See* 77 FR 9319 (February 16, 2012). The EPA also found that mercury emissions pose a hazard to wildlife, adversely affecting fish-eating birds and mammals, and that the large volume of acid gas HAP associated with EGUs also pose a hazard to the environment.[28] These technical

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[26] U.S. EPA. 2011. *Revised Technical Support Document: National-Scale Assessment of Mercury Risk to Populations with High Consumption of Self-caught Freshwater Fish In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units.* Office of Air Quality Planning and Standards. November. EPA–452/R–11–009. Docket ID Item No. EPA–HQ–OAR–2009–0234–19913.

[27] The EPA determined the 1-in-1 million standard was the correct metric in part because CAA section 112(c)(9)(B)(1) prohibits the EPA from removing a source category from the list if even one person is exposed to a lifetime cancer risk greater than 1-in-1 million, and CAA section 112(f)(2)(A) directs the EPA to conduct a residual risk rulemaking if even one person is exposed to a lifetime excess cancer risk greater than 1-in-1 million. *See White Stallion* at 1235-36 (agreeing it was reasonable for the EPA to consider the 1-in-1 million delisting criteria in defining "hazard to public health" under CAA section 112(n)(1)(A)).

[28] The EPA had determined it was reasonable to consider environmental impacts of HAP emissions from EGUs in the appropriate determination because CAA section 112 directs the

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analyses were all challenged in the *White Stallion* case, and the D.C. Circuit found that the EPA's risk finding as to mercury alone – that is, before reaching any other risk finding – established a significant public health concern. The court stated that "EPA's 'appropriate and necessary' determination in 2000, and its reaffirmation of that determination in 2012, are amply supported by EPA's finding regarding the health effects of mercury exposure." *White Stallion Energy Center v. EPA*, 748 F.3d 1222, 1245 (D.C. Cir. 2014). Additional scientific evidence about the human health hazards associated with EGU HAP emissions that has been collected since the 2016 Supplemental Finding and is discussed in this section has extended our confidence that these emissions pose an unacceptable risk to the American public and in particular, to vulnerable, exposed populations.

This section of the preamble starts by briefly reviewing the long-standing and extensive body of evidence, including new scientific information made available since the 2016 Supplemental Finding, which demonstrates that HAP emissions from oil- and coal-fired EGUs present hazards to public health and the environment warranting regulation under CAA section 112 (section III.A.2). This is followed by an expanded discussion of the health risks associated with domestic EGU mercury emissions based on additional evidence regarding cardiovascular effects that has become available since the 2016 Supplemental Finding (section III.A.3). In section III.A.4, the EPA describes the reasons why it is extremely difficult to estimate the full health and environmental impacts associated with exposure to HAP. We note the longstanding challenges associated with quantifying and monetizing these effects, which may be permanent

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EPA to consider impacts of HAP emissions on the environment, including in the CAA section 112(n)(1)(B) Mercury Study. *See White Stallion* at 1235-36 (agreeing it was reasonable for the EPA to consider the environmental harms when making the appropriate and necessary determination).

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and life-threatening and are often distributed unevenly (*i.e.*, concentrated among highly exposed individuals). Next, the section provides an expanded discussion of some identified environmental justice (EJ) issues associated with these emissions (section III.A.5). Section III.A.6 identifies health effects associated with other, non-HAP emissions from EGUs such as SO_2, direct $PM_{2.5}$ and other $PM_{2.5}$ and ozone precursors. Because these pollutants are co-emitted with HAP, the controls necessary to reduce HAP emissions from EGUs often reduce these pollutants as well. After assessing all the evidence, the EPA concludes again (section III.A.7) that regulation of HAP emissions from EGUs under CAA section 112 greatly improves public health for Americans by reducing the risks of premature mortality from heart attacks, cancer, and neurodevelopmental delays in children, and by helping to restore economically vital ecosystems used for recreational and commercial purposes. Further, we conclude that these public health improvements will be particularly pronounced for certain segments of the American population that are especially vulnerable (*e.g.*, subsistence fishers[29] and their children) to impacts from EGU

[29] Subsistence fishers, who by definition obtain a substantial portion of their dietary needs from self-caught fish consumption, can experience elevated levels of exposure to chemicals that bioaccumulate in fish including, in particular, methylmercury. Subsistence fishing activity can be related to a number of factors including socio-economic status (poverty) and/or cultural practices, with ethnic minorities and tribal populations often displaying increased levels of self-caught fish consumption (Burger *et al.*, 2002, Shilling *et al.*, 2010, Dellinger 2004).

Burger J, (2002). *Daily consumption of wild fish and game: exposures of high end recreationalists*. International Journal of Environmental Health Research 12:4, p. 343-354.

Shilling F, White A, Lippert L, Lubell M, (2010). *Contaminated fish consumption in California's Central Valley Delta*. Environmental Research 110, p. 334-344.

Dellinger J, (2004). *Exposure assessment and initial intervention regarding fish consumption of tribal members in the Upper Great Lakes Region in the United States*. Environmental Research 95, p. 325-340.

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HAP emissions. In addition, the concomitant reductions in co-emitted pollutants will also provide substantial public health and environmental benefits.

2. Overview of Health Effects Associated with Mercury and Non-Mercury HAP

In calling for the Agency to consider the regulation of HAP from EGUs, the CAA stipulated that the EPA complete three studies (all of which were extensively peer-reviewed) exploring various aspects of risk posed to human health and the environment by HAP released from EGUs. The first of these studies, the Utility Study, published in 1998, focused on the hazards to public health specifically associated with EGU-sourced HAP including, but not limited to, mercury. *See* CAA section 112(n)(1)(A). A second study, the Mercury Study, released in 1997, while focusing exclusively on mercury, was broader in scope including not only human health, but also environmental impacts and specifically addressed the potential for mercury released from multiple emissions sources (in addition to EGUs) to affect human health and the environment. *See* CAA section 112(n)(1)(B). The third study, required under CAA section 112(n)(1)(C), the NIEHS Study, submitted to Congress in 1995, considered the threshold level of mercury exposure below which adverse human health effects were not expected to occur. An additional fourth study, the NAS Study, directed by Congress in 1999 and completed in 2000, focused on determining whether a threshold for mercury health effects could be identified for sensitive populations and, as such, presented a rigorous peer review of the EPA's RfD for methylmercury. The aggregate results of these peer-reviewed studies commissioned by Congress as part of CAA section 112(n)(1) supported the determination that HAP emissions from EGUs represented a hazard to public health and the environment that would not be addressed through imposition of the other requirements of the CAA. In the 2 decades that followed, the EPA has

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continued to conduct additional research and risk assessments and has surveyed the latest science related to the risk posed to human health and the environment by HAP released from EGUs.

a. Review of Health Effects and Previous Risk Analyses for Methylmercury

Mercury is a persistent and bioaccumulative toxic metal that, once released from power plants into the ambient air, can be readily transported and deposited to soil and aquatic environments where it is transformed by microbial action into methylmercury. *See* Mercury Study; 76 FR 24976 (May 3, 2011) (2011 NESHAP Proposal); 80 FR 75029 (December 1, 2015) (2015 Proposal). Methylmercury bioaccumulates in the aquatic food web eventually resulting in highly concentrated levels of methylmercury within the larger and longer-living fish, which can then be consumed by humans.[30] As documented in both the NAS Study and the Mercury Study, fish and seafood consumption is the primary route of human exposure to methylmercury, with populations engaged in subsistence-levels of consumption being of particular concern.[31] The NAS Study reviewed the effects of methylmercury on human health, concluding that it is highly toxic to multiple human and animal organ systems. Of particular concern is chronic prenatal exposure via maternal consumption of foods containing methylmercury. Elevated exposure has been associated with developmental neurotoxicity and manifests as poor performance on neurobehavioral tests, particularly on tests of attention, fine motor function, language, and visual-spatial ability. Evidence also suggests potential for adverse effects on the cardiovascular

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[30] We recognize that mercury deposition over land with subsequent impacts to agricultural-sourced food may also represent a public health concern, however as noted below, primary exposure to the U.S. population is through fish consumption.

[31] In light of the methylmercury impacts, the EPA and the Food and Drug Administration have collaborated to provide advice on eating fish and shellfish as part of a healthy eating pattern (*https://www.fda.gov/food/consumers/advice-about-eating-fish*). In addition, states provide fish consumption advisories designed to protect the public from eating fish from waterbodies within the state that could harm their health based on local fish tissue sampling.

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system, adult nervous system, and immune system, as well as potential for causing cancer.[32] Below we review the broad range of public health hazards associated with methylmercury exposure.

Neurodevelopmental Effects of Exposure to Methylmercury. Methylmercury is a powerful neurotoxin. Because the impacts of the neurodevelopmental effects of methylmercury are greatest during periods of rapid brain development, developing fetuses and young children are particularly vulnerable. Children born to populations with high fish consumption (*e.g.*, people consuming fish as a dietary staple) or impaired nutritional status (*e.g.*, people with iron or vitamin C deficiencies) are especially vulnerable to adverse neurodevelopmental outcomes. These dietary and nutritional vulnerabilities are often particularly pronounced in underserved communities with minority populations and low-income populations that have historically faced economic and environmental injustice and are overburdened by cumulative levels of pollution.[33]

Infants in the womb can be exposed to methylmercury when their mothers eat fish and shellfish that contain methylmercury. This exposure can adversely affect unborn infants' growing brains and nervous systems. Children exposed to methylmercury while they are in the womb can have impacts to their cognitive thinking, memory, attention, language, fine motor skills, and visual spatial skills. Based on scientific evidence reflecting concern about a range of neurodevelopmental effects seen in children exposed *in utero* to methylmercury, the EPA defined an RfD of 0.0001 mg/kg-day for methylmercury.[34] An RfD is defined as an estimate

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[32] National Research Council. 2000. *Toxicological Effects of Methylmercury*. Washington, DC: The National Academies Press. *https://doi.org/10.17226/9899*.
[33] Burger J, 2002. *Daily consumption of wild fish and game: Exposures of high end recreationalists*. International Journal of Environmental Health Research 12:4, p. 343-354.
[34] U.S. EPA. 2001. *IRIS Summary for Methylmercury*. U.S. Environmental Protection Agency, Washington, DC. (USEPA, 2001).

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(with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime (EPA, 2002).[35]

Prenatal exposure to methylmercury from maternal consumption of fish has been associated with several adverse neurodevelopmental outcomes in various fish consuming populations. Although data are limited, the EPA has focused on several subpopulations likely to be at higher risk from methylmercury exposure associated with EGU HAP due to fish consumption. As part of the 2011 Final Mercury TSD, the EPA completed a national-scale risk assessment focused on mercury emissions from domestic EGUs. Specifically, we examined risk associated with mercury released from U.S. EGUs that deposits to watersheds within the continental U.S., bioaccumulates in fish as methylmercury, and is consumed when fish are eaten by female subsistence fishers of child-bearing age and other freshwater self-caught fish consumers. There is increased risk for *in utero* exposure and adverse outcomes in children born to female subsistence fishers with elevated exposure to methylmercury. The risk assessment modeled scenarios representing high-end self-caught fish consumers active at inland freshwater lakes and streams. The analysis estimated that 29 percent of the watersheds studied would lead to female subsistence fishers having exposures which exceeded the methylmercury RfD, based on *in utero* effects, due in whole or in part to the contribution of domestic EGU emissions of mercury. This included up to 10 percent of modeled watersheds where deposition from U.S. EGUs alone leads to potential exposures that exceed the RfD.[36]

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[35] U.S. EPA. 2002. *A Review of the Reference Dose and Reference Concentration Processes*. EPA/630/P-02/002F, December 2002.

[36] The EPA chose this risk metric in part because CAA section 112(n)(1)(C) directed the NIEHS to develop a threshold for mercury concentration in fish tissue that can be consumed by even

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In addition to the 2011 Final Mercury TSD focusing on subsistence fishers referenced above, the EPA also completed a RIA in 2011 including the characterization of benefits associated with the prospective reduction of U.S. EGU mercury emissions under MATS.[37] However, due to limitations on the available data with regard to the extent of subsistence fishing activity in the U.S., which prevented the enumeration of subsistence fisher populations, the EPA was unable to develop a quantitative estimate of the reduction in population-level risk or associated dollar benefits for children of female subsistence fishers. Instead, in the 2011 MATS RIA, the EPA focused on a different population of self-caught fish consumers that could be enumerated. Specifically, we quantitatively estimated the amount and value of IQ loss associated with prenatal methylmercury exposure among the children of recreational anglers consuming self-caught fish from inland freshwater lakes, streams and rivers (unlike subsistence fishers, available data allow the characterization of recreational fishing activity across the U.S. including enumeration of these populations). Although the EPA acknowledged uncertainty about the size of the affected population and acknowledged that it could be underestimated, these unborn children associated with recreational anglers represented precisely the type of sensitive population most at risk from mercury exposure that CAA section 112 is designed to protect. The results generated in the 2011 RIA for recreational anglers suggested that by reducing

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sensitive populations without adverse effect and because CAA section 112(c)(6) demonstrates a special interest in protecting the public from exposure to mercury.

[37] The 2011 MATS RfD-based risk assessment focusing on the subsistence fisher population was designed as a screening-level analysis to inform consideration for whether U.S. EGU-sourced mercury represented a public health hazard. As such, the most appropriate risk metric was modeled exposure (for highly-exposed subsistence fishers) compared to the RfD for methylmercury. By contrast, the 2011 RIA was focused on estimating the dollar benefits associated with MATS and as such focused on a health endpoint which could be readily enumerated and then monetized, which at the time was IQ for infants born to recreational anglers.

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methylmercury exposure, MATS was estimated to yield an additional 511 IQ points among the affected population of children, which would increase their future lifetime earnings. The EPA noted at the time that the analysis likely underestimated potential benefits for children of recreational anglers since, due to data limitations, it did not cover consumption of recreationally caught seafood from estuaries, coastal waters, and the deep ocean which was expected to contribute significantly to overall exposure. Nevertheless, this single endpoint alone, evaluated solely for the recreational angler, provides evidence of potentially significant health harm from methylmercury exposure.

In 2011 we noted that other, more difficult to quantify endpoints may also contribute to the overall burden across a broader range of subgroups. The metrics studied in addition to IQ include those measured by performance on neurobehavioral tests, particularly on tests of attention, fine motor-function, language, and visual spatial ability (USEPA, 2001; Agency for Toxic Substances and Disease Registry (ATSDR), 1999).[38] Such adverse neurodevelopmental effects are well documented in cohorts of subsistence fisher populations (*i.e.*, Faroe Islands and the Nunavik region of Arctic Canada).

At this time, the EPA is conducting an updated methylmercury IRIS assessment and recently released preliminary assessment materials, an IRIS Assessment Plan (IAP) and Systematic Review Protocol for methylmercury.[39] The update to the methylmercury IRIS assessment will focus on updating the quantitative aspects of neurodevelopmental outcomes associated with methylmercury exposure. As noted in these early assessment materials, new studies are available, since 2001, assessing the effects of methylmercury exposure on cognitive

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[38] Agency for Toxic Substances and Disease Registry (ATSDR). 1999. *Toxicological profile for mercury*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.
[39] *https://iris.epa.gov/ChemicalLanding/&substance_nmbr=73*.

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function, motor function, behavioral, structural, and electrophysiological outcomes at various ages following prenatal or postnatal exposure to methylmercury (USEPA, 2001; NAS Study; 84 FR 13286 (April 4, 2019);[40] 85 FR 32037 (May 8, 2020)).[41]

Cardiovascular Impacts of Exposure to Methylmercury. The NAS Study indicated that there was evidence that exposure to methylmercury in humans and animals can have adverse effects on both the developing and adult cardiovascular system. Infant exposure in the womb to methylmercury has been associated with altered blood-pressure and heart-rate variability in children. In adults, dietary exposure to methylmercury has been linked to a higher risk of acute myocardial infarction (MI), coronary heart disease, or cardiovascular heart disease. To date, the EPA has not attempted to utilize a quantitative dose-response assessment for cardiovascular effects associated with methylmercury exposures because of a lack of consensus among scientists on the dose-response functions for these effects and inconsistency among available studies as to the association between methylmercury exposure and various cardiovascular system effects.

However, additional studies have become available that have increased the EPA's confidence in characterizing the dose-response relationship between methylmercury and adverse cardiovascular outcomes. These new studies were leveraged to inform new quantitative screening analyses (described in section III.A.3, below) to estimate one cardiovascular endpoint – incidence of MI mortality – that may potentially be linked to U.S. EGU mercury emissions as well as the number of U.S. EGU impacted watersheds. In addition to a new meta-analysis (Hu *et*

[40] *Availability of the IRIS Assessment Plan for Methylmercury*. 84 FR 13286 (April 4, 2019).
[41] *Availability of the Systematic Review Protocol for the Methylmercury Integrated Risk Information System (IRIS) Assessment*. 85 FR 32037 (May 28, 2020).

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al., 2021)[42] on the association of methylmercury generally with cardiovascular disease (CVD), stroke, and ischemic heart disease (IHD), there is a limited body of existing literature that has examined associations between mercury and various cardiovascular outcomes. These include acute MI, hypertension, atherosclerosis, and heart rate variability (Roman *et al.*, 2011).[43]

Immunotoxic Effects of Exposure to Methylmercury. Although exposure to some forms of mercury can result in a decrease in immune activity or an autoimmune response (ATSDR, 1999), evidence for immunotoxic effects of methylmercury is limited (NAS Study).

Other Mercury-Related Human Toxicity Data Including Potential Carcinogenicity. The Mercury Study noted that methylmercury is not a potent mutagen but is capable of causing chromosomal damage in a number of experimental systems. The NAS Study indicated that the evidence that human exposure to methylmercury causes genetic damage is inconclusive; it noted that some earlier studies showing chromosomal damage in lymphocytes may not have controlled sufficiently for potential confounders. One study of adults living in the Tapajos River region in Brazil (Amorim *et al.*, 2000)[44] reported a relationship between methylmercury concentration in hair and DNA damage in lymphocytes, as well as effects on chromosomes. Long-term methylmercury exposures in this population were believed to occur through consumption of fish,

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[42] Hu, X. F., Lowe, M., Chan, H.M., *Mercury exposure, cardiovascular disease, and mortality: A systematic review and dose-response meta-analysis*. Environmental Research 193 (2021),110538.

[43] Roman HA, Walsh TL, Coull BA, Dewailly É, Guallar E, Hattis D, Mariën K, Schwartz J, Stern AH, Virtanen JK, Rice G. *Evaluation of the cardiovascular effects of methylmercury exposures: current evidence supports development of a dose-response function for regulatory benefits analysis*. Environ Health Perspect. 2011 May;119(5):607-14. doi: 10.1289/ehp.1003012. Epub 2011 Jan 10.

[44] Amorim MI, Mergler D, Bahia MO, Dubeau H, Miranda D, Lebel J, Burbano RR, Lucotte M. *Cytogenetic damage related to low levels of methyl mercury contamination in the Brazilian Amazon*. An Acad Bras Cienc. 2000 Dec;72(4):497-507. doi: 10.1590/s0001-37652000000400004.

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suggesting that genotoxic effects (largely chromosomal aberrations) may result from dietary, chronic methylmercury exposures similar to and above those seen in the populations studied in the Faroe Islands and Republic of Seychelles. Since 2000, more recent studies have evaluated methylmercury genotoxicity *in vitro* in human and animal cell lines and *in vivo* in rats.

Based on limited human and animal data, methylmercury is classified as a "possible human carcinogen" by the International Agency for Research on Cancer (IARC, 1993)[45] and in IRIS (USEPA, 2001). However, a quantitative estimate of the carcinogenic risk of methylmercury has not been assessed under the IRIS program at this time. Multiple human epidemiological studies have found no significant association between methylmercury exposure and overall cancer incidence, although a few studies have shown an association between methylmercury exposure and specific types of cancer incidence (*e.g.*, acute leukemia and liver cancer) (NAS Study).

Some evidence of reproductive and renal toxicity in humans from methylmercury exposure exists. However, overall, human data regarding reproductive, renal, and hematological toxicity from methylmercury are very limited and are based on studies of the two high-dose poisoning episodes in Iraq and Japan or animal data, rather than epidemiological studies of chronic exposures at the levels of interest in this analysis.

b. Review of Health Effects for Non-Mercury HAP

As noted earlier, EGUs are the largest source of HCl, HF, and selenium emissions, and are a major source of metallic HAP emissions including arsenic, chromium, nickel, cobalt, and

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[45] International Agency for Research on Cancer (IARC) Working Group on the Evaluation of Carcinogenic Risks to Humans. *Beryllium, Cadmium, Mercury, and Exposures in the Glass Manufacturing Industry*. Lyon (FR): International Agency for Research on Cancer; 1993. (IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, No. 58.) Mercury and Mercury Compounds. Available from: *https://www.ncbi.nlm.nih.gov/books/NBK499780*.

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others. Exposure to these HAP, depending on exposure duration and levels of exposures, is associated with a variety of adverse health effects. These adverse health effects may include chronic health disorders (*e.g.*, irritation of the lung, skin, and mucus membranes; decreased pulmonary function, pneumonia, or lung damage; detrimental effects on the central nervous system; damage to the kidneys; and alimentary effects such as nausea and vomiting).

As of 2021, three of the key metal HAP emitted by EGUs (arsenic, chromium, and nickel) have been classified as human carcinogens, while three others (cadmium, selenium, and lead) are classified as probable human carcinogens. Overall (metal and non-metal), the EPA has classified four of the HAP emitted by EGUs as human carcinogens and five as probable human carcinogens. *See* 76 FR 25003–25005 (May 3, 2011) for a fuller discussion of the health effects associated with these pollutants.

As summarized in the *Supplement to the Non-Hg Case Study Chronic Inhalation Risk Assessment In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units* (2011 Non-Hg HAP Assessment),[46] the EPA previously completed a refined chronic inhalation risk assessment for 16 EGU case studies in order to assess potential public health risk associated with non-mercury HAP. The 16 case studies included one unit that used oil and 15 that used coal. As noted in the 2015 Proposal, this set of case studies was designed to include those facilities with potentially elevated cancer and non-cancer risk based on an initial risk screening of prospective EGU units completed utilizing the Human Exposure Model paired with HAP emissions data obtained from the 2005 National Emissions Inventory.

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[46] U.S. EPA. 2011. *Supplement to the Non-Hg Case Study Chronic Inhalation Risk Assessment In Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units.* Office of Air Quality Planning and Standards. November. EPA–452/R–11–013. Docket ID Item No. EPA-HQ-OAR-2009-0234-19912.

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For each of the 16 case study facilities, we conducted refined dispersion modeling with the EPA's AERMOD (American Meteorological Society/Environmental Protection Agency Regulatory Model) system to calculate annual ambient concentrations (*see* 2011 Non-Hg HAP Assessment). Average annual concentrations were calculated at census block centroids. We calculated the MIR for each facility as the cancer risk associated with a continuous lifetime (24 hours per day, 7 days per week, and 52 weeks per year for a 70-year period) exposure to the maximum concentration at the centroid of an inhabited census block, based on application of the unit risk estimate from the EPA's IRIS program. Based on estimated actual emissions, the highest estimated individual lifetime cancer risk from any of the 16 case study facilities was 20-in-1 million, driven by nickel emissions from the one case study facility with oil-fired EGUs. Of the facilities with coal-fired EGUs, five facilities had MIR greater than 1-in-1 million (the highest was 5-in-1 million), with the risk from four due to emissions of chromium VI and the risk from one due to emissions of nickel. There were also two facilities with coal-fired EGUs that had MIR equal to 1-in-1 million. Based on this analysis, the EPA concludes that cancer risks associated with these HAP emissions supports a finding that it is appropriate to regulate HAP emissions from EGUs.

c. Review of Other Adverse Environmental Effects Associated with EGU HAP Emissions

Ecological Effects of Methylmercury. Along with the human health hazards associated with methylmercury, it is well-established that birds and mammals are also exposed to methylmercury through fish consumption (Mercury Study). At higher levels of exposure, the harmful effects of methylmercury include slower growth and development, reduced reproduction, and premature mortality. The effects of methylmercury on wildlife are variable across species but have been observed in the environment for numerous avian species and

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mammals including polar bears, river otters, and panthers. These adverse effects can propagate into impacts on human welfare to the extent they influence economies that depend on robust ecosystems (*e.g.*, tourism).

Ecological Effects of Acid Gas HAP. Even after the ARP was largely implemented in 2005, EGU sources comprised 82 percent of all anthropogenic HCl (a useful surrogate for all acid gas HAP) emissions in the U.S. When HCl dissolves in water, hydrochloric acid is formed. When hydrochloric acid is deposited by rainfall into terrestrial and aquatic ecosystems, it results in acidification of those systems. The MATS rule was expected to result in an 88 percent reduction in HCl emissions. As part of a recent Integrated Science Assessment (EPA, 2020),[47] the EPA concluded that the body of evidence is sufficient to infer a causal relationship between acidifying deposition and adverse changes in freshwater biota. Affected biota from acidification of freshwater include plankton, invertebrates, fish, and other organisms. Adverse effects can include physiological impairment, as well as alteration of species richness, community composition, and biodiversity in freshwater ecosystems. This evidence is consistent and coherent across multiple species. More species are lost with greater acidification.

3. Post-2016 Screening-Level Risk Assessments of Methylmercury Impacts

This section of the preamble describes three screening-level risk assessments completed since the 2016 Supplemental Finding that further strengthen the conclusion that U.S. EGU-sourced mercury represents a hazard to public health. These "screening-level" assessments are designed as broad bounding exercises intended to illustrate the potential scope and public health importance of methylmercury risks associated with U.S. EGU emissions. In some cases, they

[47] U.S. EPA. *Integrated Science Assessment (ISA) for Oxides of Nitrogen, Oxides of Sulfur and Particulate Matter Ecological Criteria* (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-20/278, 2020.

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incorporate newer peer-reviewed literature that was not available to the Agency previously. Remaining uncertainties, however, prohibit the EPA from generating a more precise estimate at this time. Two of the three risk assessments focus on the potential for methylmercury exposure to increase the risk of MI-related mortality in adults and for that reason, section III.A.3.a begins by describing the methodology used in the analyses, including discussion of the concentration response (CR) function[48] for MI-related mortality and the incorporation of confidence cutpoints designed to address uncertainty. Then, the EPA describes an extension of the original watershed-level subsistence fisher methylmercury risk assessment to evaluate the potential for elevated MI-mortality risk among subsistence fishers (section III.A.3.b). In addition, a separate risk assessment is presented for elevated MI mortality among all adults utilizing a bounding approach that explores potential risks associated with exposure of the general U.S. population to methylmercury (sourced from U.S. EGUs) through fish consumption (section III.A.3.c). Finally, focusing on neurodevelopmental outcomes, another bounding analysis is presented that focuses on the risk of IQ points loss in children exposed *in utero* through maternal fish consumption by the population of general U.S. fish consumers (section III.A.3.d). Each of these analyses quantify potential impacts on incidence of adverse health effects. Section III.A.4 provides illustrative examples of how these incidence estimates translate to monetized benefits.

a. Methodology for Estimating MI-Mortality

This section describes the methodology used in the new screening-level risk assessments related to mortality, including the EPA's application of a CR function characterizing the

[48] Concentration-response functions relate levels of exposure for the chemical of interest to the probability or rate of response for the adverse health outcome in the exposed individual or population. Typically these mathematical relationships are based on data obtained either from human epidemiology studies, clinical studies, or toxicological (animal) studies. In this case, CR functions for MI-related mortality are based on epidemiology studies as discussed further below.

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relationship between increased MI-mortality and methylmercury exposure. As discussed further in the 2021 Risk TSD,[49] which is contained in the docket for this action, the approach draws on recommendations provided by an expert panel convened by the EPA in 2010 to evaluate the cardiovascular effects associated with methylmercury exposure (the findings of the expert panel were summarized as a peer-reviewed paper, Roman *et al.*, 2011). The panel "found the body of evidence exploring the link between [methylmercury] and acute myocardial infarction (MI) to be sufficiently strong to support its inclusion in future benefits analyses, based both on direct epidemiological evidence of [a methylmercury]–MI link and on [methylmercury's] association with intermediary impacts that contribute to MI risk." Given the likely mechanism of action associated with MI, the panel further recommended that either hair-mercury or toenail-mercury be used as an exposure metric because both reflect a longer-term pattern of exposure. Regarding the shape of the CR function, the panel noted that the EURAMIC study (Guallar *et al.*, 2002)[50] had identified a log-linear model form with log-of exposure providing the best fit using toenail mercury as the biomarker of exposure. The panel also discussed the issue of potential effect modification by cardioprotective compounds including polyunsaturated fatty acids (PUFA).[51]

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[49] U.S. EPA. 2021. *National-Scale Mercury Risk Estimates for Cardiovascular and Neurodevelopmental Outcomes for the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units – Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding; Notice of Proposed Rulemaking.*

[50] Guallar E, Sanz-Gallardo MI, van't Veer P, Bode P, Aro A, Gómez-Aracena J, Kark JD, Riemersma RA, Martín-Moreno JM, Kok FJ; Heavy Metals and Myocardial Infarction Study Group. *Mercury, fish oils, and the risk of myocardial infarction.* N Engl J Med. 2002 Nov 28;347(22):1747-54. doi: 10.1056/NEJMoa020157.

[51] Virtanen JK, Voutilainen S, Rissanen TH, Mursu J, Tuomainen TP, Korhonen MJ, Valkonen VP, Seppänen K, Laukkanen JA, Salonen JT. *Mercury, fish oils, and risk of acute coronary events and cardiovascular disease, coronary heart disease, and all-cause mortality in men in eastern Finland.* Arterioscler Thromb Vasc Biol. 2005 Jan;25(1):228-33. doi: 10.1161/01.ATV.0000150040.20950.61. Epub 2004 Nov 11.

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KIHD and EURAMIC datasets "provide the strongest and most useful data sets for quantifying methylmercury-related incidence of MI." However, the panel did note the disconnect between typical levels of exposure to methylmercury in the U.S. population and the relatively higher levels of exposure reflected in the two recommended epidemiology studies (KIHD and EURAMIC). Therefore, the panel suggested that consideration be given to restricting modeling MI mortality to those with higher concentrations reflecting the levels of exposure found in the two key epidemiology studies (corresponding to roughly 75th to 95th percentile hair-mercury levels for U.S. women of child-bearing age, as characterized in National Health and Nutrition Examination Survey (NHANES) data and referenced by the panel).

In the intervening period since the release of the expert panel's findings in 2011 (Roman *et al.*, 2011), the EPA has continued to review literature characterizing the relationship between methylmercury exposure and cardiovascular effects. While the EPA has not yet conducted a systematic review, two recent studies are of particular interest for quantifying the potential relationship between U.S. EGU mercury emissions and acute MI that informed a modeling approach. Giang and Selin (2016)[52] presented an approach for modeling MI mortality reflecting a number of the recommendations presented in Roman *et al.*, 2011 including the use of the KIHD and EURAMIC studies as the basis for a CR function including both the log-linear functional form and the effect estimate derived from the KIHD study results. A second study, Hu *et al.* 2021,[53] presented a meta-analysis looking at the relationship between methylmercury exposure and mortality. That paper utilized eight studies each determined to be of good quality

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[52] Giang A, Selin NE. *Benefits of mercury controls for the United States*. Proc Natl Acad Sci U S A. 2016 Jan 12;113(2):286-91. doi: 10.1073/pnas.1514395113. Epub 2015 Dec 28.
[53] Hu XF, Lowe M, Chan HM. *Mercury exposure, cardiovascular disease, and mortality: A systematic review and dose-response meta-analysis*. Environ Res. 2021 Feb;193:110538. doi: 10.1016/j.envres.2020.110538. Epub 2020 Dec 5.

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and reflecting at a minimum, adjustments for age, sex, and n-3 PUFA in specifying dose-response relationships. Historically, studies which account for n-3 PUFA have assumed a linear relationship between PUFAs and risk of MI (Roman *et al.*, 2011). However, the association between PUFA intake and cardiovascular risk may not be linear (Mozaffarian and Rimm, 2006).[54] The potential for confounding and effect modification by PUFA and selenium makes it difficult to interpret the relationship between methylmercury and MI, particularly at lower doses where there is potential for masking of methylmercury toxicity. The results of the meta-analysis by Hu *et al.*, 2021 illustrated this phenomenon with their J-shaped functions for both IHD and CVD, both of which showed an initial region of negative slope (diminishing net risk with methylmercury exposure) before reaching an inflection point (between 1 and 2 microgram per gram (µg/g) hair-mercury depending on the endpoint) where the function turns positive (increasing risk).

For the EPA's new screening-level assessment, we have considered the recommendations presented in Roman *et al.*, 2011, as well as the J-shaped functions presented in Hu *et al.*, 2021, and their implications for considering overall confidence in specifying the relationship between cardiovascular-related mortality and methylmercury exposure. In particular, the EPA has higher confidence in the log-linear relationship at levels of hair-mercury exposure above the selected confidence cutpoints. In specifying these confidence cutpoints (for modeling MI mortality) we have looked to recommendations presented in Roman *et al.*, 2011, specifically that we consider modeling risk for levels of exposure reflected in the EURAMIC and KIHD studies (with these equating to roughly 0.66 and 1.9 µg/g hair-mercury, respectively, or approximately the 75th-95th

[54] Mozaffarian D, Rimm EB. *Fish intake, contaminants, and human health: evaluating the risks and the benefits*. JAMA. 2006 Oct 18;296(15):1885-99. doi: 10.1001/jama.296.15.1885. Erratum in: JAMA. 2007 Feb 14;297(6):590.

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percentile of hair-mercury levels seen in women of childbearing age in available 1999-2000 NHANES survey data[55]). Further, we note that these confidence cutpoints roughly match the inflection point for IHD and CVD seen in the J-shaped plot presented in Hu *et al.*, 2021, which further supports their use in defining regions of methylmercury exposure above which we have increased confidence in modeling MI mortality. However, as noted earlier, we are not concluding here that there is an absence of risk below these cutpoints, as such conclusions would require a weight of the evidence analysis and subsequent independent peer review. Rather, we are less confident in our ability to specify the nature of the CR function in those lower exposure regions due to possible effect modification and/or confounding by PUFA and/or selenium. Therefore, in applying the CR function in modeling MI mortality, we included a set of three functions–two including the cutpoints described above and a third no-cutpoint version of the function reflecting the assumption that risk extends across the entire range of methylmercury exposure. In terms of the other elements of the CR function (shape and effect estimate), we have also followed the advice presented in Roman *et al.*, 2011, as further illustrated through the analysis published by Giang and Selin 2016, and utilized a log-linear form and an effect estimate of 0.10 for MI mortality obtained from the KIHD study (*see* 2021 Risk TSD). As with the other risk estimates presented for methylmercury, these estimates reflect the baseline for U.S. EGUs prior to implementation of MATS (*i.e.*, 29 tons).

b. Increased MI-Mortality Risk in Subsistence Fishers Exposed to Methylmercury

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[55] NHANES has not continued to collect hair-mercury data in subsequent years since the NHANES dataset referenced here. While NHANES has continued with total blood-mercury monitoring, hair mercury is a better biomarker for characterizing methylmercury exposure over time. Given that the CR functions based on the KIHD study (as well as observations presented in Roman *et al.* 2011 regarding cardio-modeling) were all based on hair-mercury, this was chosen as the anchoring analytical biometric. The potential for bias due to the use of the 1999-2000 NHANES data is further discussed in the 2021 Risk TSD.

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This screening-level analysis of MI -mortality risk is an extension of the female subsistence-fisher-based at-risk watershed analysis originally completed as part of the 2011 risk assessment supporting the appropriate and necessary determination (USEPA, 2011) and documented in the 2011 Final Mercury TSD. In that original analysis, a series of female subsistence fisher risk scenarios was evaluated for a subset of 3,141 watersheds within the continental U.S. for which there were sampled methylmercury fish tissue data (that fish tissue data allowing a higher-confidence empirically-based assessment of methylmercury risk to be generated for those watersheds). For each watershed, we used the fish tissue methylmercury data to characterize total mercury-related risk and then we estimated the portion of that total risk attributable to U.S. EGUs (based on the fraction of total mercury deposition to those watersheds associated with U.S. EGU emissions as supported by the Mercury Maps approach, USEPA, 2011).[56]

We have now extended the at-risk watershed analysis completed in 2011 for the subsistence fisher scenarios to include an assessment of the potential for increased MI mortality risk.[57] Specifically, we have utilized the U.S. EGU-attributable methylmercury exposure estimates (µg/kg-day methylmercury intake) generated for the subsistence fisher scenario in each watershed to generate equivalent hair-mercury exposure estimates for that subsistence fisher scenario in each watershed (*see* 2021 Risk TSD for additional detail on the conversion of daily

[56] A detailed discussion of the Mercury Maps approach (establishing a proportional relationship between mercury deposition and methylmercury concentrations in fish at the watershed level) is presented in section 1.4.6.1 of the 2011 Final Mercury TSD which in turn references: *Mercury Maps - A Quantitative Spatial Link Between Air Deposition and Fish Tissue Peer Reviewed Final Report*. U.S. EPA, Office of Water, EPA-823-R-01-009, September, 2001.

[57] Note that while the 2011 Final Mercury TSD, in utilizing an RfD-based approach reflecting neurodevelopmental effects, focused on female subsistence fishers; the analysis focused on MI-mortality risk covers all adult subsistence fishers, and we use our cutpoint bounding analysis because there is not an RfD focused specifically on cardiovascular effects for methylmercury.

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methylmercury intake rates into hair-mercury levels). We then compare those hair-mercury levels to the confidence cutpoints developed for the MI mortality screening-level risk assessment described above in section III.A.3.a. If the hair-mercury level for a particular watershed is above either the EURAMIC or KIHD confidence cutpoint (*i.e.*, above 0.66 and 1.9 μg/g hair-mercury, respectively), then we consider that watershed to be at increased risk for MI mortality exclusively due to that U.S. EGU-attributable methylmercury exposure.[58] Note, that this is not to suggest that exposures at watersheds where U.S. EGU-attributable contributions are below these cutpoints are without risk, but rather that when exposure levels exceed these cutpoints, we have increased confidence in concluding there is an increased risk of MI mortality for subsistence fishers active within that watershed. It is also important to note that in many cases, total methylmercury exposure (*i.e.*, EGU contribution plus contributions from other sources) may exceed these confidence cutpoints such that subsistence fishers active at those watersheds would be at increased risk of MI mortality at least in part due to EGU emissions. *See White Stallion*, 748 F.3d at 1242-43 (finding reasonable the EPA's decision to consider cumulative impacts of HAP from EGUs and other sources in determining whether HAP emissions from EGUs pose a hazard to public health under CAA section 112(n)(1)(A)); *see also* CAA section 112(n)(1)(B) (directing the EPA to study the cumulative impacts of mercury emissions from EGUs and other domestic stationary sources of mercury).

Table 3 of the 2021 Risk TSD presents the results of the analysis of risk for MI-mortality for the subsistence fisher scenarios. As with the original RfD-based risk estimates, these results

[58] Although we have used the MI-mortality CR function described in section III.A.3.a of this preamble to generate mortality incidence estimates for the general fish consuming population (*see* section III.A.3.c), this is not possible for subsistence fishers since we are not able at this point to enumerate them. Consequently, we use the confidence cutpoints associated with that CR function to identify exposures associated with MI mortality risk as described here.

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are dimensioned on two key parameters (*self-caught fish consumption rate* and *the watershed percentile exposure level - hair-mercury µg/g*). Those watershed percentile hair-mercury values that exceed the EURAMIC-based MI mortality confidence cutpoints (0.66 µg/g hair-mercury) are shaded in the table and those cells that also exceed the KIHD-based MI mortality confidence cutpoint (1.9 µg/g hair-mercury) are bolded. Once again, these thresholds identify levels of methylmercury exposure (hair-mercury) associated with a clear association with MI-related health effects (*i.e.*, increased risk). Unlike the RfD-based risk estimates, for MI-mortality estimates we only focus on U.S. EGU-attributable methylmercury (*i.e.*, whether U.S. EGU-attributable hair-mercury exceeds the cutpoints of interest).

Results for the typical subsistence fisher, representing high-end self-caught fish consumption in the U.S. population, suggest that up to 10 percent of the watersheds modeled are associated with hair-mercury levels (due to U.S. EGU mercury emissions alone) that exceed the lower EURAMIC cutpoint for MI-mortality risk, with 1 percent of modeled watersheds also exceeding the KIHD cutpoint (due to U.S. EGU-mercury emissions alone). For low-income Black subsistence fishers active in the Southeast, up to 25 percent of the watersheds exceed the lower EURAMIC confidence threshold (assuming the highest rate of fish consumption), with only the upper 1 percent of watersheds exceeding the KIHD threshold (again based only on U.S. EGU-sourced mercury exposure).

c. Characterization of MI-Mortality Risk for the General U.S. Population Resulting from the Consumption of Commercially-Sourced Fish

The second of the three new screening-level risk analyses estimates the incidence of MI mortality in the general U.S. population resulting from consumption of commercially-sourced

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fish containing methylmercury emitted from U.S. EGUs.[59] This is accomplished by first estimating the total burden of methylmercury-related MI mortality in the U.S. population and then estimating the fraction of that total increment attributable to U.S. EGUs. The task of modeling this health endpoint can involve complex mechanistic modeling of the multi-step process leading from U.S. EGU mercury emissions to mercury deposition over global/regional fisheries to bioaccumulation of methylmercury in fisheries stocks to exposure of U.S. fish consumers through consumption of those commercially-sourced fish (*e.g.*, Giang and Selin, 2016). However, in recognition of the uncertainty associated with attempting to model this more complex multi-step process, we have instead developed a simpler screening analysis approach intended to generate a range of risk estimates that reflects the impact of critical sources of uncertainty associated with this exposure scenario. Rather than attempting to generate a single high-confidence estimate of risk, which in our estimation is challenging given overall uncertainty associated with this exposure pathway, the goal with the bounding approach is simply to generate a range of risk estimates for MI mortality that furthers our understanding of the significant public health burden associated with EGU HAP emissions.

The bounding approach developed for this particular scenario is based on the assumption that fish sourced from global commercial fisheries are loaded by mercury deposited to those fisheries and that the fraction of that deposited mercury originating from U.S. EGUs will eventually be reflected as a fraction of methylmercury in those fish and subsequently as a fraction of MI mortality risk associated with those U.S. EGUs. One of the challenges associated

[59] Although the analysis presented here focuses on methylmercury exposure associated with fish consumption which, as noted earlier, is the primary source of methylmercury exposure for the U.S. population, EGU mercury deposited to land can also impact other food sources including those associated with agricultural production (*e.g.*, rice). In the context of fish consumption, commercially-sourced fish refers to fish consumed in restaurants or from food stores.

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with this screening analysis is how to attribute domestic EGU contributions to global fisheries and how that might vary from location to location. For simplicity, the bounding analysis includes two assumptions: (1) A potential lower-bound reflecting the assumption that U.S. fish consumption is largely sourced from global fisheries and consequently the U.S. EGU contribution to total global mercury emissions (anthropogenic and natural) can be used to approximate the U.S. EGU fractional contribution to MI mortality and (2) a potential upper-bound where we assume that fisheries closer to U.S. EGUs (*e.g.*, within the continental U.S. or just offshore and/or along the U.S. Atlantic and Pacific coastlines) supply most of the fish and seafood consumed within the U.S., and therefore U.S. EGU average deposition over the U.S. (as a fraction of total mercury deposition) can be used to approximate the U.S. EGU fractional contribution to MI mortality (*see* 2021 Risk TSD for more detail).[60] The EPA is continuing to review the literature (including consideration of research by FDA) to better define the relative contributions for sources of fish consumed within the U.S. Note that the bounding analysis also includes consideration for another key source of uncertainty, namely, the specification of the CR function linking methylmercury exposure to increased MI mortality and, in particular, efforts to account for increased confidence in specifying the CR function for higher levels of methylmercury exposure through the use of confidence cutpoints (section III.A.3.a). Additional detail on the stepwise process used to first generate the total U.S. burden of MI-mortality related to total methylmercury exposure and then apportion that total risk estimate to the fraction

[60] Another way of stating this is that the lower-bound estimate reflects an assumption that U.S. EGU mercury is diluted as part of a global pool and impacts commercial fish sourced from across the globe (with lower levels of methylmercury contribution) while the upper-bound estimate reflects a focus on more near-field regional impacts by U.S. EGU mercury to fish sourced either within the continental U.S. or along its coastline (with greater relative contribution to methylmercury levels).

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contributed by U.S. EGUs is presented the 2021 Risk TSD. Based on the 29 tons of mercury emitted by U.S. EGUs prior to implementation of MATS, the bounding estimates from the fraction of total mercury deposition attributable to U.S. EGUs at the global scale is 0.48 percent (lower bound) and 1.8 percent (upper bound). These estimated bounding percentages are important since they have a significant impact on the overall incidence of MI mortality ultimately attributable to U.S. EGU-sourced mercury.

Reflecting both the spread in the apportionment of U.S. EGU-sourced mercury (as described above) and application of the three possible applications of the CR function for MI mortality (no confidence-cutpoint, KIHD cutpoint, EURAMIC cutpoint), the estimated MI-mortality attributable to U.S. EGU-sourced mercury for the general U.S. population associated primarily with consumption of commercially-sourced fish ranges from 5 to 91 excess deaths each year.[61] For those Americans with high levels of methylmercury in their body (*i.e.*, above certain cutpoints), the science suggests that any additional increase in methylmercury exposure will raise the risk of fatal heart attacks. Based on this screening analysis, even after imposition of the ARP and other CAA criteria pollutant requirements that also reduce HAP emissions from domestic EGU sources, we find that mercury emissions from EGUs pose a risk of premature mortality due to MI.

d. Characterization of IQ loss for Children Born to Mothers in the General U.S. Population Resulting from the Consumption of Commercially Sourced Fish (and Other Food Items Containing Methylmercury)

[61] Inclusion of 95th percentile confidence intervals for the effect estimate used in modeling MI mortality extends this range to from 3 to 143 deaths (reflecting the 5th percentile associated with the 5 lower bound estimate to the 95th percentile for the upper bound estimate of 91).

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The third new screening-level risk analysis estimates the incidence of IQ loss in children in the general U.S. population resulting from maternal consumption of commercially sourced fish containing methylmercury attributable to U.S. EGUs (resulting in subsequent prenatal exposure to methylmercury). The approach used in estimating incidence of this adverse health effect shares several elements with the approach described above for modeling MI mortality in the general U.S. population, including in particular, the method used to apportion the total methylmercury-related health burden to the fraction associated with U.S. EGU mercury emissions (*e.g.*, use of lower and upper bound estimates of the fractional contribution of domestic EGU sources). Other elements of the modeling approach, including the specification of the number of children born annually in the U.S., the specification of maternal baseline hair-mercury levels (utilizing NHANES data) and the characterization of the linkage between methylmercury exposure (*in utero*) and IQ loss, are based on methods used in the original 2011 benefits analysis completed for MATS (USEPA, 2011) and are documented in the 2021 Risk TSD.

As with the MI-mortality estimates described earlier, the two bounding estimates for the fraction of total mercury deposition attributable to U.S. EGUs at the global and regional scales (0.48 percent and 1.8 percent, respectively) have a significant impact on the overall magnitude of IQ points lost (for children born to the general U.S. population) which are ultimately attributable to U.S. EGUs. However, the EPA has relatively high confidence in modeling this endpoint due to greater confidence in the IQ loss CR function. The range in IQ points lost annually due to U.S. EGU-sourced mercury is estimated at 1,600 to 6,000 points, which is distributed across the

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population of U.S. children covered by this analysis.[62] Given variation in key factors related to maternal methylmercury exposure, it is likely that modeled IQ loss will not be uniformly distributed across the population of exposed children and may instead, display considerable heterogeneity.[63] The bounding analysis described here was not designed to characterize these complex patterns of heterogeneity in IQ loss across the population of children simulated and we note that such efforts would be subject to considerable uncertainty. However, it does provide evidence of specific adverse outcomes with real implications to those affected. Even small degradations in IQ in the early stages of life are associated with diminished future outcomes in education and earnings potential.

4. Most HAP Benefits Cannot Be Quantified or Monetized

Despite the array of adverse health and environmental risks associated with HAP emissions from U.S. coal- and oil-fired EGUs documented above, as the above discussion demonstrates, it can be technically challenging to estimate the extent to which EGU HAP emissions will result in adverse effects quantitively across the U.S. population absent regulation. In fact, the vast majority of the post-control benefits of reducing HAP cannot be quantified or monetized with sufficient quality to inform regulatory decisions due to data gaps, particularly with respect to sensitive populations. But that does not mean that these benefits are small, insignificant, or nonexistent. There are numerous unmonetized effects that contribute to

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[62] Inclusion of 95th percentile confidence intervals for the effect estimate used in modeling this endpoint extends this range to from 80 to 12,600 IQ points lost (reflecting the 5th and 95th percentiles).

[63] Maternal exposure (and hence IQ impacts to children) from U.S. EGU-sourced mercury can display considerable variation due to (a) spatial patterns of U.S. EGU mercury fate and transport (including deposition and methylation) which affects impacts on fish methylmercury and (b) variations in fish consumption by mothers (including differences in daily intake, types of fish consumed and geographical origins of that fish).

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additional benefits realized from emissions reductions. These include additional reductions in neurodevelopmental and cardiovascular effects from exposure to methylmercury, adverse ecosystem effects including mercury-related impacts on recreational and commercial fishing, health risks from exposure to non-mercury HAP, and health risks in EJ subpopulations that face disproportionally high exposure to EGU HAP.

Congress well understood the challenges in monetizing risks. As discussed in section II.B above, the statutory language in CAA section 112 clearly supports a conclusion that the intended benefit of HAP regulation is a reduction in the volume of HAP emissions to reduce assumed and identified risks from HAP with the goal of protecting even the most exposed and most sensitive members of the population. The statute requires the EPA to move aggressively to quickly reduce and eliminate HAP, placing high value on doing so in the face of uncertainty regarding the full extent of harm posed by hazardous pollutants on human health and welfare. The statute also clearly places great value on protecting even the most vulnerable members of the population, by instructing the EPA, when evaluating risk in the context of a determination of whether regulation is warranted, to focus on risk to the most exposed and most sensitive members of the population. *See, e.g.,* CAA sections 112(c)(9)(B), 112(f)(2)(B), and 112(n)(1)(C). For example, in evaluating the potential for cancer effects associated with emissions from a particular source category under CAA section 112(f)(2), the EPA is directed by Congress to base its determinations on the maximum individual risk (MIR) to the most highly exposed individual living near a source. Similarly, in calculating the potential for non-cancer effects to occur, the EPA evaluates the impact of HAP to the most exposed individual and accounts for sensitive subpopulations.

Notably, Congress in CAA section 112 did not require the EPA to quantify risk across the entire population, or to calculate average or "typical" risks. The statutory design focusing on

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maximum risk to individuals living near sources acknowledges the inherent difficulty in enumerating HAP effects, given the large number of pollutants and the uncertainties associated with those pollutants, as well as the large number of sources emitting HAP. However, this does not mean that these effects do not exist or that society would not highly value these reductions, despite the fact that the post-control effects of the reductions generally cannot be quantified. The EPA has long acknowledged the difficulty of quantifying and monetizing HAP benefits. In March 2011, the EPA issued a report on the post-control benefits and costs of the CAA. This Second Prospective Report[64] is the latest in a series of EPA studies that estimate and compare the post-control benefits and costs of the CAA and related programs over time. Notably, it was the first of these reports to include any attempt to quantify and monetize the impacts of reductions in HAP, and it concentrated on a small case study for a single pollutant, entitled "Air Toxics Case Study – Health Benefits of Benzene Reductions in Houston, 1990-2020." As the EPA summarized in the Second Prospective Report, "[t]he purpose of the case study was to demonstrate a methodology that could be used to generate human health benefits from CAAA controls on a single HAP in an urban setting, while highlighting key limitations and uncertainties in the process. …Benzene was selected for the case study due to the availability of human epidemiological studies linking its exposure with adverse health effects." (pg. 5-29). In describing the approach, the EPA noted: "[b]oth the Retrospective analysis and the First Prospective analysis omitted a quantitative estimation of the benefits of reduced concentrations of air toxics, citing gaps in the toxicological database, difficulty in designing population-based epidemiological studies with sufficient power to detect health effects, limited ambient and

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[64] U.S. EPA Office of Air and Radiation, April 2011. *The Benefits and Costs of the Clean Air Act from 1990 to 2020*, Final Report – Rev. A. Available at *https://www.epa.gov/sites/production/files/2015-07/documents/fullreport_rev_a.pdf.*

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personal exposure monitoring data, limited data to estimate exposures in some critical microenvironments, and insufficient economic research to support valuation of the types of health impacts often associated with exposure to individual air toxics." (pg. 5-29). These difficulties have long hindered the Agency's ability to quantify post-control HAP impacts and estimate the monetary benefits of HAP reductions.

In preparing the benzene case study for inclusion in the Second Prospective Report, the Agency asked the Advisory Council on Clean Air Compliance Analysis (the Council) to review the approach. In its 2008 consensus advice to the EPA after reviewing the benzene case study,[65] the Council noted that "Benzene… has a large epidemiological database which OAR used to estimate the health benefits of benzene reductions due to CAAA controls. The Council was asked to consider whether this case study provides a basis for determining the value of such an exercise for HAP benefits characterization nationwide." They concluded:

> As recognized by OAR, the challenges for assessing progress in health improvement as a result of reductions in emissions of hazardous air pollutants (HAPs) are daunting. Accordingly, EPA has been unable to adequately assess the economic benefits associated with health improvements from HAP reductions due to a lack of exposure-response functions, uncertainties in emissions inventories and background levels, the difficulty of extrapolating risk estimates to low doses and the challenges of tracking health progress for diseases, such as cancer, that have long latency periods. …
>
> The benzene case study successfully synthesized best practices and implemented the standard damage function approach to estimating the benefits of reduced benzene, however the Council is not optimistic that the approach can be repeated on a national scale or extended to many of the other 187 air toxics due to insufficient epidemiological data. With some exceptions, it is not likely that the other 187 HAPs will have the quantitative exposure-response data needed for such analysis. Given EPA's limited resources to evaluate a large number of HAPs individually, the Council urges EPA to consider alternative approaches to estimate the benefits of air toxics regulations.

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[65] U.S. EPA Advisory Council on Clean Air Act Compliance Analysis, Review of the Benzene Air Toxics Health Benefits Case Study. July 11, 2008. Available at *https://nepis.epa.gov/Exe/ZyPDF.cgi/P1000ZYP.PDF?Dockey=P1000ZYP.PDF.*

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In addition to the difficulties noted by the Council, there are other challenges that affect the EPA's ability to fully characterize post-control impacts of HAP on populations of concern, including sensitive groups such as children or those who may have underlying conditions that increase their risk of adverse effects following exposure to HAP. Unlike for criteria pollutants such as ozone and PM, the EPA lacks information from controlled human exposure studies conducted in clinical settings which enable us to better characterize dose-response relationships and identify subclinical outcomes. Also, as noted by the Council and by the EPA itself in preparing the benzene case study, the almost universal lack of HAP-focused epidemiological studies is a significant limitation. Estimated risks reported in epidemiologic studies of fine PM ($PM_{2.5}$) and ozone enable the EPA to estimate health impacts across large segments of the U.S. population and quantify the economic value of these impacts. Epidemiologic studies are particularly well suited to supporting air pollution health impact assessments because they report measures of population-level risk that can be readily used in a risk assessment.

However, such studies are infrequently performed for HAP. Exposure to HAP is typically more uneven and more highly concentrated among a smaller number of individuals than exposure to criteria pollutants. Hence, conducting an epidemiologic study for HAP is inherently more challenging; for starters, the small population size means such studies often lack sufficient statistical power to detect effects. For example, in the case of mercury, the most exposed and most sensitive members of the population may be both small and highly concentrated, such as the subsistence fishers that the EPA has identified as likely to suffer deleterious effects from U.S. EGU HAP emissions. While it is possible to estimate the potential risks confronting this population in a case-study approach (an analysis that plays an important

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role in supporting the public health hazard determination for mercury as discussed above in sections III.A.2 and III.A.3), it is not possible to translate these risk estimates into post-control quantitative population-level impact estimates for the reasons described above.

Further, for many HAP-related health endpoints, the Agency lacks economic data that would support monetizing HAP impacts, such as willingness to pay studies that can be used to estimate the social value of avoided outcomes like heart attacks, IQ loss, and renal or reproductive failure. In addition, the absence of socio-demographic data such as the number of affected individuals comprising sensitive subgroups further limits the ability to monetize HAP-impacted effects. All of these deficiencies impede the EPA's ability to quantify and monetize post-control HAP-related impacts even though those impacts may be severe and/or impact significant numbers of people.

Though it may be difficult to quantify and monetize most post-control HAP-related health and environmental benefits, this does not mean such benefits are small. The nature and severity of effects associated with HAP exposure, ranging from lifelong cognitive impairment to cancer to adverse reproductive effects, implies that the economic value of reducing these impacts would be substantial if they were to be quantified completely. By extension, it is reasonable to expect both that reducing HAP-related incidence affecting individual endpoints would yield substantial benefits if fully quantified, and moreover that the total societal impact of reducing HAP would be quite large when evaluated across the full range of endpoints. In judging it appropriate to regulate based on the risks associated with HAP emissions from U.S. EGUs, the EPA is placing weight on the likelihood that these effects are significant and substantial, as supported by the health evidence. The EPA's new screening-level analyses laid out in the Risk TSD for this proposal illustrate this point. Specifically, in exploring the potential for MI-related

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mortality risk attributable to mercury emissions from U.S. EGUs, the EPA's upper bound estimate is that these emissions may contribute to as many as 91 additional premature deaths each year. The value society places on avoiding such severe effects is very high; as the EPA illustrates in the valuation discussion in the 2021 Risk TSD, the benefit of avoiding such effects could approach $720 million per year. Similarly, for IQ loss in children exposed *in utero* to U.S. EGU-sourced mercury, our upper bound estimate approaches 6,000 IQ points lost which could translate into a benefit approaching $50 million per year.

These estimates are intended to illustrate the point that the HAP impacts are large and societally meaningful, but not to suggest that they are even close to the full benefits of reducing HAP. There are many other unquantified effects of reducing EGU HAP that would also have substantial value to society. As described above, mercury alone is associated with a host of adverse health and environmental effects. The statute clearly identifies this basket of effects as a significant concern in directing the EPA to study them specifically. If the EPA were able to account for all of these post-control effects in our quantitative estimates, the true benefits of MATS would be far clearer. However, available data and methods currently preclude a full quantitative accounting of the post-control impacts of reducing HAP emissions from U.S. EGUs and a monetization of these impacts.

There are other aspects of social willingness to pay that are not accounted for in the EPA's quantitative estimate of benefits either. For example, in previous MATS-related rulemakings and analysis, the EPA has not estimated what individuals would be willing to pay in order to reduce the exposure of *others* who are exposed (even if they are not experiencing high levels of HAP exposure themselves). These may be considered and quantified as benefits

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depending on whether it is the health risks to others in particular that is motivating them.[66] For example, Cropper *et al.* (2016) found that focus group participants indicated a preference for more equitable distribution of health risks than for income, which indicates that it is specifically the risks others face that was important to the participants.[67] This result is particularly important as exposure to HAP is often disproportionately borne by underserved and underrepresented communities (Bell and Ebisu, 2012).[68] Unfortunately, studies to quantify the willingness to pay for a more equitable distribution of HAP exposures are limited, so quantification of this benefit likely cannot be performed until new research is conducted.

The HAP-related legislative history for the 1990 Amendments includes little discussion of the monetized benefits of HAP, perhaps due to these attendant difficulties. When such monetized benefits were estimated in several outside reports submitted to Congress before passage of the 1990 Amendments, the estimates were based on reduced cancer deaths and the value of the benefits that are quantified were estimated to be small as compared to the estimated costs of regulating HAP emissions under CAA section 112. *See, e.g., A Legislative History of the Clean Air Act Amendments of 1990*, Vol. I at 1366-67 (November 1993) (estimating the total annual cost of CAA section 112 to be between $6 billion and $10 billion per year and the estimated annual benefits to be between $0 and $4 billion per year); *id.* at 1372-73 (estimating the total annual cost of CAA section 112 to be between $14 billion and $62 billion per year and

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[66] Jones-Lee, M. W. *Paternalistic Altruism and the Value of Statistical Life*. The Economic Journal, vol. 102, no. 410, 1992, pp. 80–90.
[67] Cropper M., Krupnick A., and W. Raich, *Preferences for Equality in Environmental Outcomes*, Working Paper 22644 *http://www.nber.org/papers/w22644*
National Bureau of Economic Research, September 2016.
[68] Bell, Michelle L., and Keita Ebisu. *Environmental inequality in exposures to airborne particulate matter components in the United States*. Environmental Health Perspectives 120.12 (2012): 1699-1704.

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the estimated annual benefits to be between $0 and $4 billion per year). Despite the apparent disparity of estimated costs and monetized benefits, Congress still enacted the revisions to CAA section 112. Thus, it is reasonable to conclude that Congress found HAP emissions to be worth regulating even without evidence that the monetized benefits of doing so were greater than the costs. The EPA believes this stems from the value that the statute places on reducing HAP regardless of whether the post-control benefits of doing so can be quantified or monetized, and the statute's purpose of protecting even the most exposed and most sensitive members of the population.

5. Characterization of HAP Risk Relevant to Consideration of Environmental Justice

In assessing the adverse human health effects of HAP pollution from EGUs, we note that these effects are not borne equally across the population, and that some of the most exposed individuals and subpopulations – protection of whom is, as noted, of particular concern under CAA section 112 – are minority and/or low-income populations. Executive Order 12898 (59 FR 7629; February 16, 1994) establishes Federal executive policy on EJ issues. That Executive Order's main provision directs Federal agencies, to the greatest extent practicable and permitted by law, to make EJ part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. Executive Order 14008 (86 FR 7619; February 1, 2021) also calls on Federal agencies to make achieving EJ part of their missions "by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts." That Executive Order also declares a policy "to secure

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environmental justice and spur economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and under-investment in housing, transportation, water and wastewater infrastructure, and health care." Under Executive Order 13563, Federal agencies may consider equity, human dignity, fairness, and distributional considerations, where appropriate and permitted by law.

In the context of MATS, exposure scenarios of clear relevance from an EJ perspective include the full set of subsistence fisher scenarios included in the watershed-level risk assessments completed for the rule. Subsistence fisher populations are potentially exposed to elevated levels of methylmercury due to their elevated levels of self-caught fish consumption which, in turn, are often driven either by economic need (*i.e.*, poverty) and/or cultural practices. In the context of MATS, we completed watershed-level assessments of risks for a broad set of subsistence fisher populations covering two health endpoints of clear public health significance including: (a) neurodevelopmental effects in children exposed prenatally to methylmercury (the methylmercury-based RfD analysis described in the 2011 Final Mercury TSD) and (b) potential for increased MI-mortality risk in adults due to methylmercury exposure (section III.A.3.b above).

The general subsistence fisher population that was evaluated nationally for both analyses was not subdivided by socioeconomic status, race, or cultural practices.[69] Therefore, the risk estimates derived do not fully inform our consideration of EJ impacts, although the significantly elevated risks generated for this general population are clearly relevant from a public health

[69] Note that the RfD-based analysis described in the 2011 Final Mercury TSD and referenced here addressed the potential for neurodevelopmental effects in children and therefore focused on the ingestion of methylmercury by female subsistence fishers. By contrast, the analysis focusing on increased MI-mortality risk for subsistence fishers described in the 2021 Risk TSD and referenced here was broader in scope and encompassed all adult subsistence fishers.

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standpoint. However, the other, more differentiated subsistence fisher populations, which are subdivided into smaller targeted communities, are relevant in the EJ context and in some instances were shown to have experienced levels of risk significantly exceeding those of the general subsistence fisher population, as noted earlier in section III.A.3.b.

In particular, for the watershed analysis focusing on the methylmercury RfD-based analysis (*i.e.*, neurodevelopmental risk for children exposed prenatally), while the general female fisher scenario suggested that modeled exposures (from U.S. EGU-sourced mercury alone) exceeded the methylmercury RfD in approximately 10 percent of the watersheds modeled (2011 Final Mercury TSD, Table 2-6), for low-income Black subsistence fisher females in the Southeast, modeled exposures exceeded the RfD in approximately 25 percent of the watersheds. These results suggest a greater potential for adverse effects in low-income Black populations in the Southeast. Similarly, while the general subsistence fisher had exposure levels suggesting an increased risk for MI-mortality risk in 10 percent of the watersheds modeled, two sub-populations were shown to be even further disadvantaged. Low-income Black and white populations in the Southeast and tribal fishers active near the Great Lakes had the potential for increased risk in 25 percent of the watersheds modeled.[70] Both of these results (the neurodevelopmental RfD-based analysis and the analysis of increased MI-mortality risk) suggest that subsistence fisher populations that are racially or culturally, geographically, and income-

[70] Recognizing challenges in obtaining high-end consumption rates for tribal populations active in areas of high U.S. EGU impact (*e.g.*, Ohio River valley, areas of the central Southeast such as northern Georgia, northern South Carolina, North Carolina and Tennessee) there is the potential for our analysis of tribal-associated risk to have missed areas of elevated U.S. EGU-sourced mercury exposure and risk. In that case, estimates simulated for other subsistence populations active in those areas (*e.g.*, low-income whites and Blacks in the Southeast as reported here and in Table 3 of the 2021 Risk TSD) could be representative of the ranges of risk experienced by tribal populations to the extent that cultural practices result in similar levels of increased fish consumption.

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differentiated could experience elevated risks relative to not only the general population but also the population of subsistence fishers generally. We think these results are relevant in considering the benefits of regulating EGU HAP.

6. Overview of Health and Environmental Effects Associated with non-HAP Emissions from EGUs

Alongside the HAP emissions enumerated above, U.S. EGUs also emit a substantial quantity of criteria pollutants, including direct $PM_{2.5}$, nitrogen oxides (NO_x) (including NO_2), and SO_2, even after implementation of the ARP and numerous other CAA requirements designed to control criteria pollutants. In the 2011 RIA, for example, the EPA estimated that U.S. EGUs would emit 3.4 million tons of SO_2 and 1.9 million tons of NO_x in 2015 prior to implementation of any controls under MATS (*see* Table ES-2). These EGU SO_2 emissions were approximately twice as much as all other sectors combined (EPA SO_2 Integrated Science Assessment, 2017).[71] These pollutants contribute to the formation of $PM_{2.5}$ and ozone criteria pollutants in the atmosphere, the exposure to which is causally linked with a range of adverse public health effects. SO_2 both directly affects human health and is a precursor to $PM_{2.5}$. Short-term exposure to SO_2 causes respiratory effects, particularly among adults with asthma. SO_2 serves as a precursor to $PM_{2.5}$, the exposure to which increases the risk of premature mortality among adults, lung cancer, new onset asthma, exacerbated asthma, and other respiratory and cardiovascular diseases. Likewise, EGU-related emissions of NO_x will adversely affect human health in the form of respiratory effects including exacerbated asthma. NO_x is a precursor pollutant to both $PM_{2.5}$ and ground-level ozone. Exposure to ozone increases the risk of respiratory-related

[71] U.S. EPA. *Integrated Science Assessment for Sulfur Oxides – Health Criteria* (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-17-451, December 2017.

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premature death, new onset asthma, exacerbated asthma, and other outcomes. Fully accounting for the human health impacts of reduced EGU emissions under MATS entails quantifying both the direct impacts of HAP as well as the avoided premature deaths and illnesses associated with reducing these co-emitted criteria pollutants. Similarly, U.S. EGUs emit substantial quantities of CO_2, a powerful greenhouse gas (GHG): the EPA estimated these emissions at 2.23 million metric tpy in 2015 (2011 RIA, Table ES-2). The environmental impacts of GHG emissions are accounted for through the social cost of carbon,[72] which can be used to estimate the benefits of emissions reductions due to regulation.

Not all of the non-HAP benefits of MATS were quantified or monetized in the 2011 RIA. However, the EPA thoroughly documented these potential effects and identified those for which quantification and/or monetization was possible. Specifically, the EPA calculated the number and value of avoided $PM_{2.5}$-related impacts, including 4,200 to 11,000 premature deaths, 4,700 nonfatal heart attacks, 2,600 hospitalizations for respiratory and cardiovascular diseases, 540,000 lost work days, and 3.2 million days when adults restrict normal activities because of respiratory symptoms exacerbated by $PM_{2.5}$ (2011 RIA, p. ES-3). We also estimated substantial additional health improvements for children from reductions in upper and lower respiratory illnesses, acute bronchitis, and asthma attacks. In addition, we included in our monetized co-benefits estimates

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[72] *See https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html*: "EPA and other federal agencies use estimates of the social cost of carbon (SC-CO_2) to value the climate impacts of rulemakings. The SC-CO_2 is a measure, in dollars, of the long-term damage done by a ton of carbon dioxide (CO_2) emissions in a given year. This dollar figure also represents the value of damages avoided for a small emission reduction (*i.e.*, the benefit of a CO_2 reduction). The SC-CO_2 is meant to be a comprehensive estimate of climate change damages and includes changes in net agricultural productivity, human health, property damages from increased flood risk, and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning. However, given current modeling and data limitations, it does not include all important damages."

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the effect from the reduction in CO_2 emissions resulting from this rule, based on the interagency SC-CO_2 estimates. These benefits stemmed from imposition of MATS and would be coincidentally realized alongside the HAP benefits.

7. Summary of Public Health Hazards Associated with Emissions from EGUs

The EPA is proposing to find that the evidence provided in this section of the preamble, informed where possible with new scientific evidence available since the publication of the 2016 Supplemental Finding, once again demonstrates that HAP released from U.S. EGUs represent a significant public health hazard absent regulation under CAA section 112. As noted earlier, the EPA found that even after imposition of the other requirements of the CAA, EGUs were the largest domestic source of mercury, HF, HCl, and selenium and among the largest domestic contributors of arsenic, chromium, cobalt, nickel, hydrogen cyanide, beryllium, and cadmium. The EPA has documented a wide range of adverse health effects in children and adults associated with mercury including, in particular, neurodevelopmental effects in children exposed prenatally (*e.g.*, IQ, attention, fine motor-function, language, and visual spatial ability) and a range of cardiovascular effects in adults including fatal MI and non-fatal IHD. Non-mercury HAP have also been associated with a wide range of chronic health disorders (*e.g.*, irritation of the lung; decreased pulmonary function, pneumonia, or lung damage; detrimental effects on the central nervous system; and damage to the kidneys). Furthermore, three of the key metal HAP emitted by EGUs (arsenic, chromium, and nickel) have been classified as human carcinogens and there is evidence to suggest that, prior to MATS, emissions from these sources had the potential to result in cancer risks greater than 1-in-1 million.

Further, this section describes the results from several new screening-level risk assessments considering mercury from domestic EGU sources. These risk assessments focused

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on two broad populations of exposure: (a) subsistence fishers exposed to mercury through self-caught fish consumption within the continental U.S. and (b) the general U.S. population exposed to mercury through the consumption of commercially-sourced fish (*i.e.*, purchased from restaurants and food stores). The results of these screening-level risk assessments are useful for informing our understanding about the potential scope and public health importance of these impacts, but remaining uncertainties prohibit precise estimates of the size of these impacts currently. For example, numerous studies considering multiple, large cohorts have shown that people exposed to high amounts of mercury are at higher risk of fatal and non-fatal CVD. While U.S. EGUs are only one of multiple global sources that contribute to this mercury exposure, the EPA's screening analysis suggests the potential for U.S. EGU emissions of mercury to contribute to premature mortality in the general U.S. population.

Furthermore, as part of the subsistence fisher analyses, we included scenario modeling for a number of EJ-relevant populations showing that several populations (including low-income Blacks and whites in the Southeast and tribal populations near the Great Lakes) had risk levels that were significantly above the general subsistence fisher population modeled for the entire U.S. As noted earlier, the EPA believes that Congress intended in CAA section 112 to address risks to the most exposed and most sensitive members of the public. These additional risk assessments suggest that there are populations that are particularly vulnerable to EGU HAP emissions, including populations of concern from an EJ standpoint.

MATS plays a critical role in reducing the significant volume and risks associated with EGU HAP emissions discussed above. Mercury emissions have declined by 86 percent, acid gas HAP by 96 percent, and non-mercury metal HAP by 81 percent since 2010 (pre-MATS). *See* Table 4 at 84 FR 2689 (February 7, 2019). MATS is the only Federal requirement that

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guarantees this level of HAP control from EGUs. At the same time, the concomitant reductions in CO_2, NOx, and SO_2, also provide substantial public health and environmental benefits. Given the numerous and important public health and environmental risks associated with EGU emissions, the EPA again concludes that the advantages of regulating HAP emissions from this sector are significant. Acknowledging the difficulties associated with characterizing risks from HAP emissions discussed earlier in this section, we solicit comments about the health and environmental hazards of EGU HAP emissions discussed in this section and the appropriate approaches for quantifying such risks, as well any information about additional risks and hazards not discussed in this proposal.

B. Consideration of Cost of Regulating EGUs for HAP

1. Introduction

In evaluating the costs and disadvantages of MATS, we begin with the costs to the power industry of complying with MATS. This assessment uses a sector-level (or system-level) accounting perspective to estimate the cost of MATS, looking beyond just pollution control costs for directly affected EGUs to include incremental costs associated with changes in fuel supply, construction of new capacity, and costs to non-MATS units that were also projected to adjust operating decisions as the power system adjusted to meet MATS requirements. Such an approach is warranted due to the nature of the power sector, which is a large, complex, and interconnected industry. This means that while the MATS requirements are directed at a subset of EGUs in the power sector, the compliance actions of the MATS-regulated EGUs can affect production costs and revenues of other units due to generation shifting and fuel and electricity price changes. Thus, the EPA's projected compliance cost estimate represents the incremental costs to the entire power sector to generate electricity, not just the compliance costs projected to be incurred by the

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coal- and oil-fired EGUs that are regulated under MATS. Limiting the cost estimate to only those expenditures incurred by EGUs directly regulated by MATS would provide an incomplete estimate of the costs of the rule.

Using this broad view, in the 2011 RIA we projected that the compliance cost of MATS would be $9.6 billion per year in 2015.[73] This estimate of compliance cost was based on the change in electric power generation costs between a base case without MATS and a policy case where the sector complies with the HAP emissions limits in the final MATS. The EPA generated this cost estimate using the Integrated Planning Model (IPM).[74] This model is designed to reflect electricity markets as accurately as possible using the best available information from utilities, industry experts, natural gas and coal market experts, financial institutions, and government statistics. Notably, the model includes cost and performance estimates for state-of-the-art air pollution control technologies with respect to mercury and other HAP controls. But there are inherent limits to what can be predicted *ex ante*. And because the estimate was made 5 years prior to full compliance with MATS, stakeholders, including a leading power sector trade association, have indicated that our initial cost projection significantly overestimated actual costs expended by industry. There are significant challenges to producing an *ex post* cost estimate that provides an apples-to-apples comparison to our initial cost projections, due to the complex and interconnected nature of the industry. However, independent analyses provided to the EPA

[73] All costs were reported in 2007 dollars.

[74] IPM, developed by ICF International, is a state-of-the-art, peer-reviewed, dynamic, deterministic linear programming model of the contiguous U.S. electric power sector. IPM provides forecasts of least-cost capacity expansion, electricity dispatch, and emission control strategies while meeting electricity demand and various environmental, transmission, dispatch, and reliability constraints. The EPA has used IPM for over 2 decades to understand power sector behavior under future business-as-usual conditions and to evaluate the economic and emission impacts of prospective environmental policies.

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indicate that we may have overestimated the cost of MATS by billions of dollars per year. Moreover, there have been significant changes in the power sector in the time since MATS was promulgated that were not anticipated in either EPA or U.S. Energy Information Administration (EIA) projections at the time.[75] Entirely outside of the realm of EPA regulation, there were dramatic shifts in the cost of natural gas and renewables, state policies, and Federal tax incentives, which have also further encouraged construction of new renewables. These have led to significantly faster and greater than anticipated retirement of coal capacity and coal-fired generation.

While there are significant limitations to producing an *ex post* cost estimate, we have endeavored, where possible, to approximate the extent of our overestimate. The unexpected shifts in the power sector, including the rapid increase in natural gas supplies that occurred after promulgation of MATS, resulted in our projected estimates of natural gas prices to be approximately double what they were in actuality. Incremental natural gas expenditures accounted for approximately 25 percent of the $9.6 billion compliance cost estimate for 2015 in the 2011 RIA. The market trends of the power sector also had major impacts on the number of controls installed and operated on coal-fired EGUs in the years following promulgation of MATS. With respect to just pollution control installation and operation, we project that we overestimated annual compliance costs by at least $2.2 to 4.4 billion per year, simply as a result of fewer pollution controls being installed than were estimated in the 2011 RIA. Though this

[75] In 2009, coal-fired generation was by far the most important source of utility scale generation, providing more power than the next two sources (natural gas and nuclear) combined. By 2016, natural gas had passed coal-fired generation as the leading source of generation in the U.S. While natural gas-fired generation, nuclear generation and renewable generation have all increased since 2009, coal-fired generation has significantly declined.

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range of an overestimate is limited to costs associated with pollution controls and operation, those costs made up 70 percent of the projected $9.6 billion figure.

We additionally find that the controls that were installed at MATS-regulated EGUs were likely both less expensive and more effective in reducing pollution than originally projected, resulting in our estimate likely being too high for these reasons as well. Lastly, since completing the 2011 RIA, we have updated several assumptions in our modeling that would also have resulted in a lower cost estimate had they been incorporated into our modeling at the time of the rule. Taking into account the above considerations, we believe we overestimated the cost of MATS by billions of dollars.

We next examine the projected cost of MATS – both total cost and specific types of costs – using sector-level metrics that put those cost estimates in context with the economics of the power sector. The reason we examine these metrics is to better understand the disadvantages that expending these costs had on the EGU industry and the public more broadly, just as on the benefits side we look beyond the volume of pollution reductions to the health and environmental advantages conferred by the reductions.

For purposes of these analyses, we use the 2011 RIA projections, keeping in mind our newer analyses, which indicated that those projections were almost certainly overestimated. Specific to the power sector, we evaluate the projected costs of the rule to revenues from electricity sales across nearly 20 years, and we compare the projected expenditures required under the rule with historic expenditures by the industry over the same time period. We additionally evaluate broader impacts on the American public by looking at projected effects of MATS on retail electricity prices and our analyses of whether the power sector could continue to provide adequate and reliable electricity after imposition of the rule. We find that, when viewed

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in context, the projected costs of MATS to both the power sector and the public were small relative to these metrics and well within the range of historical variability. Moreover, experience has borne out our projection that the EGU sector could continue to provide adequate, reliable, and affordable electricity to the American public after the imposition of the rule.

Section III.B.2 contains our discussion of the ways in which the compliance costs for MATS were likely overestimated. Section III.B.3 expands upon and re-evaluates the cost metrics used in the 2016 Supplemental Finding by adding post-promulgation information to our analysis, and we discuss impacts on power sector generating capacity. In section III.B.4, we propose to reaffirm additional cost considerations regarding the availability and cost of control technologies discussed in earlier rulemakings, and in section III.B.5, we provide our proposed conclusions regarding the costs, or disadvantages, of regulating HAP from EGUs.

2. Compliance Cost Projections in the 2011 RIA Were Likely Significantly Overestimated

In issuing this proposal, the EPA finds itself in a position Congress was not likely to have contemplated when it promulgated the 1990 Amendments. The statute contemplated that the EPA would have completed the required studies and presumably made its determination more than 20 years ago. Due to litigation and multiple changes of administration following *Michigan,* we are, at this point, nearly 10 years after promulgation of the regulation about which we are making a threshold determination, and 5 years after full implementation of that regulation. The vast majority of MATS-affected sources were required to be in compliance with the rule's requirements by April 2016, and installation of new controls–or upgrades to existing controls–were in place by 2017.[76] This means we now have on hand unit-level data regarding

[76] Affected sources were required to be in compliance with the requirements in MATS within 3 years after the effective date of the rule (*i.e.*, by April 2015). However, sources were allowed to

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installations, a clearer picture about market trends, and updated, more accurate assumptions that, taken together, produce a very different picture of the actual costs of MATS than what we projected when we reaffirmed the appropriate and necessary determination and promulgated the rule in 2012. Therefore, while the Agency considers that the information that was available at the time of MATS promulgation provided a valid analytical basis for the threshold appropriate and necessary determination, because many years have elapsed since then, the EPA believes it is reasonable to examine how the power sector has evolved since MATS was finalized and, with the benefit of hindsight, compare important aspects of the 2011 RIA projections with what actually happened since MATS was promulgated. Because our obligation under CAA section 112(n)(1)(A) is to fully consider the advantages and disadvantages of regulating a large, critically important industry, whose role impacts the lives of every American, we think it is important to evaluate and consider the best, currently available information, even if, as discussed in sections III.B.3 and 4, the pre-existing record supports the same conclusion. This *ex post* examination demonstrates that the EPA almost certainly significantly overestimated compliance costs in the 2011 RIA, which further supports the determination that regulation is appropriate and necessary after considering cost. We also do not view this updated, post-hoc evaluation of what happened post-promulgation as undermining the record we established in 2012. Models are not invalidated "solely because there might be discrepancies between those predictions and the real world. That possibility is inherent in the enterprise of prediction." *EME Homer City Generation, L.P. v. EPA*, 795 F.3d 118, 135-36 (D.C. Cir. 2015).

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request an additional year to comply with the rule and the vast majority of sources were required to be in compliance with the rule's requirements by April 2016. We therefore think 2017 is a reasonable year in which to analyze installed controls on the EGU fleet.

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In an ideal world, with perfect information, we would be able to generate an *ex post* analysis of regulatory costs that could be compared to our *ex ante* cost estimate prepared at the time MATS was issued. However, it is extremely challenging to produce rigorous retrospective estimates of regulatory costs. A literature review and series of case studies performed by EPA staff provides insights on how analysts can perform retrospective cost analysis.[77] Kopits *et al.* (2015) identifies several challenges associated with *ex post* cost assessments, including data limitations with respect to how facilities chose to comply with regulations and comprehensive facility-level pollution abatement costs. A key component to a rigorous retrospective analysis noted by the authors that can be particularly difficult to achieve is an accurate definition of the counterfactual, that is, what would have occurred absent the rule. It is this counterfactual that provides the baseline against which the incremental costs of regulation are estimated.

In the case of MATS, to construct an estimate of *ex post* implementation costs that is directly comparable to the *ex ante* 2011 RIA cost estimate, we would first need to accurately attribute changes in the power sector that were due to MATS requirements rather than to market and technological changes, other regulations, or, importantly, combinations of these factors (*i.e.*, properly specify the counterfactual). Second, we would need actual information of the incremental costs that had been associated with facility-level operational changes due to MATS, such as observed changes in dispatch, actual fuel consumption, and how controls in MATS-affected units were actually operated. Even the operation of non-MATS affected units would be relevant to such an analysis, because operational decisions are interconnected on the grid via dispatch decisions as well as through fuel markets. While there may be approaches such as

[77] Kopits, E., A. McGartland, C. Morgan, C. Pasurka, R. Shadbegian, N. B. Simon, D. Simpson and A. Wolverton (2015). *Retrospective cost analyses of EPA regulations: a case study approach*. Journal of Benefit-Cost Analysis 5(2): 173-193.

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econometric analysis, simulation modeling, and event study analysis that could capture and estimate components of the problem identified above and derive an estimate of *ex post* MATS costs, the approach would very likely require different methods and assumptions than the 2011 RIA estimates which were based on the comparison of two forward-looking sets of projections. Even if we undertook such additional analysis or modeling, ultimately we would still only be able to provide a new *estimate* of regulatory costs, not an *actual* cost. Given how challenging it is to produce rigorous retrospective estimates of regulatory costs, particularly at a system-level, an *ex post* analysis is better suited to comparing particular aspects of the analysis, which can help us understand whether costs in the 2011 RIA were over- or under-estimated and can yield a general sense of how much reality diverged from the projection, than to attempting to generate a new and precise "actual" total compliance cost estimate for MATS.

Estimating retrospective costs for a rule of the magnitude of MATS is an especially significant challenge because the rule regulates hundreds of units within a complex, interdependent, and dynamic economic sector. Units within the power sector are also subject to many regulatory requirements and other economic drivers. While we can observe the decisions of the sector and individual units in terms of decisions on controls, fuels, and retirement, we cannot pinpoint the reason(s) behind each unit-level decision. With respect to identifying the counterfactual against which to evaluate retrospective compliance costs, several unforeseen factors since MATS promulgation have driven changes in the power sector that have led to the composition of the current fleet being different than the fleet projected in the 2011 RIA. For example, dramatic increases in the supply of natural gas, along with advances in cost and performance of renewable generation technologies and low electricity demand growth, none of which were fully anticipated in the 2011 RIA, have made strong contributions to shifts away

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from coal-fired generation.[78,79] Additionally, other EPA regulations such as the Disposal of Coal Combustion Residuals from Electric Utilities final rule, the Steam Electric Power Generating Effluent Guidelines - 2015 Final Rule, and the 2020 Steam Electric Reconsideration Rule, were promulgated after MATS.[80] While the compliance periods of these rules all postdate the MATS compliance date, utilities are likely to consider multiple regulations simultaneously when making planning decisions, a likelihood that also complicates the identification of the counterfactual scenario of a world without MATS that is needed to generate an *ex post* incremental cost estimate of MATS that would be directly comparable to the *ex ante* 2011 RIA cost estimate.

Even though it is extremely challenging to produce the type of *ex post* incremental cost estimate discussed above, several stakeholders have conducted analyses, focusing on different components of the regulation's cost, to assess actual costs of compliance. While none of these estimates can be precisely compared against the EPA *ex ante* estimates because they use different methods than the power sector modeling the EPA used in the 2011 RIA, all of the independent analyses suggested that the actual compliance costs expenditures were significantly lower – by billions of dollars – than the EPA estimated in the 2011 RIA.

First, a 2015 analysis by Andover Technology Partners focused on the capital and operating costs associated with the actual installation and operation of pollution control equipment at MATS-regulated units and made two key findings: the number of installed controls was significantly lower than the number of controls that was projected in the 2011 RIA and the

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[78] Linn, J. and K. McCormack (2019). *The Roles of Energy Markets and Environmental Regulation in Reducing Coal-Fired Plant Profits and Electricity Sector Emissions*. RAND Journal of Economics 50: 733-767.
[79] Coglianese, J., *et al.* (2020). *The Effects of Fuel Prices, Environmental Regulations, and Other Factors on U.S. Coal Production, 2008-2016*. The Energy Journal 41(1): 55-82.
[80] 85 FR 53516 (August 28, 2020), 80 FR 67838 (November 3, 2015), and 85 FR 64650 (October 13, 2020), respectively.

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cost of the installed controls was generally lower than the control costs that the EPA assumed in the 2011 RIA modeling. Based on these findings, the study estimated that the EPA's projected cost of compliance was over-estimated by approximately $7 billion.[81,82] In other words, the Andover Technology Partners estimated that the EPA's projected cost was approximately four times higher than their retrospective estimate of cost, which they estimated to be approximately $2 billion per year.

Second, a 2017 study performed by M.J. Bradley & Associates (MJB&A) used information from the EIA and estimated that owners and operators of coal-fired EGUs incurred total capital expenditures on environmental retrofits of $4.45 billion from December 2014 to April 2016.[83] To the EPA's understanding, the MJB&A cost estimate represents total upfront capital costs (not ongoing operating and maintenance expenditures), and is not annualized as was the capital expenditure in the 2011 RIA-based projected cost estimate. For comparison, the estimated total upfront (not annualized) capital expenditures underpinning the 2011 RIA annual compliance cost estimate is about $36.5 billion, which is more than eight times higher than the MJB&A estimates. This result suggests that the capital cost component of the 2011 RIA cost projections was significantly overestimated, potentially by a factor of more than eight.

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[81] Declaration of James E. Staudt, Ph.D., CFA, at 3, *White Stallion Energy Center v. EPA*, No. 12-1100 (D.C. Cir., December 24, 2015). Also available at Docket ID Item No. EPA-HQ-OAR-2009-0234-20549.

[82] In addition to the 2015 study, Andover Technology Partners produced two other analyses in 2017 and 2019, respectively, that estimated the ongoing costs of MATS. The 2017 report estimated that the total annual operating cost for MATS-related environmental controls was about $620 million, an estimate that does not include ongoing payments for installed environmental capital. The 2019 report estimates the total annual ongoing incremental costs of MATS to be about $200 million; again, this estimate does not include ongoing MATS-related capital payment. The 2017 report is available in Docket ID Item No. EPA-HQ-OAR-2018-0794-0794. The 2019 report is available in Docket ID Item No. EPA-HQ-OAR-2018-0794-1175.

[83] Available in Docket ID Item No. EPA-HQ-OAR-2018-0794-1145.

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Third, the Edison Electric Institute (EEI), the association that represents all U.S. investor-owned electric companies, estimated that by April 2019, owners and operators of coal- and oil-based EGUs incurred *cumulative* (not annual) compliance costs of more than $18 billion to comply with MATS, including both capital and operations and maintenance costs since MATS became effective in April 2012.[84] In order to provide a simple comparison between the EEI figure, which was incurred over 7 years, and the annualized amount presented in the 2011 RIA ($9.6 billion), we can divide the EEI figure by 7 to estimate an average annual amount of approximately $2.6 billion, which is similar to the Andover Technology Partners estimate of approximately $2 billion. Also in line with the Andover Technology Partners estimate, EEI's estimate suggests that the annual costs related to MATS compliance were overestimated in the 2011 RIA by approximately $7 billion. While there is some uncertainty in the amount of time over which those costs were incurred, as well as the exact nature of those expenditures, it is clear that the information provided by EEI supports a conclusion that the costs of compliance with MATS were significantly lower than the Agency's projections.

In summary, it is the EPA's understanding that two of these studies indicate that the 2011 RIA may have overestimated annual compliance costs by approximately $7 billion, and the third study finds that the projected total upfront capital costs may have been overestimated by a factor of more than eight. While each of these retrospective cost estimates is developed from bases that are dissimilar from one another and, in particular, from how the EPA developed the prospective cost estimates in the 2011 RIA, each of the independent analyses indicate that the costs of MATS are likely significantly less than the EPA estimated in the 2011 RIA.

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[84] Available in Docket ID Item No. EPA-HQ-OAR-2018-0794-2267.

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For this proposal, the EPA has evaluated whether the *ex ante* estimates in the 2011 RIA were likely accurate, overestimated, or underestimated, and the details of the EPA's new analysis are contained in the docketed TSD (referred to herein as the "Cost TSD").[85] Consistent with our systems-level approach, we begin our analysis with an evaluation of natural gas expenditures during the relevant time period. The rapid decrease in the price of natural gas during this time period affected U.S. power generation profoundly, including U.S. EGU fuel expenditures; this has significant implications for our *ex post* analysis because natural gas expenditures constituted approximately 25 percent of the projected 2015 compliance costs in the 2011 RIA.[86] These market shifts in the industry also impacted expenditures associated with the installation and operation of pollution control equipment at MATS-affected facilities. Those costs constituted a majority – about 70 percent – of the projected annual compliance costs in 2015. The following sections closely examine these two components of the compliance cost and use available information to evaluate whether the projected compliance costs reported in the 2011 RIA were likely higher or lower than actual costs. We also review important cost assumptions used in the 2011 RIA. Taken together, this suite of quantitative and qualitative evaluations indicates that the projected costs in the 2011 RIA were almost certainly significantly overestimated. We find that the 2011 RIA's estimate of the number of installations alone led to an overestimate of about $2.2 to $4.4 billion, and that if recent updates to the cost and performance assumption for pollution

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[85] U.S. EPA. 2021. *Supplemental Data and Analysis for the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units – Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding; Notice of Proposed Rulemaking ("Cost TSD").*

[86] We projected that regulation of coal- and oil-fired EGUs under MATS would induce units to switch to natural gas, which in turn would increase the price of natural gas and the cost of those expenditures.

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controls had been reflected in the 2011 RIA modeling, the projected compliance costs would likely have been even lower (suggesting the overestimate could be greater than $4.4 billion).

a. Natural Gas Supply

The natural gas industry has undergone significant change in recent years. Starting in the mid-2000s, technological changes in natural gas drilling and extraction initiated major market changes that resulted in significant increases to domestic supplies of natural gas. As these technologies have continued to advance, they have had a lasting impact on natural gas markets, resulting in major shifts in the economics of electric sector operations given the abundant supply of natural gas at relatively low costs. This section summarizes these changes and the implications for the cost projection presented in the 2011 RIA.

In 2005, the EIA estimated that proved reserves of natural gas were 213 trillion cubic feet (tcf).[87] In 2019, the estimate of proved reserves was 495 tcf, an increase of 132 percent. The market effects of this major supply shift were profound across the economy, but especially for the power sector. By the end of 2019, aided by advances in drilling and hydraulic fracturing techniques, natural gas production from tight and shale gas formations was the major source of domestic production (*see* Table 1 below) and had increased three-fold from 2005 production levels.

TABLE 1: U.S. NATURAL GAS PRODUCTION, BY SOURCE (TRILLION CUBIC FEET)

Year	Tight/Shale Gas	Other Lower 48 onshore	Lower 48 Offshore	Other
2005	7.2	5.1	3.4	2.3
2006	8.0	5.1	3.2	2.3
2007	9.0	4.9	3.1	2.3

[87] *U.S. Crude Oil and Natural Gas Proved Reserves, Year-end 2019* (Table 9: U.S. proved reserves of natural gas). EIA, January 11, 2021 release available at *https://www.eia.gov/naturalgas/crudeoilreserves*. Accessed July 23, 2021.

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2008	10.3	4.9	2.6	2.4
2009	11.1	4.5	2.7	2.4
2010	12.4	4.2	2.5	2.2
2011	14.8	4.0	2.0	2.1
2012	16.7	3.7	1.6	2.0
2013	17.6	3.5	1.4	1.7
2014	19.5	3.4	1.3	1.6
2015	21.0	3.2	1.4	1.5
2016	21.1	2.8	1.3	1.4
2017	22.2	2.7	1.1	1.3
2018	25.7	2.7	1.0	1.3
2019	29.3	2.4	1.0	1.2
2020	29.2	2.3	1.2	1.2

Source: U.S. EIA, *https://www.eia.gov/energyexplained/natural-gas/where-our-natural-gas-comes-from.php*, accessed July 25, 2021.

Note: "Other" includes production from Alaska and Coalbed Methane sources.

As a result, the natural gas market underwent a long period of sustained low prices (*see* Table 2 below). These market shifts were not fully anticipated or predicted by observers, as indicated by natural gas futures prices at the time of MATS promulgation. Although these changes took root in the mid-2000s, the lasting market disruption would take more time to cement itself. From 2010 through 2019, the U.S became one of the world's leading producers of natural gas, breaking domestic production records year-on-year through the decade, while maintaining record-low prices. During this timeframe, the U.S. shifted from a *total* net energy importer to an exporter,[88] while maintaining some of the lowest relative natural gas prices globally.[89]

TABLE 2: NATURAL GAS PRICES

[88] *Monthly Energy Review*, EIA (June 24, 2021) and *Today in Energy* ("U.S. total energy exports exceed imports in 2019 for the first time in 67 years"), EIA (April 20, 2020) available at *https://www.eia.gov/todayinenergy/detail.php?id=43395*. Accessed July 23, 2021.
[89] BP, *Statistical Review of World Energy 2021* available at *https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html*. Accessed July 23, 2021.

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Year	NYMEX Natural Gas Henry Hub Natural Gas Futures ($/MMBtu), Annual Average, As Of: 2011-03-16	NYMEX Natural Gas Henry Hub Natural Gas Futures ($/MMBtu), Annual Average, As Of: 2011-12-21	Henry Hub Spot Natural Gas Index Annual Average Price ($/MMBtu)
2005	--	--	8.63
2006	--	--	6.74
2007	--	--	6.96
2008	--	--	8.90
2009	--	--	3.94
2010	--	--	4.37
2011	4.24	--	4.00
2012	4.91	3.43	2.75
2013	5.31	4.07	3.73
2014	5.67	4.43	4.37
2015	6.04	4.66	2.63
2016	6.36	4.90	2.51
2017	6.67	5.16	2.98
2018	6.97	5.43	3.16
2019	7.25	5.70	2.56
2020	7.50	5.96	2.03
2021	7.76	6.23	
2022	8.02	6.50	
2023	8.28	6.78	
2024	--	7.06	

Source: Annual Average Henry Hub Price, EIA. NYMEX price, from S&P Global data. 2015 data from 2011 RIA, Chapter 3.

The EPA projected a 2015 natural gas price of roughly $5/MMBtu when MATS was finalized in December 2011, which was a reasonable expectation based on prevailing market conditions at that time. However, natural gas prices post-MATS promulgation ended up being considerably lower than anticipated, which resulted in major shifts in the economics of fossil fuel-fired electric generating technologies (*see* Table 2 above and Chart A-1 in the Cost TSD). From 2005 through 2010, annual average natural gas prices (at Henry Hub) averaged about $6.60/MMBtu. Several years later, as MATS compliance began, prices averaged roughly $2.75/MMBtu for the years 2015 through 2019. This market shift greatly changed the economics

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of power plant operation for fossil fuel-fired facilities, with the electric sector surpassing the industrial sector to become the largest consumer of natural gas (38 percent of the total in 2020),[90] and gas-fired generators becoming the leading source of electric generation in the electric sector, representing 40 percent of total generation in 2020.[91]

The modeling supporting the 2011 RIA did not anticipate this major change in natural gas supply, which has clearly had a significant impact on the electric power sector and those sources covered by MATS. While we do not quantify the impact this change would have on the projected compliance costs associated with incremental changes in natural gas use and price (about 25 percent of the total projected compliance cost in the 2011 RIA), we note that any closures of covered units that occurred as a result of the changed relative economics of fuel prices would decrease the MATS-related compliance costs for the sector. These closures reduced the amount of control capacity necessary for compliance with MATS, and we estimate below a range of costs associated with the overestimation of control installations in the 2011 RIA.

Several researchers have investigated the role of relative fuel prices as a factor in decisions that were made regarding closures of coal-fired units around 2015. Generally, these studies attribute closures primarily to the decrease in natural gas prices, and they also note smaller factors such as advances in the cost and performance of renewable generating sources, lower-than-anticipated growth in electricity demand, and environmental regulations.

For example, Linn and McCormack (2019) developed a simulation model of the U.S. Eastern Interconnection that reproduced unit operation, emissions, and retirements over the

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[90] Table 4.3, *Monthly Energy Review*, EIA, April 2021, available at *https://www.eia.gov/totalenergy/data/monthly/archive/00352104.pdf.*
[91] EIA, Electricity Data Browser, Net generation, United States, all sectors, annual, available at *https://www.eia.gov/electricity/data/browser/.*

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2005- 2015 period. The authors use this model to explain the relative contributions of demand, natural gas prices, wind generation, and environmental regulations, including MATS, to the changes in the share of coal in electricity generation. The results showed that lower electricity consumption and natural gas prices account for a large majority of the declines in coal plant profitability and resulting retirements. The authors found that the environmental regulations they modeled, NO_x emissions caps and MATS, played a relatively minor role in declines of coal plant profitability and retirements.

Additionally, Coglianese *et al.* (2020) developed a statistical modeling approach to enable the decomposition of changes in U.S. coal production from 2008-2016 into changes due to a variety of factors, including changes in electricity demand, natural gas prices relative to coal, renewable portfolio standards, and environmental regulations that affect coal-fired plants. The results indicated that declines in natural gas prices explained about 92 percent of the decrease in coal production between 2008 and 2016. Air regulations, including MATS, explained about 6 percent of the drop in coal production. The study attributed about 5.2 GW of coal-fired EGU retirements to MATS.

These studies both demonstrate that the decrease in natural gas prices played a significant role in closures of coal-fired EGUs. While we do not quantify the impact this change had on the projected costs included in the 2011 RIA, we note that any closures of covered units that occurred as a result of the dramatically changed relative economics of fuel prices would decrease the MATS-related compliance costs for the sector.

b. Projected Versus Observed Pollution Control Installations

The 2011 RIA reported a sector-level compliance cost of $9.6 billion annually in 2015. The majority of those costs – about 70 percent – represented the incremental annualized capital

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and annual operation and maintenance (O&M) costs associated with installation and operation of pollution controls for compliance with MATS at coal steam units. Given the time that has passed, we can now compare the incremental projected pollution control capacity reported in the 2011 RIA with available information regarding actual (observed) control installations. For this proposal, therefore, the EPA has compared observed installations and costs over 2013-2016 to unit-level estimates of the control installation capacity and associated costs presented in the 2011 RIA. This analysis demonstrates, subject to the caveats and uncertainty discussed below, that the 2011 RIA likely overestimated total pollution control retrofit capacity that would occur in response to MATS and, thus, likely overestimated MATS compliance costs. For example, the analysis that follows demonstrates that fabric filter (FF) systems – which are an expensive and capital-intensive control technology – were only installed on less than one-third of the capacity anticipated in the 2011 RIA analysis.

This comparison of projected to observed control capacity installations relies on the simplifying assumption that all dry scrubbers (*e.g.*, dry FGD systems), dry sorbent injection (DSI) systems, activated carbon injection (ACI) systems, and FF systems installed during the 2013-2016 period were installed for compliance with the MATS emissions limits. This assumption is necessitated by the absence of comprehensive data on the specific reasons EGUs installed pollution control equipment. While assuming pollution controls of these types that were installed in this period are singularly attributable to MATS requirements is a reasonable assumption for this analysis, it is a highly conservative assumption given that some of the observed installations likely occurred in response to other regulations to control criteria air pollutants (*e.g.*, Cross-State Air Pollution Rule, Regional Haze, Federal implementation plans, or state implementation plans) or enforcement actions (*e.g.*, consent decrees). Because some of the

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observed installations in this analysis likely resulted from non-MATS requirements, the approach potentially over-attributes the amount of pollution controls built specifically for MATS compliance, thereby leading to an overestimate of the control costs associated with MATS.

Table 3 presents the findings of this analysis in capacity terms. The total capacity projected to retrofit with each control in the 2011 RIA is reported for the base case (*i.e.*, projected future conditions absent MATS) and under MATS. The difference is presented in the 'Projected Incremental Controls' column. So, for example, in the 2011 RIA the EPA projected that there would be an incremental 20.3 GW of capacity retrofitting with dry FGD that is attributable to MATS. We compare the projected incremental controls capacity value to the observed installations capacity value. Note that we are unable to estimate the total capacity of observed upgrades to electrostatic precipitators (ESP) and scrubbers due to a lack of available data regarding such upgrades. For additional information, *see* the docketed Cost TSD.

TABLE 3. PROJECTED VS. OBSERVED CAPACITY (GIGAWATTS (GW))

Pollution Control Retrofit	Base Case	MATS	Projected Incremental Controls	Observed Installations (2013-2016)	Difference: Observed Minus Projected (2013-2016)	Percent Difference: Observed Minus Projected (2013-2016)
Dry FGD	4.6	24.8	20.3	16.0	-4.3	-21%
DSI	8.6	52.5	43.9	15.8	-28.1	-64%
ACI	0	99.3	99.3	96.1	-3.2	-3%
FF	12.7	114.7	102	31.4	-70.6	-69%
ESP Upgrade	0	33.9	33.9	N/A	N/A	N/A
Scrubber Upgrade	0	63.1	63.1	N/A	N/A	N/A

Source: Projected Controls: 2011 RIA; Observed Installations: NEEDS v.5.16.
Note: FF installations include installations specifically related to PM control, as well as installations included with dry scrubber, DSI, and some ACI retrofits in the modeling. Totals may not sum due to rounding.

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This analysis demonstrates that projected incremental capacity of dry FGD, DSI, ACI, and FF was likely significantly overestimated in the 2011 RIA. The capacities of actual installed control technologies are lower, often significantly lower, than projected (and again, this analysis attributes *all* control installations of certain types during this time period to MATS, even though some portion of those installations were likely made in whole or in part due to other regulations). For example, the installed DSI capacity is about two-thirds lower than was projected. The difference between observed installed control capacities and what we projected those incremental control capacities would be translates directly into significantly lower costs than estimated. Because the vast majority of compliance costs in the 2011 RIA were related to the installation and operation of pollution controls, and because significant deployment of any higher-cost compliance strategies did not occur, the large differences observed in Table 3 suggest that the projected compliance costs were likely significantly overestimated as well. For example, approximately $2 billion was estimated to be attributable to the installation and operation of DSI controls (21 percent of the total annual projected costs of MATS), when in actuality, only one-third of those installations occurred (and some were likely attributable to regulations other than MATS).

We also conduct an analysis of the approximate costs related to the overestimate of projected incremental pollution controls. This analysis is discussed in detail in the Cost TSD. Specifically, we compared observed installations over 2013-2016 to unit-level estimates of the control installation capacity and associated costs presented in the 2011 RIA to develop a range of the potential overestimate of compliance costs related to projected control installations that did not occur.

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As result of this analysis, we find that based on this one variable – the number of control technology installations – the 2011 RIA overestimated control costs by about $2.2 to $4.4 billion (or 2.7 times). If recent updates to the cost and performance assumptions for pollution controls had been reflected in the 2011 RIA modeling, the projected compliance costs would likely have been even lower (suggesting the overestimate could be greater than $4.4 billion). The EPA did not quantify advances in cost and performance of control technology between the time of the EPA's modeling and implementation of the rule due to uncertainty. We note that this may be one reason that the Andover Technology Partners' overestimate for control costs of $7 billion exceeds the EPA's range of overestimates ($2.2-4.4 billion) for the same control and operation costs. The next section helps explain some of the difference quantified above, and provides further qualitative evidence supporting the EPA's conclusion that the 2011 RIA likely significantly overestimated the compliance costs associated with meeting MATS requirements.

c. 2011 RIA Modeling Assumptions

Since promulgation of MATS, the EPA has found it necessary to update some of the modeling assumptions used in the IPM modeling that informed the RIA cost estimate, in order to capture the most recently available information and best reflect the current state of the power sector. Several of these recent updates are directly related to pollution control retrofits that were projected to be installed for MATS in the 2011 RIA. Had these updates been reflected in our modeling, it likely would have projected fewer controls needing to be installed and therefore a lower cost estimate overall.

The full suite of assumptions utilized in the IPM modeling are reported in the model documentation, which provides additional information on the assumptions discussed here as well

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as all other assumptions and inputs to the model.[92] Updates specific to MATS modeling are also in the IPM 4.10 Supplemental Documentation for MATS.[93] As was included in the 2011 RIA discussion regarding uncertainty and limitations of the power sector modeling analysis (Section 3.15), the cost and emissions impact projections did not take into account the potential for advances in the capabilities of pollution control technologies or reductions in their costs over time. EPA modeling cannot anticipate in advance the full spectrum of compliance strategies that the power sector may innovate to achieve required emission reductions, and experience has shown that regulated industry often is able to comply at lower costs through innovation or efficiencies. Where possible, the EPA designs regulations to assure environmental performance while preserving flexibility for affected sources to design their own solutions for compliance. Industry will employ an array of responses, some of which regulators may not fully anticipate and will generally lead to lower costs associated with the rule than modeled in *ex ante* analysis. *See, e.g.*, section III.D of this preamble, discussing how the actual cost of the ARP was up to 70 percent less than what had been estimated.

A first example regards the assumptions of HCl removal for certain types of coal. When lignite and subbituminous coals are combusted, the chemistry of coal ash alkalinity removes HCl emissions. The 2011 RIA modeling assumed a 75 percent reduction of HCl emissions from lignite and subbituminous coals.[94] Upon subsequent review of available data, the EPA updated this assumption to 95 percent HCl removal.[95] This revised assumption regarding improved HCl

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[92] *See https://www.epa.gov/airmarkets/ipm-analysis-proposed-mercury-and-air-toxics-standards-mats*. Accessed July 23, 2021.
[93] *See https://www.epa.gov/airmarkets/documentation-supplement-base-case-v410mats*. Accessed July 23, 2021.
[94] *Id.*
[95] *See https://www.epa.gov/sites/default/files/2019-03/documents/chapter_5.pdf*. Accessed July 23, 2021.

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removal from coal ash alkalinity effectively lowers uncontrolled HCl emissions rates in the projections and is a better reflection of actual removal rates observed by EGUs combusting subbituminous and/or lignite coal. This updated assumption, had it been used in the 2011 RIA modeling, would have significantly decreased the incremental capacity of acid gas controls (*e.g.*, DSI, dry FGD) that the model projected to be needed for compliance with the MATS acid gas limits.[96] The lower projection for controls would in turn have resulted in a lower cost estimate.

For a second example, the EPA updated the DSI retrofit cost methodology used in our power sector modeling. The 2011 RIA compliance cost projections assumed an SO_2 removal rate of 70 percent and a corresponding HCl removal effect of 90 percent[97] based on a technical report, developed by Sargent and Lundy in August 2010.[98] These assumptions have been updated to reflect an SO_2 removal rate of 50 percent and a corresponding HCl removal effect of 98 percent for units with FF in the EPA's recent modeling,[99] based on an updated technical report from Sargent and Lundy.[100]

These revised assumptions, which better reflect the actual cost and performance of DSI, would reduce the variable costs significantly, by about one-third at a representative plant,[101]

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[96] While we are unable to quantify precisely the impact that updating this assumption would have on the projected compliance costs, we can observe that most incremental DSI capacity (about 40 GW) would not require DSI controls in the 2011 RIA modeling, holding all else constant.
[97] *See https://www.epa.gov/sites/production/files/2015-07/documents/updates_to_epa_base_case_v4.10_ptox.pdf.* Accessed July 23, 2021.
[98] *See Dry Sorbent Injection Cost Development Methodology* at *https://www.epa.gov/sites/production/files/2015-07/documents/append5_4.pdf.* Accessed July 23, 2021.
[99] *See https://www.epa.gov/airmarkets/documentation-epa-platform-v6-november-2018-reference-case-chapter-5-emission-control.* Accessed July 23, 2021.
[100] *See Dry Sorbent Injection for SO_2/HCl Control Cost Development Methodology* at *https://www.epa.gov/sites/production/files/2018-05/documents/attachment_5-5_dsi_cost_development_methodology.pdf.* Accessed July 23, 2021.
[101] Based on a 500 MW plant with a heat rate of 9,500 Btu/kWh burning bituminous coal.

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because less sorbent is required to achieve the same amount of HCl reduction. If the EPA had been able to use this new information in the 2011 RIA modeling, the projected compliance costs would have been lower, reflecting the reduced sorbent necessary to achieve the MATS emission limits. Furthermore, we note that while these modeling assumptions are based on a single sorbent (trona), alternative sorbents are available, potentially at a lower cost for some units.

A third example relates to the assumed cost of ESP upgrades. In the 2011 RIA modeling, the EPA assumed that a range of upgrades would be necessary at units with existing ESP controls in order to meet the MATS PM standard. The EPA assumed the cost of these upgrades ranged from $55/kilowatt (kW) to $100/kW (in 2009 dollars). However, new evidence suggests that many ESP upgrades were installed and are available at less than $50/kW.[102]

These examples highlight the uncertainty inherent in *ex ante* compliance cost projections, and contribute additional evidence that the projected compliance costs presented in the 2011 RIA were likely overestimated and that actual compliance costs for MATS in 2015 were likely significantly less than the $9.6 billion estimate.

d. Conclusion That the 2011 RIA Costs were Overestimated

After reviewing this suite of quantitative and qualitative updates and considering studies that were performed by outside entities, the EPA concludes that the available *ex post* evidence points to significantly lower costs of compliance for the power sector under MATS than suggested by the *ex ante* projections in the 2011 RIA. There are numerous reasons for this, and chief among them is the fact that the natural gas industry has undergone profound change in recent years. Following the promulgation of MATS, natural gas supply increased substantially,

[102] *Analysis of PM and Hg Emissions and Controls from Coal-Fired Power Plants*. Andover Technology Partners (August 19, 2021), available in the rulemaking docket.

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leading to dramatic price decreases that resulted in major shifts in the economics of fossil fuel-fired electric generating technologies. The 2011 RIA modeling did not fully anticipate this historic change in natural gas supply and the related decrease in natural gas prices. As a result of this and other fundamental changes in the industry, we see a very different pattern of control installations than was projected:[103]

- 21 percent less capacity of dry FGD than projected;
- 64 percent less capacity of DSI than projected;
- 3 percent less capacity of ACI than projected;
- 69 percent less capacity of FF than projected; and
- Likely fewer ESP and scrubber control upgrades than projected.

These controls were responsible for approximately 70 percent of the projected annual compliance costs in the 2011 RIA. Because so many projected controls were not installed, we know that the control-related costs were almost certainly significantly overestimated. By simply comparing between projected and installed controls, we now find that the projected control-related costs for 2015 of about $7 billion were likely overestimated by $2.2 to $4.4 billion, and possibly more.

In addition, we have updated some of the modeling assumptions that supported the 2011 RIA. Specifically:

- HCl emissions for EGUs burning subbituminous and lignite coals are much lower than originally modeled, reducing the number of controls necessary for compliance in the model;

[103] As discussed above, although we attributed all controls of these types to MATS in this analysis, even those controls that were installed were likely due in part or in whole for reasons other than MATS.

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- DSI controls require less sorbent than originally assumed, lower the operating cost of these controls, and other lower-cost sorbents are likely available; and
- The assumed cost of ESP upgrades in the modeling was likely much higher than the actual cost of these upgrades.

While not quantified here, the advances in cost and performance of control technology between the time of the EPA's modeling and implementation of the rule would, if quantified, likely add to the $2.2 to $4.4 billion overestimate.

Furthermore, the three studies submitted to the EPA during earlier rulemakings support this finding that the 2011 RIA cost projection was significantly overestimated:

- Andover Technology Partners estimated that the actual costs of compliance with MATS were approximately $2 billion, and that the 2011 RIA may have overestimated compliance costs by approximately $7 billion.
- MJB&A estimated that the total upfront capital expenditures of pollution controls installed for compliance with the rule were overestimated in the 2011 RIA by a factor of more than eight.
- EEI, the association that represents all U.S. investor-owned electric companies, estimated cumulative costs incurred by the industry in response to MATS, and that estimate suggests an annual amount about $7 billion less than the 2011 RIA projected.

Taken together, this information indicates that the projected costs in the 2011 RIA were almost certainly significantly overestimated. We solicit comment on data resource and methods such as econometric, simulation, and event study approaches that may aid the EPA in better

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characterizing the *ex post* regulatory costs of MATS for consideration before we issue the final rule.

3. Evaluation of Metrics Related to MATS Compliance

In the next four sections, we place the costs that we estimated in 2011, and which, as just explained, were likely significantly overestimated, in the context of the EGU industry and the services the EGU industry provides to society. The purpose of these comparisons is to better understand the disadvantages conferred by expending this money, both in terms of their scale and distribution, in order to weigh cost as a factor in our preferred methodology for making the appropriate determination. While we recognize the projected cost estimate from the 2011 RIA in absolute terms is perceived as a large number, our findings demonstrate that, for example, the (overestimated) projected cost estimate is less than 3 percent of the power sector's revenues from electricity sales, even when compared against data from 2019 (which had the lowest electricity sale revenues in a nearly 20 year period). As we did in 2016, we first contextualize the costs of MATS against power sector data for the years 2000 to 2011, *i.e.*, the information that was available to the Agency when we were promulgating MATS in 2012 and reaffirming the appropriate and necessary determination. For purposes of this proposal, we also expand our assessment to compare the 2011 cost estimates to the most recent years of data available regarding, for example, industry revenue and electricity prices. The intent of expanding the years of analysis is to update our assessments from the 2016 Supplemental Finding considering power sector trends with the newest information. We continue to use projections developed for the 2011 RIA for purposes of these evaluations, because as discussed in section III.B.2, we are unable to generate new, bottom-line actual cost projections. However, in section III.D, we consider these

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evaluations in light of the EPA's finding that the projected costs were almost certainly significantly overestimated.

a. Compliance Costs as a Percent of Power Sector Sales

The first metric examined here (as in 2016) is a comparison of the annual compliance costs of MATS to electricity sales at the power sector-level (*i.e.*, revenues), often called a sales test. The sales test is a frequently used indicator of potential impacts from compliance costs on regulated industries.[104] Incorporating updated information from the EIA, Section 2.a and Table A-4 of the Cost TSD present the value of retail electricity sales from 2000 to 2019, as well as net generation totals for the electric power sector for the same period.

This information indicates that the $9.6 billion in annual compliance costs of MATS projected for 2015 would have represented about 2.7 percent of 2008 power sector revenues from retail electricity sales, the peak year during the 2000 to 2019 period. The $9.6 billion in projected compliance costs would constitute about 2.9 percent of 2019 sales, which was the lowest sales level observed in the post-2011 period. These projected compliance costs are a very small percentage of total EGU revenues from electricity sales in both robust or lean years, and newer data confirms the findings of the 2016 record. Moreover, if we account for the fact that the $9.6 billion figure likely significantly overestimated the actual cost of compliance, the percentage of compliance costs to revenues would be even smaller.

b. Compliance Expenditures Compared to the Power Sector's Annual Expenditures

[104] For example, the sales test is often used by the EPA when evaluating potential economic impacts of regulatory actions on small entities. In the context of a small entity analysis, an evaluation of the change in profits to owners is likely the best approach to assessing the economic burden to owners from a regulatory action. Data limitations prevent solely analyzing profit changes to EGU owners as a result of MATS in this proposal.

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The next metrics we examine are a comparison of the annual capital expenditures projected in the 2011 RIA to be needed for MATS compliance to historical power sector-level overall capital expenditures, followed by a comparison of projected annual capital and production expenditures related to MATS compliance to historical power sector-level overall capital and production expenditures.

First, we evaluate capital expenditures. Capital costs represent largely irreversible investments for firms that must be paid off regardless of future economic conditions, as opposed to other important variable costs, such as fuel costs, that may vary according to economic conditions and generation needs. Section 2.b and Table A-5 of the Cost TSD present two sets of estimates for trends in annual capital expenditures by the electric power sector through 2019. The first set of information is based on data compiled by S&P Global, a private sector firm that provides data and analytical services. The second set of information is from the U.S. Census Bureau's Annual Capital Expenditures Survey. While each dataset has limitations, the estimates from each correspond to one another reasonably well.

The 2011 RIA modeling estimated the incremental capital expenditures associated with MATS compliance to be $4.2 billion for 2015. As discussed in section III.B.2, the 2011 RIA likely significantly overestimated compliance costs. This conclusion also applies to the capital cost component of the overall cost because, as detailed earlier, fewer pollution controls were installed during the 2013-2016 timeframe than were projected in the 2011 RIA. While the EPA is not able to produce an alternative capital cost estimate directly comparable to the estimates from the 2011 RIA, the analysis discussed in section III.B.2 and the Cost TSD indicated the annualized capital expenditures at units that installed controls under MATS might be as low as $0.7 billion ($3.5 billion lower than projected in 2011 RIA, or less than one-fifth).

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Even using the significantly overestimated figure of $4.2 billion in our comparison shows that the projected capital expenditures associated with MATS represent a small fraction of the power sector's overall capital expenditures in recent years. Specifically, the $4.2 billion estimate represents about 3.6 or 3.7 percent of 2019 (*i.e.*, most recent) power sector level capital expenditures based on the S&P Global and U.S. Census information, respectively. Compared against 2004 power sector level capital expenditures (*i.e.*, the 20-year low), the $4.2 billion figure represents 10.4 or 9.3 percent of sector level capital expenditures (using the two respective data sets). Additionally, the projected $4.2 billion in incremental capital costs is well within the range of annual variability associated with capital expenditures for the sector over the 2000-2019 period. During this period, based on the Census information, for example, the largest year-to-year decrease in power sector-level capital expenditures was $19.5 billion (from 2001 to 2002) and the largest year-to-year increase in power sector-level capital expenditures was $23.4 billion (from 2000 to 2001). This wide range (-$19.5 to +$23.4 billion) indicates substantial year-to-year variability in industry capital expenditures, and the projected $4.2 billion increase in capital expenditures in 2015 projected under MATS falls well within this variability. Similar results are found using the S&P Global information. If a $4.2 billion increase in capital expenditures in 2015 projected under MATS falls well within the variability of historical trends, then a capital expenditure of less than $4.2 billion would also fall within this variability.

Next, in order to provide additional perspective to the projected cost information, we look at a broader set of costs faced by industry, including both capital and production expenditures together. Section 2.b and Table A-6 of the Cost TSD present two sets of estimates through 2019 for trends in annual total (capital and production) expenditures by the electric power sector using

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the same two data sets as above, which we then compare with the projected annual total expenditures required by MATS.

We find that even the overestimated $9.6 billion compliance cost projection from the 2011 RIA represents a small fraction of the power sector's annual capital and production expenditures compared to historical data, and is well within annual variability in total costs over the 2000 to 2011 and the 2012 to 2019 periods. Compared to 2008 data (*i.e.*, the historic high for total industry expenditures), the projected $9.6 billion estimate represents about 4.2 to 4.3 percent of total expenditures. The MATS projected compliance cost represents 6.2 to 6.6 percent of total expenditures in 2003 (which was the lowest year for total industry expenditures during the studied time period). Additionally, the EPA notes that, similar to the capital expenditures analysis set forth in the 2015 Proposal, the projected $9.6 billion in incremental capital plus production costs is well within the range of annual variability in costs in general over the 2000 to 2019 period. For example, during this period, the largest year-to-year decrease in power sector-level capital and production expenditures ranged from $30.5 billion to $32.8 billion. The largest year-to-year increase in power sector-level capital and production expenditures in this period ranged from $27.5 billion to $28.7 billion. If a $9.6 billion increase in expenditures falls well within the variability of historical trends, then an expenditure substantially less than $9.6 billion would also fall within this variability.

c. Impact on Retail Price of Electricity

We are cognizant that, for an industry like the power sector, costs and disadvantages to regulation are not solely absorbed by regulated sources. Many firms in the industry are assured cost-recovery for expenditures, so there is considerable potential for EGUs to pass through the costs of compliance to consumers via increases in retail electricity prices. This is especially true

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given that the demand for electricity is not particularly price-responsive. That is, because people are dependent on electricity for daily living, they are not likely to reduce their consumption of electricity even when the price goes up but will instead pay the higher price, thus absorbing the costs of compliance incurred by the industry. Notably, average retail electricity prices have fallen since the promulgation of MATS.

While we analyze these aspects of cost separately, control costs and electricity prices are not separate economic indicators. Electricity price increases are generally related to increases in the capital and operating expenditures by the power sector. Therefore, the electricity price impacts and the associated increase in electricity bills by consumers are not costs that are additional to the compliance costs described earlier in this section. In fact, to the extent the compliance costs are passed on to electricity consumers, the costs to the EGU owners in the power sector are reduced. Therefore, in order to further assess the disadvantages to regulation, in this case to consumers of electricity in all sectors (residential, commercial, industrial, transportation, and other sectors), we evaluate as we did in 2016 the projected effect MATS was anticipated to have on retail electricity prices, as measured against the variations in electricity prices from year to year. For this proposal, we expanded that analysis using updated data from the EIA, as presented in section 2.c and Table A-7 of the Cost TSD.

Looking at 2000-2019 data, we find that the projected 0.3 cents per kilowatt-hour projected increase in national average retail electricity price under MATS is well within the range of annual variability over the 2000-2019 period. During that time period, the largest year-to-year decrease in national average retail electricity price was -0.2 cents per kilowatt-hour (from 2001 to 2002) and the largest year-to-year increase was 0.5 cents per kilowatt-hour (from 2005 to 2006). For the newer data analyzed, we also found that average retail electricity prices have

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generally decreased since 2011, from 9.33 cents per kilowatt-hour in 2011 to 8.68 cents per kilowatt-hour in 2019, or by nearly 7 percent.

After considering the potential impacts of MATS on retail electricity prices, the EPA concludes that the projected increase in electricity prices is within the historical range. In addition, any increase in electricity prices would not be additive to the overall compliance costs of MATS. Rather, such price impacts would in part reflect the ability of many EGUs to pass their costs on to consumers, thereby reducing the share of MATS compliance costs borne by owners of EGUs. Given the relationship between compliance costs and electricity prices, we would also therefore expect the significant overestimate of compliance costs reflected in the $9.6 billion figure to translate into overestimates in our projections for electricity price increases. Therefore, incorporating this newer data into our analysis, we find that MATS did not result in increases in electricity prices for American consumers that were outside the range of normal year-to-year variability, and during the period when MATS was implemented, electricity prices generally decreased.

d. Impact on Power Sector Generating Capacity

We recognize that the power sector plays a role of critical importance to the American public. A potential disadvantage to regulation that we consider to be a relevant factor in our consideration under CAA section 112(n)(1)(A) is how such regulation would impact the provision of adequate and reliable electricity throughout the country.[105] Therefore, we analyzed, as part of the 2012 record, projected net changes in generation capacity under MATS, as

[105] The EPA generally uses the term "reliability" to refer to the ability to deliver the resources to the projected electricity loads so the overall power grid remains stable, and the term "resource adequacy" generally refers to the provision of adequate generating resources to meet projected load and generating reserve requirements in each region.

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compared to the base case, that is, what expected generation capacity would have been absent the rule.[106] We also conducted an analysis of the impacts of projected retirements on electric reliability. *Id.* And finally, in parallel with finalizing MATS, the EPA's Office of Enforcement and Compliance Assurance issued a policy memorandum describing an approach for units that were reliability critical that could demonstrate a need to operate in noncompliance with MATS for up to a year.[107]

Our analysis indicated that the vast majority of the generation capacity in the power sector directly affected by the requirements of MATS would remain operational following MATS. Specifically, our model projected that operational capacity with MATS in place would be reduced by less than 1 percent nationwide. *See* Resource Adequacy and Reliability TSD at 2. With respect to reliability, our modeling indicated that coal retirements would be distributed throughout the power grid, and that there would only be small impacts at the regional level, and that in those regions, we anticipated small decreases in overall adequacy of resources and robust remaining reserve margins. *Id.* These analyses therefore found that the power sector would be able to continue to provide adequate and reliable electricity even with regulation of the EGU sector for HAP.

Additionally, since MATS was promulgated, the EPA has not been made aware of reliability or resource adequacy problems attributable to MATS. As noted, the EPA's

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[106] U.S. EPA. 2011. *Resource Adequacy and Reliability in the Integrated Planning Model Projections for the MATS Rule* (Resource Adequacy and Reliability TSD), *http://www3.epa.gov/ttn/atw/utility/revised_resource_adequacy_tsd.pdf*, Docket ID Item No. EPA-HQ-OAR-2009-0234-19997.

[107] U.S. EPA. 2011. *The Environmental Protection Agency's Enforcement Response Policy For Use of Clean Air Act Section 113(a) Administrative Orders In Relation To Electric Reliability And The Mercury and Air Toxics Standard, https://www.epa.gov/sites/default/files/documents/mats-erp.pdf*, Docket ID Item No. EPA-HQ-OAR-2009-0234-20577.

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enforcement office concurrently issued a policy memorandum to work with sources that faced demonstrated reliability concerns, and five administrative orders were issued in connection with the policy.[108] We think this small number of sources obtaining relief due to their reliability critical status provides some confirmation of the EPA's projections that regulation would not cause widespread resource and reliability problems.

4. Other Cost Considerations

We also propose to reaffirm our previous findings regarding the costs of mercury controls, consistent with the instruction from the statute to study the availability and cost of such controls in CAA section 112(n)(1)(B). 80 FR 75036-37 (December 1, 2015). We similarly propose to reaffirm our previous records and findings regarding the cost of controls for other HAP emissions from EGUs, and the cost of implementing the utility-specific ARP, which Congress wrote into the 1990 CAA Amendments and implementation of which Congress anticipated could result in reductions in HAP emissions. *Id.* With respect to the costs of technology for control of mercury and non-mercury HAP, the record evidence shows that in 2012 controls were available and routinely used and that control costs had declined considerably over time. *Id.* at 75037-38. With regard to the ARP, industry largely complied with that rule by switching to lower-sulfur coal, and subsequently the actual costs of compliance were substantially lower than projected. Though the reasons for discrepancies between projected and actual costs are different for MATS, as discussed in section III.B.2, the newer information examined as part of this proposal demonstrates that the projected cost estimates for MATS were also likely significantly overestimated.

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[108] *https://www.epa.gov/enforcement/enforcement-response-policy-mercury-and-air-toxics-standard-mats.*

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5. Summary of Consideration of Cost of Regulating EGUs for HAP

In this section, the EPA noted several studies performed by outside entities suggesting that costs of MATS may have been overestimated in the 2011 RIA. We discussed the dramatic impacts to the power sector over the last 10 years due to increasing supplies and decreasing price of natural gas and renewables, and we conducted a suite of quantitative and qualitative updates to the information available in the 2011 RIA. Based on this information, we propose to conclude that the available *ex post* evidence points to a power sector that incurred significantly lower costs of compliance obligations under MATS than anticipated based on the *ex ante* projections when the rule was finalized in 2012. This overestimate was significant – for just one part of the original compliance cost estimate, the EPA was able to quantify a range of at least $2.2 to $4.4 billion in projected costs related to the installation, operation, and maintenance of controls which were not expended by industry. This projected overestimation is limited to these costs; it does not account for other ways in which the rule's costs were likely overestimated, such as advances in control technologies that made control applications less expensive or more efficient at reducing emissions. The other studies conducted by stakeholders asserted there were even greater differences between projected and actual costs of MATS.

We next examined the 2011 projected costs, which were almost certainly significantly overestimated, in the context of the EGU industry and the services the EGU industry provides to society. The purpose of these comparisons was to better understand the disadvantages imposed by these costs, in order to weigh cost as a factor in our preferred methodology for making the appropriate determination. Even though the cost estimates we used in this analysis were almost certainly significantly overestimated, we noted they were relatively small when placed in the context of the industry's revenues and expenditures, and well within historical variations.

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Based on the 2011 RIA, the total projected cost of the MATS rule to the power sector in 2015 represented between 2.7 and 3.0 percent of annual electricity sales when compared to years from 2000 to 2019, a small fraction of the value of overall sales (and even smaller when one takes into account that the 2011 RIA projections were likely significantly overestimated). Looking at capital expenditures, the EPA demonstrated that the projected MATS capital expenditures in 2015 represented between 3.6 and 10.4 percent of total annual power sector capital expenditures when compared to years surrounding the finalization of the MATS rule. Such an investment by the power sector would comprise a small percentage of the sector's historical annual capital expenditures on an absolute basis and also would fall within the range of historical variability in such capital expenditures. Similarly, the EPA demonstrated that the projected capital and operating expenditures in 2015 represented between 4.3 and 6.2 percent of total annual power sector capital and operating expenditures over 2000 to 2019, and is well within the substantial range of annual variability. This proposal's analysis indicating that the far fewer controls were installed than the EPA had projected would be required is particularly relevant to considering our findings as to this metric; with the overestimation of capital expenditures in mind, actual investments by the power sector to comply with MATS would have comprised an even smaller percentage of historical annual capital expenditures.

With respect to impacts on the wider American public, the EPA examined impacts on average retail electricity prices and found the modest increases – which, like overall compliance costs, are also likely to have been significantly overestimated – to be within the range of historical variability. Experience has also shown that national average retail electricity prices in years after MATS promulgation have declined. Finally, previous analysis indicated that the vast majority of the generation capacity in the power sector would remain operational and that the

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power sector would be able to continue to provide adequate and reliable electricity after implementation of the rule, and we have seen no evidence to contradict those findings.

The EPA proposes that each of these analyses are appropriate bases for evaluating the disadvantages to society conferred by the MATS-related projected compliance expenditures. As we note above, even though the projected costs we use in this analysis are almost certainly significantly overestimated, we find that they are still relatively small when placed in the context of the economics of the industry, and well within historical variations. We solicit comments on all aspects of this proposed consideration of costs.

C. *Revocation of the 2020 Final Action*

We are proposing to revoke the 2020 Final Action because we find that the framework used to consider cost in 2020, which centered the Agency's mandated determination under CAA section 112(n)(1)(A) on a comparison of costs to monetized HAP benefits, was an approach ill-suited to making the appropriate and necessary determination in the context of CAA section 112(n)(1)(A) specifically and the CAA section 112 program generally. Moreover, the statutory text and legislative history do not support a conclusion that the 2020 framework is required under CAA section 112(n)(1)(A), and we exercise our discretion to adopt a different approach. We also disagree with the conclusions presented in the 2020 Final Action as to the 2016 Supplemental Finding's two approaches.

The 2020 Final Action established the following framework for making the appropriate and necessary determination. It stated:

> "The Administrator has concluded that the following procedure provides the appropriate method under which the EPA should proceed to determine whether it is appropriate and necessary to regulate EGUs under CAA section 112(n)(1)(A). First, the EPA compares the monetized costs of regulation against the subset of HAP benefits that could be monetized. . . . Second, the EPA considers whether unquantified HAP benefits may alter that outcome. . . . Third, the EPA considers

> whether it is appropriate, notwithstanding the above, to determine that it is "appropriate and necessary" to regulate EGUs under CAA section 112(n)(1)(A) out of consideration for the PM co-benefits that result from such regulation." 85 FR 31302 (May 22, 2020).

Applying the first part of the framework, the Agency noted that the costs of regulation estimated in the 2011 RIA were disproportionately higher–by three orders of magnitude–than the monetized HAP benefits, and concluded "[t]hat does not demonstrate 'appropriate and necessary.'" *Id.* Under the framework's second inquiry, the EPA determined that the unquantified HAP benefits, even if monetized, were unlikely to alter its conclusion under the first part of the framework. *Id.*; *see also* 85 FR 31304 (noting that "valuing HAP-related morbidity outcomes would not likely result in estimated economic values similar to those attributed to avoiding premature deaths"). Finally, applying the third part of its framework, the EPA noted that nearly all of the monetized benefits of MATS as reflected in the 2011 RIA were derived from PM benefits. *See* 85 FR 31302-03 (May 22, 2020). The EPA then posited that, "[h]ad the HAP-specific benefits of MATS been closer to the costs of regulation, a different question might have arisen as to whether the Administrator could find that co-benefits legally form part of the justification for determination that regulation of EGUs under CAA section 112(d) is appropriate and necessary." *See* 85 FR 31303 (May 22, 2020). However, because of the factual scenario presented in the record, the Agency in the 2020 Final Action stated that "[t]he EPA does not need to, and does not, determine whether that additional step would be appropriate . . . given that the monetized and unquantified HAP-specific benefits do not come close to a level that would support the prior determination." *Id.* In conclusion, the EPA stated that "[u]nder the interpretation of CAA section 112(n)(1)(A) that the EPA adopts in this action, HAP benefits, as compared to costs, must be the primary question in making the 'appropriate and necessary' determination." *Id.*

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We note that the three-step framework employed by the 2020 Final Action is not a BCA conforming to recognized principles (*see*, *e.g.*, OMB Circular A-4, EPA Economic Guidelines). BCA is a specific tool developed by economists to assess total society-wide benefits and costs, to determine the economic efficiency of a given action. Instead of conforming to this comprehensive approach, the three-step framework focused primarily on comparing the rule's total costs to a very small subset of HAP benefits that could be monetized. The Agency gave secondary weight to the vast majority of the benefits of regulating HAP emissions from stationary sources that cannot be quantified, and completely ignored the non-HAP monetized benefits directly attributable to the MATS rule.

We propose to find that this three-step framework is an unsuitable approach to making the appropriate and necessary determination under CAA section 112(n)(1)(A) because it places undue primacy on those HAP benefits that have been monetized, and fails to consider critical aspects of the inquiry posed to the EPA by Congress in CAA section 112(n)(1). The 2020 three-step framework also did not in any meaningful way grapple with the bases upon which the EPA had relied to design the 2016 preferred approach, as discussed above, including the broad statutory purpose of CAA section 112 to reduce the volume of HAP emissions with the goal of reducing the risk from HAP emissions to a level that is protective of even the most exposed and most sensitive subpopulations; the fact that we rarely can fully characterize or quantify risks, much less benefits, at a nationwide level; and the fact that except for one of the many health endpoints for only one of the many HAP emitted from EGUs, the EPA lacked the information necessary to monetize any post-control benefit of reductions in HAP emissions. The sole rationale provided in the 2020 Final Action for rejecting the relevance of the statute's clear purpose as evinced in the broader CAA section 112 program and reflected in the provisions of

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CAA section 112(n)(1) was that CAA section 112(n)(1)(A) is a separate provision and threshold determination. *See* 85 FR 31293-94 (May 22, 2020). But we do not think it is sensible to view the statute's direction to the EPA to make a separate determination as to EGUs as an invitation to disregard the statutory factors of CAA section 112(n)(1) and the greater statutory context in which that determination exists, and we do not think that the 2020 Final Action provided an adequately reasoned basis for abandoning the interpretation and assessment provided in the 2016 Supplemental Finding. And in any event, we believe the methodology we propose today is better suited to making the statutory finding than the 2020 framework.

In the 2020 rulemaking, the EPA did not explain its rationale for its decision to anchor the appropriate and necessary determination at step one as a comparison between the monetized costs of regulation and *monetized* HAP specific benefits. Rather, the proposed and final rules repeatedly state that the "primary" inquiry in the determination should be a comparison of costs and HAP benefits, but did not explain why only *monetized* HAP benefits should be given primacy. *See, e.g.*, 85 FR 31286, 31288, 31303 (May 22, 2020). Given the Agency's recognition of the broad grant of discretion inherent in the phrase "appropriate and necessary," *see* 81 FR 24430-31 (April 25, 2016), its acknowledgement of Congress' "particularized focus on reducing HAP emissions and addressing public health and environmental risks from those emissions" in CAA section 112, *see* 85 FR 31299 (May 22, 2020), and its knowledge and recognition that the dollar value of one of its points of comparison represented but a small subset of the advantages of regulation, *see* 85 FR 31302 (May 22, 2020), we now believe it was inappropriate to adopt a framework that first and foremost compared dollar value to dollar value. Nothing in the CAA required the Agency's decision in 2020 to hinge its framework on monetized HAP benefits. The consideration of the non-monetized benefits of MATS *(i.e.*, dozens of endpoints, including

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virtually all of the HAP benefits associated with this rule) occurred only at step two, where the Agency considered whether the unquantified benefits, if monetized, were "likely to overcome the imbalance between the monetized HAP benefits and compliance costs in the record." *See* 85 FR 31296 (May 22, 2020). This approach discounts the vast array of adverse health and environmental impacts associated with HAP emissions from coal- and oil-fired EGUs that have been enumerated by the EPA[109] and discounts the social value (benefit) of avoiding those impacts through regulation, simply because the Agency cannot assign a dollar value to those impacts. Further, the three-step framework gave no consideration to the important statutory objective of protecting the most at-risk subpopulations. As noted above, in CAA section 112(n)(1)(C) Congress directed the EPA to establish threshold levels of exposure under which no adverse effect to human health would be expected to occur, even considering exposures of sensitive populations, and throughout CAA section 112, Congress placed special emphasis on regulating HAP from sources to levels that would be protective of those individuals most exposed to HAP emissions and most sensitive to those exposures. The rigid and narrow approach to making the appropriate and necessary determination in the 2020 Final Action is at odds with the text and purpose of CAA section 112, and is certainly not required under the express terms of CAA section 112 or CAA section 112(n)(1)(A).

Commenters on the 2019 Proposal objected strenuously to the Agency's revised framework for making the appropriate and necessary determination, arguing that the 2019 Proposal's interpretation "fails to meaningfully address factors that are 'centrally relevant' to the inquiry of whether it is appropriate and necessary to regulate HAP from EGUs," and that the

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[109] *See, e.g.*, 65 FR 79829-30 (December 20, 2000); 76 FR 24983-85, 24993-97, 24999-25001, 25003-14, 25015-19 (May 3, 2011).

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Agency's new interpretation must fall because the EPA failed to provide a reasoned explanation for its change in policy, as required by *Motor Vehicle Mfrs. Ass'n of United States, Inc. v. State Farm Mut. Automobile Ins. Co.*, 463 U.S. 29 (1983), and *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502 (2009). *See* 85 FR 31294 (May 22, 2020). Among the factors that commenters argued had been inadequately addressed under the new framework were the "hazards to public health reasonably anticipated to occur" that had not been monetized; the non-monetizable benefits of HAP regulation such as preservation of tribal social practices; the latency, persistence in the environment, and toxicity of HAP as recognized by Congress; and the distributional impacts on particular communities and individuals most impacted by HAP emitted from power plants. In responses to these comments, the EPA claimed that it was not "disregarding" or "dismissing" the concerns raised by the commenters, but rather simply weighing them differently, and explained that the Administration's changed priorities provided the "reasoned basis" for its changed interpretation. *See* 85 FR 31296-97 (May 22, 2020).

Agencies do have broad discretion to re-evaluate policies and change their "view of what is in the public interest," *State Farm*, 463 U.S. at 57, but such re-evaluations must still adhere to principles of reasoned decision-making. The 2020 Final Action did not aver that the concerns identified by commenters were factors that the statute does not instruct the Agency to consider in making its appropriate and necessary determination. Instead, the EPA stated that it was permitted to pick its decisional framework and admitted that its decisional framework might undervalue certain factors. For example, with respect to commenters' concerns that the revised appropriate and necessary framework did not adequately account for adverse impacts on tribal culture or undue concentration of public health risks on certain population subgroups or individuals, the EPA stated,

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> "In a cost-benefit comparison, the overall amount of the benefits stays the same no matter what the distribution of those benefits is. The EPA, therefore, believes it is reasonable to conclude that those factors to which the EPA previously gave significant weight–including qualitative benefits, and distributional concerns and impacts on minorities–will not be given the same weight in a comparison of benefits and costs for this action under CAA section 112(n)(1)(A)." 85 FR 31297 (May 22, 2020).

The decisional framework in the 2020 Final Action, however, did not give "less weight" to these factors – it gave them none. In both the selection and application of its framework, the EPA in the 2020 Final Action effectively ignored these factors altogether, and we do not agree that the inability to monetize a factor should render it unimportant. *Cf. Am. Trucking Ass'ns, Inc. v. EPA*, 175 F.3d 1027, 1052–53 (D.C. Cir. 1999), reversed in part on other grounds in *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457 (2001) (holding that the EPA was not permitted to ignore information "because the . . . benefits are difficult, if not impossible, to quantify reliably and because there is 'no convincing basis for concluding that any such effects . . . would be significant'"); *Pub. Citizen v. Fed. Motor Carrier Safety Admin.*, 374 F.3d 1209, 1219 (D.C. Cir. 2004) ("The mere fact that the magnitude of . . . effects is *uncertain* is no justification for *disregarding* the effect entirely.") (emphasis in original). The mere mention and summary dismissal of factors does not constitute meaningful consideration of those factors.

In the 2020 Final Action, like the 2016 Supplemental Finding before it, the EPA maintained that there is more than one permissible way to interpret the Agency's obligation to consider cost in the appropriate and necessary determination. Given the Agency's knowledge of the significant risks and often irreversible impacts of HAP exposure on vulnerable populations like developing fetuses, the disproportionate impact of EGU HAP emissions on communities who subsist on freshwater fish due to cultural practices and/or economic necessity, and the record of data demonstrating risks to public health amassed over decades, and, perhaps more

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importantly, the overwhelming quantity of advantages to regulation that could not be monetized, we do not think that selecting a framework that compared first and foremost monetized HAP benefits with costs was appropriate. And even if the framework ultimately addressed the statutorily relevant factors because at the second step the EPA stated that it was considering non-monetized HAP benefits, we think that the application of that second step fell short. The secondary consideration of non-monetized HAP benefits in the three-step framework only considered post-control HAP-related impacts of regulation insofar as the EPA speculated about what the monetized value of those benefits might be (*see* 85 FR 31296 (May 22, 2020), asserting that monetized value of avoiding morbidity effects such as neurobehavioral impacts is "small" compared to monetized value associated with avoided deaths). The Agency did not, at this second step, grapple with the existing risk analyses, including those stemming from the statutorily mandated studies in CAA section 112(n)(1). Those analyses demonstrated substantial public health and environmental hazards, even if the hazards were not translated into post-control monetized benefits. *See White Stallion*, 748 F.3d at 1245. The Agency also did not explain why other attributes of risk – such as impacts on vulnerable populations and the reality that HAP pollution from EGUs is not distributed equally across the population but disproportionately impacts some individuals and communities far more than others – were unimportant, stating only that the selected framework did not accommodate consideration of those factors.

As noted, the Agency did not point to anything in the CAA as supporting the use of its three-step framework. This is in stark contrast to the 2016 Supplemental Finding rulemaking, in which the EPA examined CAA section 112(n)(1)(A) and the other section 112(n)(1) provisions, and the rest of CAA section 112 generally, and D.C. Circuit case law on CAA cost considerations to inform the EPA's interpretation of CAA section 112(n)(1)(A). *See* 80 FR

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75030 (December 1, 2015); 2015 Legal Memorandum. In the 2020 Final Action, the EPA merely asserted that a comparison of benefits to costs is "a traditional and commonplace way to assess costs" and claimed that the Supreme Court's holding in *Entergy Corp. v. Riverkeeper*, 556 U.S. 208 (2009) supported the EPA's 2020 position that, absent an unambiguous prohibition to use a BCA, an agency may generally rely on a BCA as a reasonable way to consider cost. *See* 85 FR 31293 (May 22, 2020). The 2020 Final Action also pointed out "many references comparing" costs and benefits from the *Michigan* decision, including: "EPA refused to consider whether the costs of its decision outweighed the benefits" (576 U.S. at 743); "[o]ne would not say that it is rational, never mind 'appropriate,' to impose billions of dollars in economic costs in return for a few dollars in health or environmental benefits" (*Id.* at 752); and "[n]o regulation is 'appropriate' if it does more harm than good" (*Id.*).

But while we agree that a comparison of benefits to costs is a traditional way to assess costs, the 2020 framework was *not* a BCA. There is no economic theory or guidance of which we are aware that endorses the version of BCA presented in the 2020 Final Action, in which total costs are compared against a small subset of total benefits. *See* section III.E for further discussion. Moreover, general support for weighing costs and benefits does not justify placing undue weight on monetized HAP benefits, with secondary consideration for all other benefits, and only valuing those other benefits to the extent of their speculative monetized effects. As noted in Justice Breyer's concurrence in *Entergy Corp.*, the EPA has the ability "to describe environmental benefits in non-monetized terms and to evaluate both costs and benefits in accordance with its expert judgment and scientific knowledge," and to engage in this balancing outside of "formal cost-benefit proceedings and futile attempts at comprehensive monetization." 556 U.S. at 235 (Breyer, J., concurring). Benefits – the advantages of regulation – can

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encompass outcomes that are not or cannot be expressed in terms of dollars and cents, just as the Court found that "'cost' includes more than the expense of complying with regulations; any disadvantage could be termed a cost." *Michigan*, 576 U.S. at 752. And the Court faulted the EPA's interpretation for "preclud[ing] the Agency from considering *any* type of cost – including, for instance, harms that regulation might do to human health or the environment. . . . No regulation is 'appropriate' if it does significantly more harm than good." *Id.* The constricted view of benefits that the Agency adopted in 2020 was ill-suited to the statutory inquiry as interpreted in *Michigan*.

The primary basis in the 2020 action upon which the EPA relied to find that the 2016 preferred approach was flawed was that the preferred approach failed to "satisf[y] the Agency's obligation under CAA section 112(n)(1)(A) as interpreted by the Supreme Court in *Michigan*." *See* 84 FR 2674 (February 7, 2019). The 2019 Proposal claimed that the chief flaw of the preferred approach was the Agency's failure to "meaningfully consider cost within the context of a regulation's benefits," asserting that the *Michigan* Court contemplated that a proper consideration of cost would be relative to benefits. *See* 84 FR 2675 (February 7, 2019). But that is not an accurate characterization of the 2016 preferred approach, wherein the Agency weighed the existing record from 2012 demonstrating that HAP emissions from EGUs pose a number of identified hazards to both public health and the environment remaining after imposition of the ARP and other CAA requirements against the cost of MATS. *See* 81 FR 24420 (April 25, 2016) ("After evaluating cost reasonableness using several different metrics, the Administrator has, in accordance with her statutory duty under CAA section 112(n)(1)(A), weighed cost against the previously identified advantages of regulating HAP emissions from EGUs – including the agency's prior conclusions about the significant hazards to public health and the environment

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associated with such emissions and the volume of HAP that would be reduced by regulation of EGUs under CAA section 112."). The 2020 Final Action further stated that the preferred approach was an "unreasonable" interpretation of CAA section 112(n)(1)(A) and impermissibly de-emphasized the importance of the cost consideration in the appropriate and necessary determination. *See* 85 FR 31292 (May 22, 2020). It is a decisional framework which rests primarily upon a comparison of the costs of a regulation and the small subset of HAP benefits which could be monetized that does not "meaningfully consider[s] cost within the context of a regulation's benefits," because such a narrow approach relegates as secondary (and in application appeared to ignore altogether) the vast majority of that rule's HAP benefits and other advantages. We therefore propose to revoke the 2020 three-step approach and determination because we do not think it is a suitable way to assess the advantages and disadvantages of regulation under CAA section 112(n)(1)(A) and in applying it, the Agency failed to meaningfully address key facts in the existing record. Even if the Agency's selection of the 2020 framework could be considered a permissible interpretation of the broad "appropriate and necessary" determination in CAA section 112(n)(1)(A), we exercise our discretion under the statute and as described in *Michigan*, to approach the determination differently.

D. The Administrator's Proposed Preferred Framework and Proposed Conclusion

The EPA is proposing a preferred, totality-of-the-circumstances approach as a reasonable way to "pay attention to the advantages *and* disadvantages of [our] decision," *Michigan*, 576 U.S. at 753, in determining whether it is appropriate to regulate coal- and oil-fired EGUs under section 112 of the CAA. This approach, including which factors we consider and how much weight we give them, is informed by Congress' design of CAA section 112(n)(1) specifically, and CAA section 112 generally.

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Specifically, under this approach we first consider and weigh the advantages of reducing EGU HAP via regulation. We focus on the public health advantages of reducing HAP emissions because in CAA section 112(n)(1)(A), Congress specifically directed the EPA to regulate EGUs under CAA section 112 after considering the results of the "study of hazards to public health reasonably anticipated to occur as a result of emissions" by EGUs. We also consider the other studies commissioned by Congress in CAA sections 112(n)(1)(B) and (C) and the types of information the statute directed the EPA to examine under those provisions – the rate and mass of EGU mercury emissions, the health and environmental effects of such emissions, and the threshold level of mercury concentrations in fish tissue which may be consumed (even by sensitive populations) without adverse effects to public health.[110] We place considerable weight on the factors addressed in the studies required in the other provisions of CAA section 112(n)(1) because that provision is titled "Electric utility steam generating units," so it is reasonable to conclude that the information in those studies is important and relevant to a determination of whether HAP emissions from EGUs should be regulated under CAA section 112.[111] *See Michigan*, 576 U.S. at 753-54 (citing CAA sections 112(n)(1)(B) and (C), its caption, and the additional studies required under those subparagraphs as relevant statutory context for the appropriate and necessary determination).

Notably, the studies of CAA section 112(n)(1) place importance on the same considerations that are expressed in the terms and overall structure of CAA section 112. For

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[110] CAA section 112(n)(1)(B) also directs the EPA to study available technologies for controlling mercury and the cost of such controls, and we consider those in our assessment of cost.

[111] The statute directed the EPA to complete all three CAA section 112(n)(1) studies within 4 years of the 1990 Amendments, expressing a sense of urgency with regard to HAP emissions from EGUs on par with addressing HAP emissions from other stationary sources. *See* CAA section 112(e) (establishing schedules for setting standards on listed source categories as expeditiously as practicable, but no later than between 2-10 years).

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example, CAA section 112(n)(1)(A) and section 112(n)(1)(B) both show interest in the amount of HAP emissions from EGUs – section 112(n)(1)(A) by requiring the EPA to estimate the risk remaining after imposition of the ARP and other CAA requirements and section 112(n)(1)(B) by requiring the EPA to study the rate and mass of mercury emissions; therefore, we believe it is reasonable to conclude that we should consider and weigh the volume of toxic pollution EGUs contributed to our air, water, and land absent regulation under CAA section 112, in total and relative to other domestic anthropogenic sources, and the potential to reduce that pollution, thus reducing its grave harms. In addition, the clear goal in CAA section 112(n)(1)(C) and elsewhere to consider risks to the most exposed and susceptible populations supports our decision to place significant weight on reducing the risks of HAP emissions from EGUs to the most sensitive members of the population (*e.g.*, developing fetuses and children), and communities that are reliant on self-caught local fish for their survival. Finally, we also consider the identified risks to the environment posed by mercury and acid-gas HAP, consistent with CAA section 112(n)(1)(B) and the general goal of CAA section 112 to address adverse environmental effects posed by HAP emissions. *See* CAA section 112(a)(7) (defining "adverse environmental effect").

We next examine the disadvantages of regulation, principally in the form of the costs incurred to capture HAP before they enter the environment. As with the advantages side of the equation, where we consider the consequences of reducing HAP emissions to human health and the environment, we consider the consequences of these expenditures for the electricity generating sector and society. We therefore consider compliance costs comprehensively, placing them in the context of the effect those expenditures have on the economics of power generation more broadly, the reliability of electricity, and the cost of electricity to consumers. These metrics are relevant to our weighing exercise because they give us a more complete picture of the

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disadvantages to society imposed by this regulation, and because our conclusion might change depending on how this burden affects the ability of the industry to thrive and provide reliable, affordable electricity to the benefit of all Americans. Consistent with CAA section 112(n)(1)(B), we further consider relevant control costs for EGUs and the relationship of control costs expected and experienced under the ARP and MATS.

Below, consistent with this framework, we consider and weigh the advantages to regulation against the costs of doing so, giving particular weight to our examination of the public health hazards we reasonably anticipate to occur as a result of HAP emissions from EGUs, and the risks posed by those emissions to exposed and vulnerable populations. We note as well that had we found regulation under CAA section 112 to impose significant barriers to provision of affordable and reliable electricity to the American public, this would have weighed heavily in our decision.

We acknowledge, as we recognized in the 2016 preferred approach, that this approach to making the appropriate and necessary determination is an exercise in judgment, and that "[r]easonable people, and different decision-makers, can arrive at different conclusions under the same statutory provision," (81 FR 24431; April 25, 2016), but this type of weighing of factors and circumstances is an inherent part of regulatory decision-making. As noted in then-Judge Kavanaugh's dissent in *White Stallion*, "All regulations involve tradeoffs, and . . . Congress has assigned EPA, not the courts, to make many discretionary calls to protect both our country's environment and its productive capacity." 748 F.3d at 1266 (noting as well that "if EPA had decided, in an exercise of its judgment, that it was 'appropriate' to regulate electric utilities under the MACT program because the benefits outweigh the costs, that decision would be reviewed under a deferential arbitrary and capricious standard of review"). Bright-line tests and thresholds

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are not required under the CAA's instruction to determine whether regulation is "appropriate and necessary," nor have courts interpreted broad provisions similar to CAA section 112(n)(1)(A) in such manner. In *Catawba Cty. v. EPA*, the D.C. Circuit held that "[a]n agency is free to adopt a totality-of-the-circumstances test to implement a statute that confers broad authority, even if that test lacks a definite 'threshold' or 'clear line of demarcation to define an open-ended term.'" 571 F.3d 20, 37 (D.C. Cir. 2009).

In undertaking this analysis, we are cognizant that, while the Agency has been studying the science underlying this determination for decades, the understanding of risks, health, and environmental impacts associated with toxic air pollution continues to evolve. In this notice, we explained the additional information that has become available to the Agency since we performed our national risk assessments, and explained why, despite the certainty of the science demonstrating substantial health risks, we are unable at this time to quantify or monetize many of the effects associated with reducing HAP emissions from EGUs.[112] We continue to think it is appropriate to give substantial weight to these public health impacts, even where we lack information to precisely quantify or monetize those impacts. As the D.C. Circuit stated in *Ethyl Corp. v. EPA*,

> "Where a statute is precautionary in nature, the evidence difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge, the regulations designed to protect public health, and the decision that of an expert administrator, we will not demand rigorous step-by-step proof of cause and effect. . . . [I]n such cases, the Administrator may assess risks. . . . The Administrator may apply his expertise to draw conclusions from suspected, but not completely substantiated, relationships between facts, from trends among facts, from theoretical projections from imperfect data, from probative preliminary data not yet certifiable as 'fact,' and the like."

[112] Unquantified effects include additional neurodevelopmental and cardiovascular effects from exposure to methylmercury, ecosystem effects, health risks from exposure to non-mercury HAP, and effects in EJ relevant subpopulations that face disproportionally high risks.

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541 F.2d 1, 28 (D.C. Cir. 1976). *See also Lead Industries Ass'n v. EPA*, 647 F.2d 1130, 1155 (D.C. Cir. 1980) ("[R]equiring EPA to wait until it can conclusively demonstrate that a particular effect is adverse to health before it acts is inconsistent with both the [Clean Air] Act's precautionary and preventive orientation and the nature of the Administrator's statutory responsibilities.").

The EPA is not alone in needing to make difficult judgments about whether a regulation that has a substantial economic impact is "worth it," in the face of uncertainty such as when the advantages of the regulation are hard to quantify in monetary terms. The Transportation Security Administration (TSA), when determining whether to require Advanced Imaging Technology at certain domestic airports, faced assertions that the high cost of widespread deployment of this type of screening was "not worth the cost." TSA acknowledged that it did not "provide monetized benefits" or "degree of benefits" to justify the use of the screening, but noted that the agency "uses a risk-based approach . . . in order to try to minimize risk to commercial air travel." *See* 81 FR 11364, 11394 (March 3, 2016). The agency pointed out that it could not consider "only the most easily quantifiable impacts of a terrorist attack, such as the direct cost of an airplane crashing," but rather that it had an obligation to "pursue the most effective security measures reasonably available so that the vulnerability of commercial air travel to terrorist attacks is reduced," noting that some commenters were failing to consider the more difficult to quantify aspects of the benefits of avoiding terrorist attacks, such as "substantial indirect effects and social costs (such as fear) that are harder to measure but which must also be considered by TSA when deciding whether an investment in security is cost-beneficial." *Id.*

In reviewing Agency decisions like these, courts do "not to substitute [their] judgment[s] for that of the agenc[ies]," *State Farm*, 463 U.S. at 43 (1983), and "[t]his is especially true when

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the agency is called upon to weigh the costs and benefits of alternative policies," *Center for Auto Safety v. Peck*, 751 F.2d 1336, 1342 (D.C. Cir. 1985). *See also United Church of Christ v. FCC*, 707 F.2d 1413, 1440 (D.C. Cir. 1983) ("[C]ost benefit analyses epitomize the types of decisions that are most appropriately entrusted to the expertise of an agency."). Agencies are entitled to this deference even where, or perhaps particularly where, costs or benefits can be difficult to quantify. For example, in *Consumer Elecs. Ass'n v. FCC*, the D.C. Circuit upheld the FCC's mandate to require digital tuners, finding reasonable the Commission's identification of benefits, that is, "principally speeding the congressionally-mandated conversion to DTV and reclaiming the analog spectrum," coupled with the FCC's "adequate[] estimate[of] the long-range costs of the digital tuner mandate within a range sufficient for the task at hand . . . and [its finding of] the estimated costs to consumers to be 'within an acceptable range.'" 347 F.3d 291, 303-04 (D.C. Cir. 2003) ("We will not here second-guess the Commission's weighing of costs and benefits.").

Similarly, the Food and Drug Administration, in weighing the costs and benefits of deeming electronic cigarettes to be "tobacco products," described the benefits qualitatively, "'potentially coming from' . . . premarket review [*i.e.*, the statutory consequence of deeming], which will result in fewer harmful or additive products from reaching the market than would be the case in the absence of the rule; youth access restrictions and prohibitions on free samples, which can be expected to constrain youth access to tobacco products and curb rising uptake; health warning statements, which will help consumers understand and appreciate the risks of using tobacco products; prohibitions against false or misleading claims and unsubstantiated modified risk claims; and other changes [such as monitoring and ingredient listings]." *Nicopure Labs, LLC v. FDA*, 266 F. Supp. 3d 360, 403-404 (D.D.C. 2017), *aff'd*, 944 F.3d 267 (D.C. Cir. 2019). Plaintiffs challenging the rule claimed that because the FDA had not quantified the

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benefits of the rule, it "cannot realistically determine that a rule's benefits justify its costs," because "it does not have . . . a general grasp of the rule's benefits." *Id.* at 406. The court disagreed, finding the agency's statement of benefits to have "provided substantial detail on the benefits of the rule, and the reasons why quantification was not possible" and in any case agreeing with the agency that there was no obligation to quantify benefits in any particular way. *Id.*

We think the inquiry posed to the Agency by CAA section 112(n)(1)(A) has similarities to these other decisions, in which agencies tasked with protecting and serving the American public elected to take actions that would impose significant costs in order to achieve important benefits that could not be precisely quantified or were in some cases uncertain – protection from terrorist attacks, speeding the advancement of digital technology, and subjecting a new product to marketing and safety regulation. In those cases, the framework for decision-making was to make a judgment after a weighing of advantages against disadvantages, considering qualitative factors as well as quantified metrics. Here, we employ a similar totality-of-the-circumstances approach to the CAA section 112(n)(1)(A) inquiry as to whether it is appropriate to regulate HAP emissions from EGUs.

Earlier sections of this preamble (sections III.A. and III.B.) discuss in detail the EPA's evaluation of the public health and environmental advantages of regulating HAP from U.S. EGUs and the reasons it is not possible to quantify or monetize most of those advantages, as well as the EPA's comprehensive assessment of the costs of doing so. We will not in this section repeat every detail and data point, but we incorporate all of that analysis here and highlight only a few of the considerations that weighed heavily in our application of the preferred totality-of-the-circumstances approach.

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Under our preferred approach, we first consider the public health advantages to reducing HAP from EGUs, and the other focuses for study identified by Congress in CAA section 112(n)(1). As noted, we give particular weight in our determination to the information related to the statutory factors identified for the EPA's consideration by the studies – namely, the hazards to public health reasonably anticipated to occur as a result of EGU HAP emissions (112(n)(1)(A)), the rate and mass of mercury emissions from EGUs (112(n)(1)(B)), the health and environmental effects of such emissions (112(n)(1)(B)), and the levels of mercury exposure below which adverse human health effects are not expected to occur as well as the mercury concentrations in the tissue of fish which may be consumed (including by sensitive populations) without adverse effects to public health (112(n)(1)(C)).

The statutorily mandated studies are the foundation for the Agency's finding that HAP emissions from U.S. EGUs represent a clear hazard to public health and the environment, but as documented in section III.A., the EPA has continued to amass an extensive body of evidence related to the original study topics that only furthers the conclusions drawn in the earlier studies. As discussed in section III.A, the EPA completed a national-scale risk assessment focused on mercury emissions from U.S. EGUs as part of the 2011 Final Mercury TSD. That assessment specifically examined risk associated with mercury released from U.S. EGUs that deposits to watersheds within the continental U.S., bioaccumulates in fish as methylmercury, and is consumed when fish are eaten by female subsistence fishers of child-bearing age and other freshwater self-caught fish consumers. We focused on the female subsistence fisher subpopulation because there is increased risk for *in utero* exposure and adverse outcomes in

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children born to female subsistence fishers with elevated exposure to methylmercury.[113] Our analysis estimated that 29 percent of the watersheds studied would lead to exposures exceeding the methylmercury RfD for this population, based on *in utero* effects, due in part to the contribution of domestic EGU emissions of mercury. We also found that deposition of mercury emissions from U.S. EGUs alone led to potential exposures that exceed the RfD in up to 10 percent of modeled watersheds.

We have also examined impacts of prenatal methylmercury exposure on unborn children of recreational anglers consuming self-caught fish from inland freshwater lakes, streams, and rivers, and found significant IQ loss in the affected population of children. Our analysis, which we recognized did not cover consumption of recreationally caught seafood from estuaries, coastal waters, and the deep ocean, nevertheless indicated significant health harm from methylmercury exposure. Methylmercury exposure also leads to adverse neurodevelopmental effects such as performance on neurobehavioral tests, particularly on tests of attention, fine motor function, language, and visual spatial ability. *See* section III.A.2.a.

The population that has been of greatest concern with respect to methylmercury exposure is women of childbearing age because the developing fetus is the most sensitive to the effects of methylmercury. *See* 85 FR 24995 (May 3, 2011). In the Mercury Study, the EPA estimated that, at the time of the study, 7 percent of women of childbearing age in the continental U.S. (or about 4 million women) were exposed to methylmercury at levels that exceeded the RfD and that about 1 percent of women of childbearing age (or about 580,000 women) had methylmercury exposures three to four times the RfD. *See* 65 FR 79827 (December 20, 2000).

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[113] The NAS Study had also highlighted this population as one of particular concern due to the regular and frequent consumption of relatively large quantities of fish. *See* 65 FR 79830 (December 20, 2000).

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We also performed a new bounding analysis for this proposal that focuses on the potential for IQ points lost in children exposed *in utero* through maternal fish consumption by the population of general U.S. fish consumers (section III.A.3.d).

Another important human health impact documented by the EPA over the last 2 decades includes cardiovascular impacts of exposure to methylmercury – including altered blood-pressure and heart-rate variability in children as a result of infant exposure in the womb and higher risk of acute MI, coronary heart disease, and cardiovascular heart disease in adults, due to dietary exposure. Studies that have become available more recently led the EPA to perform new quantitative screening analyses (as described in section III.A.3) to estimate the incidence of MI (heart attack) mortality that may be linked to U.S. EGU mercury emissions. The new analyses performed include an extension of the original watershed-level subsistence fisher methylmercury risk assessment to evaluate the potential for elevated MI-mortality risk among subsistence fishers (section III.A.3.b; 2021 Risk TSD) and a separate risk assessment examining elevated MI mortality among all adults that explores potential risks associated with exposure of the general U.S. population to methylmercury from domestic EGUs through commercially-sourced fish consumption (section III.A.3.c; 2021 Risk TSD). The updated subsistence fisher analysis estimated that up to 10 percent of modeled watersheds are associated with exposures linked to increased risk of MI mortality, but for some populations such as low-income Black subsistence fishers active in the Southeast, that number is approximately 25 percent of the watersheds modeled. The bounding analysis results estimating MI-mortality attributable to U.S. EGU-sourced mercury for the general U.S. population range from 5 to 91 excess deaths annually. As noted, we give significant weight to these findings and analyses examining public health impacts associated with methylmercury, given the statutory focus in CAA section 112(n)(1)(B) and

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112(n)(1)(C) on adverse effects to public health from EGU mercury emissions and the directive to develop an RfD ("threshold level of mercury exposure below which adverse human health effects are not expected to occur"), and in particular one that is designed to assess "mercury concentrations in the tissue of fish which may be consumed (including consumption by sensitive populations)." *See* CAA section 112(n)(1)(C).

Because of CAA section 112(n)(1)(A)'s broader focus on hazards to public health from all HAP, not just mercury, we also give considerable weight to health effects associated with non-mercury HAP exposure (*see* section III.A.2.b for further detail), including chronic health disorders such as irritation of the lung, skin, and mucus membranes; decreased pulmonary function, pneumonia, or lung damage; detrimental effects on the central nervous system; damage to the kidneys; and alimentary effects such as nausea and vomiting). The 2011 Non-Hg HAP Assessment, performed as part of the EPA's 2012 reaffirmation of the appropriate and necessary determination, expanded on the original CAA section 112(n)(1)(A) Utility Study by examining further public health hazards reasonably anticipated to occur from EGU HAP emissions after imposition of other CAA requirements. This study included a refined chronic inhalation risk assessment that was designed to assess how many coal- and oil-fired EGUs had cancer and non-cancer risks associated with them, and indicated that absent regulation, a number of EGUs posed cancer risks to the American public (*see* section III.A.2.b).

As discussed in section II.B, the statutory design of CAA section 112 quickly secured dramatic reductions in the volume of HAP emissions from stationary sources. CAA section 112(n)(1)(B) also directs the EPA to study, in the context of the Mercury Study, the "rate and mass" of mercury emissions. We therefore think it is reasonable to consider, in assessing the advantages to regulating HAP emissions from EGUs, what the volume of emissions was from

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that sector prior to regulation – as an absolute number and relative to other sources – and what the expected volume of emissions would be with CAA section 112(d) standards in place. Prior to the EPA's promulgation of MATS in 2012, the EPA estimated that in 2016, without MATS, coal-fired U.S. EGUs above 25 MW would emit 29 tons of mercury per year. While these mercury emissions from U.S. EGUs represented a decrease from 1990 and 2005 levels (46 tons and 53 tons, respectively), they still represented nearly half of all anthropogenic mercury emissions in 2011 (29 out of 64 tons total). Considered on a proportional basis, the relative contribution of U.S. EGUs to all domestic anthropogenic mercury emissions was also stark. The EGU sector emitted more than six times as much mercury as any other sector (the next highest being 4.6 tons). *See* Table 3 at 76 FR 25002 (May 3, 2011). Prior to MATS, U.S. EGUs were estimated to emit the majority of HCl and HF nationally, and were the predominant source of emissions nationally for many metal HAP as well, including antimony, arsenic, chromium, cobalt, and selenium. *Id.* at 25005-06. In 2012, the EPA projected that MATS would result in an 88 percent reduction in hydrogen chloride emissions, a 75 percent reduction in mercury emissions, and a 19 percent reduction in PM emissions (a surrogate for non-mercury metal HAP) from coal-fired units greater than 25 MW in 2015 alone. *See* 77 FR 9424 (February 16, 2012). In fact, actual emission reductions since MATS implementation have been even more substantial. In 2017, by which point all sources were required to have complied with MATS, the EPA estimated that acid gas HAP emissions from EGUs had been reduced by 96 percent, mercury emissions had been reduced by 86 percent, and non-mercury metal HAP emissions had been reduced by 81 percent compared to 2010 levels. *See* 84 FR 2689 (February 7, 2019). Retaining the substantial reductions in the volume of toxic pollution entering our air, water, and land, from

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this large fleet of domestic sources reduces the substantial risk associated with this pollution faced by all Americans.

Even though reducing HAP from EGUs would benefit all Americans by reducing risk and hazards associated with toxic air pollution, it is worth noting that the impacts of EGU HAP pollution in the U.S. have not been borne equally nationwide. Certain communities and individuals have historically borne greater risk from exposure to HAP emissions from EGUs prior to MATS, as demonstrated by the EPA's risk analyses. The individuals and communities that have been most impacted have shouldered a disproportionate burden for the energy produced by the power sector, which in turn benefits everyone – *i.e.*, these communities are subject to a greater share of the externalities of HAP pollution that is generated by EGUs producing power for everyone. A clear example of these disproportionately impacted populations are subsistence fishers who live near U.S. EGUs experiencing increased risk due to U.S. EGU mercury deposition at the watersheds where they are active (2011 Final Mercury TSD). CAA section 112(n)(1)(C) directed the EPA to examine risks to public health experienced by sensitive populations as a result of the consumption of mercury concentrations in fish tissue, which we think includes fetuses and communities that are reliant on local fish for their survival, and CAA section 112 more generally is drafted in order to be protective of small cohorts of highly exposed and susceptible populations. We therefore weigh heavily the importance of reducing risks to particularly impacted populations, including those who consume large amounts of self-caught fish reflecting cultural practice and/or economic necessity, including tribal populations, specific ethnic communities and low-income populations including Black persons living in the southeastern U.S.

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Consistent with CAA section 112(n)(1)(B) and the general goal of CAA section 112 to reduce risks posed by HAP to the environment, we also consider the ecological effects of methylmercury and acid gas HAP (*see* section III.A.2.c). Scientific studies have consistently found evidence of adverse impacts of methylmercury on fish-eating birds and mammals, and insect-eating birds. These harmful effects can include slower growth and development, reduced reproduction, and premature mortality. Adverse environmental impacts of emissions of acid gas HAP, in particular HCl, include acidification of terrestrial and aquatic ecosystems. In the EPA's recent *Integrated Science Assessment for Oxides of Nitrogen, Oxides of Sulfur and Particulate Matter – Ecological Criteria* (2020), we concluded that the body of evidence is sufficient to infer a causal relationship between acidifying deposition and adverse changes in freshwater biota like plankton, invertebrates, fish, and other organisms. Adverse effects on those animals can include physiological impairment, loss of species, changes in community composition, and biodiversity. Because EGUs contribute to mercury deposition in the U.S., we conclude that EGUs are contributing to the identified adverse environmental effects, and consider the beneficial impacts of mitigating those effects by regulating EGUs.

We turn next in our application of the preferred approach to the consideration of the disadvantages of regulation, which in this case we measure primarily in terms of the costs of that regulation. As discussed in section III.B, for purposes of this preferred totality-of-the-circumstances approach, we start with the sector-level estimate developed in the 2011 RIA. Given the complex, interconnected nature of the power sector, we think it is appropriate to consider this estimate, which represents the incremental costs to the entire power sector to generate electricity, not just the compliance costs projected to be borne by regulated EGUs. We explain in section III.B that while a precise *ex post* estimate of this sector-level figure is not

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possible, we update those aspects of the cost estimate where we can credibly do so (*see* section III.B.2), and our consideration of the cost of regulation therefore takes into account the fact that new analyses performed as part of this proposal demonstrate that the 2011 RIA cost estimate was almost certainly significantly overestimated. We propose to conclude that regulation is appropriate and necessary under either cost estimate.

As with the benefits side of the ledger, where we look comprehensively at the effects of reducing the volume of HAP, we also comprehensively assess costs in an attempt to evaluate the economic impacts of the regulation as a whole. We situate the cost of the regulation in the context of the economics of power generation, as we did in 2016, because we think examining the costs of the rule relative to three sector-wide metrics provides a useful way to evaluate the disadvantages of expending these compliance costs to this sector beyond a single monetary value. For each of these metrics, we use our 2011 estimate of compliance costs, which, as is discussed in section III.B.2 and the Cost TSD, was likely to have been significantly overestimated by a figure in the billions of dollars. We first evaluate the 2011 projected annual compliance costs of MATS as a percent of annual power sector sales, also known as a "sales test." A sales test is a frequently used indicator of potential impacts from compliance costs on regulated industries, and the EPA's analysis showed that projected 2015 compliance costs, based on the 2011 estimate, represented between 2.7 – 3.5 percent of power sector revenues from historical annual retail electricity sales. *See* section III.B.3; Cost TSD; 80 FR 75033 (December 1, 2015). We also examine the annual capital expenditures that were expected for MATS compliance as compared to the power sector's historical annual capital expenditures. We conclude that projected incremental annual capital expenditures of MATS would be a small percentage of 2011 power sector-level capital expenditures, and well within the range of

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historical year-to-year variability on industry capital expenditures. *Id.* Finally, we consider the annual operating or production expenses in addition to capital expenditures because we were encouraged during the 2016 rulemaking to use this broader metric of power industry costs to provide perspective on the cost of MATS relative to total capital and operational expenditures by the industry historically. Consistent with our other findings, we conclude that, even when using the likely overestimated cost of MATS based on the 2011 RIA, the total capital and operational expenditures required by MATS are in the range of about 5 percent of total historical capital and operational expenditures by the power sector during the period of 2000-2011. *See* section III.B.3; Cost TSD; 81 FR 24425 (April 25, 2016). In this proposal, we re-analyze all of these metrics using updated data to reflect more recent information (as of 2019), and took into consideration the fact that the 2011 RIA cost estimate was almost certainly significantly overestimated. All of this new analysis further supports our findings as to the cost of MATS relative to other power sector economics based on the record available to the Agency at the time we were making the threshold determination (*i.e.*, the 2012 record).

Consistent with the *Michigan* Court's instruction to consider all advantages and disadvantages of regulation, we also assess, as we did in 2016, disadvantages to regulation that would flow to the greater American public. Specifically, we examine whether regulation of EGUs would adversely impact the provision of reliable, affordable electricity to the American public, because had regulation been anticipated to have such an effect, it would have weighed heavily on our decision as to whether it was appropriate to require such regulation. The CAA tasks the EPA with the purpose of protecting and enhancing air quality in the U.S., but directs that in doing so we promote public health and welfare *and* the productive capacity of the U.S. population. CAA section 101(b)(1). As noted, we also think examining these potential impacts is

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consistent with the "broad and all-encompassing" nature of the term "appropriate," as characterized by the Supreme Court. *Michigan*, 576 U.S. at 752. We were particularly interested in examining the expected impact of MATS implementation on the retail price of electricity, because in electricity markets, utility expenditures can be fully or partially passed to consumers. It was therefore reasonable to assume that the cost of MATS could result in increased retail electricity prices for consumers, although we emphasize, as we did in 2016, that the electricity price impacts examined under this metric do not reflect *additional* compliance costs on top of the estimate produced in the 2011 RIA but rather reflect the passing on of a share of those costs to consumers (and ultimately reducing the costs EGU owners would otherwise bear). However, even though the impacts on electricity prices are reflected in the total cost estimate to the sector as a whole, we think, for the reasons stated above, that electricity price impacts are worthy of special attention because of the potential effect on the American public.

We therefore estimate the percent increase in retail electricity prices projected to result from MATS compared to historical levels of variation in electricity prices. *See* section III.B.3; 80 FR 75035 (December 1, 2015). We estimate that retail electricity prices for 2015 would increase by about 0.3 cents per kilowatt-hour, or 3.1 percent with MATS in place. Between 2000 and 2011, the largest annual year-to-year decrease in retail electricity price was -0.2 cents per kilowatt-hour and the largest year-to-year increase during that period was +0.5 cents per kilowatt-hour. The projected 0.3 cents increase due to MATS was therefore well within normal historical fluctuations. *Id.* As with the other metrics examined, as the increase in retail electricity prices due to MATS was within the normal range of historical variability, a substantially lower estimate for impacts on electricity prices would only further support the EPA's determination. We also note in section III.B.3 that the year-to-year retail electricity price changes in the new

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information we examined (*i.e.*, years 2011-2019) were within the same ranges observed during the 2000-2011 period, and that in fact, during that period when MATS was implemented, retail electricity prices have generally decreased (9.3 cents per kilowatt-hour in 2011 to 8.7 cents per kilowatt-hour in 2019). Consistent with these observed trends in retail electricity prices, as discussed in section III.B.2 and further below, our *ex post* analysis of MATS indicates that the projected compliance costs in the 2011 RIA – and, as a corollary, the projected increases in retail electricity prices – were likely significantly overestimated. Certainly, we have observed nothing in the data that suggests the regulation of HAP from EGUs resulted in increases in retail electricity prices for the American public that would warrant substantial concern in our weighing of this factor.

Similar to our reasoning for examining impacts on electricity prices for American consumers, in assessing the potential disadvantages to regulation, we elected to also look at whether the power sector would be able to continue to provide reliable electricity to all Americans after the imposition of MATS. We think this examination naturally fits into our assessment of whether regulation is "appropriate," because had MATS interfered with the provision of reliable electricity to the American public, that would be a significant disadvantage to regulation to weigh in our analysis. In examining this factor, we looked at both resource adequacy and reliability – that is, the provision of generating resources to meet projected load and the maintenance of adequate reserve requirements for each region (resource adequacy) and the sector's ability to deliver the resources to the projected electricity loads so that the overall power grid remains stable (reliability). *See* section III.B.3; U.S. EPA 2011, Resource Adequacy and Reliability TSD; 80 FR 75036 (December 1, 2015). Our analysis indicated that the power sector would have adequate and reliable generating capacity, while maintaining reserve margins

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over a 3-year MATS compliance period. *Id.* We did not in this proposal update the Resource Adequacy and Reliability Study conducted in 2011, but we note that the EPA, as a primary regulator of EGUs, is keenly aware of adequacy and reliability concerns in the power sector and in particular the relationship of those concerns to environmental regulation. We have not seen evidence in the last decade to suggest that the implementation of MATS caused power sector adequacy and reliability problems, and only a handful of sources obtained administrative orders under the enforcement policy issued with MATS to provide relief to reliability critical units that could not comply with the rule by 2016.

In addition to the cost analyses described above, the EPA revisited its prior records examining the costs of mercury controls consistent with the requirement in CAA section 112(n)(1)(B), the cost of controls for other HAP emissions from EGUs, and the cost of implementing the utility-specific ARP, which Congress wrote into the 1990 CAA Amendments and implementation of which Congress anticipated could result in reductions in HAP emissions. 80 FR 75036-37 (December 1, 2015). The ARP, like MATS, was expected to have a significant financial impact on the power sector, with projections of its cost between $6 billion to $9 billion per year (in 2000 dollars), based on the expectation that many utilities would elect to install FGD scrubbers in order to comply with the ARP. *Id.* at 75037. The actual costs of compliance were much less (up to 70 percent lower than initial estimates), in large part because of the utilities' choice to comply with the ARP by switching to low sulfur coal instead of installing scrubbers.[114] This choice also resulted in far fewer reductions in HAP emissions than would have occurred if more EGUs had installed SO_2 scrubbers. We believe the considerable reduction in the

[114] U.S. EPA Clean Air Markets Div., 2011, *National Acid Precipitation Assessment Program Report to Congress 2011: An Integrated Assessment*, National Science and Technology Council, Washington, DC.

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implementation cost of the ARP is important because of the economic benefit that accrued from delaying the large capital costs of controls by almost 25 years. With respect to the costs of technology for control of mercury and non-mercury HAP, the record evidence shows that in 2012 controls were available and routinely used and that control costs had declined considerably over time. *Id.* at 75037-38. We also note that, as explained at length in section III.B.2, the actual compliance costs of MATS, with respect to capital and operating expenditures associated with installing and operating controls, were significantly lower than what we projected at the time of the rule. In addition, the newer information examined as part of this proposal demonstrates that actual control costs were much lower than we projected, which weighs further in favor of a conclusion that it is appropriate to impose those costs in order to garner the advantages of regulation.

Our review of the record and application of the preferred totality-of-the-circumstances approach has demonstrated that we have, over the last 2 decades, amassed a voluminous and scientifically rigorous body of evidence documenting the significant hazards to public health associated with HAP emissions from EGUs, particularly to certain vulnerable populations that bear greater risk from these emissions than the general public. We have looked at the volume of emissions coming from these sources and what the impact of regulation would be on that volume. We examined the cost of regulation to industry (even using an estimate of cost that we know to be higher than what was expended), and the potential adverse impacts that could be felt by the American public via increased electricity prices and access to reliable electricity. And, consistent with the statute, we have also considered adverse impacts of EGU pollution on the environment as well as availability of controls and the costs of those controls.

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Even based solely on the record available to us at the time we issued the regulation and made the threshold determination in 2012, we find that the benefits of regulation are manifold, and they address serious risks to vulnerable populations that remained after the implementation of the ARP and other controls imposed upon the power sector that were required under the CAA. We have placed considerable weight on these benefits, given the statutory directive to do so in CAA section 112(n)(1)(A) and Congress' clear purpose in amending CAA section 112 in 1990. In contrast, the costs, while large in absolute terms, were shown in our analyses to be within the range of other expenditures and commensurate with revenues generated by the sector, and our analysis demonstrated that these expenditures would not and did not have any significant impacts on electricity prices or reliability. After considering and weighing all of these facts and circumstances, in an exercise of his discretion under the Act, the Administrator proposes to conclude that the substantial benefits of reducing HAP from EGUs, which accrue in particular to the most vulnerable members of society, are worth the costs. Consequently, we propose to find after weighing the totality of the circumstances, that regulation of HAP from EGUs is appropriate after considering cost.

The newer information examined as part of this proposal regarding both benefits and costs is directionally consistent with all of the findings the EPA has made in the 2016 administrative record. The robust and long-standing scientific foundation regarding the adverse health and environmental risks from mercury and other HAP is fundamentally unchanged since the comprehensive studies that Congress mandated in the CAA were completed decades ago. But in this proposal, we completed screening level risk assessments, informed by newer meta-analyses of the dose-response relationship between methylmercury and cardiovascular disease, which indicate that a segment of the American public is at increased risk of prematurely dying by

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heart attack due to methylmercury exposure with as many as 91 deaths per year (and possibly more) being attributable to mercury emissions from EGUs.[115] Further, analyses show that some populations (*e.g.*, low-income Blacks in the Southeast and certain tribal communities engaging in subsistence fishing activity) likely bear a disproportionately higher risk from EGU HAP emissions than the general populace.

The new cost information analyzed by the EPA, discussed in section III.B, indicates that the cost projection used in the 2016 Supplemental Finding (*i.e.*, the 2011 RIA cost estimate) likely significantly overestimated the actual costs of compliance of MATS. Specifically, the EGU sector installed far fewer controls to comply with the HAP emissions standards than projected; certain modeling assumptions, if updated with newer information, would have resulted in a lower cost estimate; unexpected advancements in technology occurred; and the country experienced a dramatic increase in the availability of comparatively inexpensive natural gas. All of these factors likely resulted in a lower actual cost of compliance than the EPA's projected estimates in 2011. We therefore find that when we consider information available to the Agency after implementation of the rule, our conclusion that it was appropriate to regulate this sector for HAP is further strengthened. The costs projected in the 2011 RIA were almost certainly overestimated by an amount in the billions of dollars.

We note as well that during prior rulemaking processes related to the appropriate and necessary determination, stakeholders suggested that undermining the threshold finding in order to pave the way to rescinding MATS would have grave economic and health consequences. Utilities reported that they rely upon the mandated status of MATS in order to recoup

[115] This estimate of premature mortality is for the EGU sector after imposition of the ARP and other CAA requirements, but before MATS implementation.

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expenditures already made to comply with the rule before Public Utility Commission proceedings.[116] States asserted that they rely upon the Federal protections achieved by the rule in state implementation planning and other regulatory efforts.[117] And other industries, such as pollution control companies, have made business decisions based on the existence of MATS.[118] We think these reliance interests, nearly all of which are aligned, also weigh in favor of retaining the appropriate and necessary determination, particularly given the fact that a significant portion of compliance costs have already been spent.

Finally, while we focus on the HAP benefits, we note that the *Michigan* court directed that "any disadvantage could be termed a cost." *Michigan*, at 752. The corollary is that any advantage could be termed a benefit. And so, while it is not necessary to our conclusion that regulation is appropriate, we also consider, under our totality-of-the-circumstances approach, whether there are additional advantages or disadvantages to the specific controls imposed under MATS. Specifically, we note that because the controls required to reduce HAP from U.S. EGUs

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[116] *See, e.g.,* Comment Letter from Edison Electric Institute, Docket ID Item No. EPA-HQ-OAR-2018-0794-2267; Comment Letter from Edison Electric Institute, NRECA, American Public Power Association, The Clean Energy Group, Class of '85 Regulatory Response Group, Large Public Power Council, Global Energy Institute, International Brotherhood of Electrical Workers, International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers & Helpers, and the Laborers' International Union of North America, Docket ID Item No. EPA-HQ-OAR-2018-0794-0577.

[117] *See, e.g.,* Comment Letter from Attorneys General of Massachusetts, California, Connecticut, Delaware, Illinois, Iowa, Maine, Maryland, Michigan, Minnesota, Nevada, New Jersey, New Mexico, New York, North Carolina, Oregon, Rhode Island, Vermont, Virginia, Washington, and the District of Columbia, the Maryland Department of the Environment, the City Solicitor of Baltimore, the Corporation Counsels of Chicago and New York City, the County Attorney of the County of Erie, NY, and the County Counsel for the County of Santa Clara, CA, Docket ID Item No. EPA-HQ-OAR-2018-0794-1175.

[118] *See, e.g.,* Comment Letter from ADA Carbon Solutions, LLC, Docket ID Item No. EPA-HQ-OAR-2018-0794-0794; Comment Letter from Advanced Emissions Solutions, Inc., Docket ID Item No. EPA-HQ-OAR-2018-0794-1181; Comment Letter from Exelon Corporation, Docket ID Item No. EPA-HQ-OAR-2018-0794-1158.

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resulted in substantial reductions in co-emitted pollutants, including direct $PM_{2.5}$ as well as SO_2 and NOx, which are both precursors to ozone and fine particle formation, the Administrator's proposed conclusion is further supported by the ramifications of the regulatory requirements in MATS for these pollutants. We propose that the benefits associated with such reductions may be appropriate to consider where the framework for making the CAA section 112(n)(1)(A) determination is a totality-of-the-circumstances approach, and we take comment on that approach. Therefore, while we conclude that the benefits associated with regulating HAP alone outweigh the costs without consideration of non-HAP benefits, we also propose that, to the extent we consider benefits attributable to reductions in co-emitted pollutants as a concomitant advantage, these benefits act to confirm that regulation is appropriate under a totality-of-the-circumstances approach. Specifically, we note that reductions in co-emissions of direct $PM_{2.5}$, SO_2 and NO_X will have substantial health benefits in the form of decreased risk of premature mortality among adults, and reduced incidence of lung cancer, new onset asthma, exacerbated asthma, and other respiratory and cardiovascular diseases. In the 2011 RIA, the EPA estimated the number and value of avoided $PM_{2.5}$-related impacts, including 4,200 to 11,000 premature deaths, 4,700 nonfatal heart attacks, 2,600 hospitalizations for respiratory and cardiovascular diseases, 540,000 lost work days, and 3.2 million days when adults restrict normal activities because of respiratory symptoms exacerbated by $PM_{2.5}$. We also estimated substantial additional health improvements for children from reductions in upper and lower respiratory illnesses, acute bronchitis, and asthma attacks. In addition, we estimated the benefit of reductions in CO_2 emissions under MATS. Although the EPA only partially monetized the benefits associated with these reductions in co-emitted pollutants in the 2011 RIA, the Agency estimated that – due in particular to the strong causal relationship between $PM_{2.5}$ and premature mortality – these

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reductions could result in as much as $90 billion (in 2016 dollars) in additional public health benefits annually. Therefore, if these non-HAP benefits are considered in the totality-of-the-circumstances approach, we take note of the fact that regulating EGUs for HAP emissions results in substantial other health benefits accruing to the American public by virtue of regulating HAP from EGUs.

E. The Administrator's Proposed Benefit-Cost Analysis Approach and Proposed Conclusion

In addition to the preferred approach, we separately put forward an alternative approach, as we did in 2016, to support a determination that it is appropriate and necessary to regulate HAP from EGUs when looking at the results of a formal BCA. The formal BCA we conducted for purposes of meeting Executive Order 12866 using established BCA practices also demonstrates that the benefits estimated for MATS far exceed the estimated costs, as reported in the 2011 RIA.[119] In its net benefits projection, the 2011 RIA monetized only one post control benefit from regulating HAP emissions from EGUs because the Agency did not and does not have the information necessary to monetize the many other benefits associated with reducing HAP emissions from EGUs. *See* section III.A.4. However, the 2011 RIA properly accounted for all benefits by discussing qualitatively those that could not be quantified and/or monetized. While some of the impacts on particularly impacted populations – such as the children of recreational anglers experiencing IQ loss – were reflected in the net benefits calculation, that accounting does not really grapple with the equitable question of whether a subset of Americans should continue to bear disproportionate health risks in order to avoid the increased cost of controlling HAP from

[119] We use the term "formal benefit-cost analysis" to refer to an economic analysis that attempts to quantify all significant consequences of an action in monetary terms in order to determine whether an action increases economic efficiency. Assuming that all consequences can be monetized, actions with positive net benefits (*i.e.*, benefits exceed costs) improve economic efficiency.

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EGUs. We continue to prefer a totality-of-the-circumstances approach to making the determination under CAA section 112(n)(1)(A), but we think that if a BCA is to be used, it should, consistent with economic theory and principles, account for all costs and all benefits.

BCA has been part of executive branch rulemaking for decades. Over the last 50 years, Presidents have issued Executive Orders directing agencies to conduct these analyses as part of the rulemaking development process. Executive Order 12866, currently in effect, requires a quantification of benefits and costs to the extent feasible for any regulatory action that is likely to result in a rule that may have an annual effect on the economy of $100 million or more or adversely affect in a material way certain facets of society. Executive Order 12866, at section 3(f)(1).

The EPA performed a formal BCA to comport with Executive Order 12866 as part of the 2012 MATS rulemaking process (referred to herein as the 2011 RIA). In the 2016 Supplemental Finding, the EPA relied on the BCA it had performed for Executive Order 12866 purposes as an alternative basis upon which to make the appropriate and necessary determination. That BCA, which reflected in its net benefits calculation only certain categories of benefits that could be confidently monetized, estimated that the final MATS would yield annual *net* monetized benefits (in 2007 dollars) of between $37 billion to $90 billion using a 3-percent discount rate and $33 billion to $81 billion using a 7-percent discount rate. *See* 80 FR 75040 (December 1, 2015). These estimates included the portion of the HAP benefits described in section III.A that could be monetized at the time, along with additional health benefits associated with the controls necessary to control the HAP emissions from U.S. EGUs. Specifically, as noted, the net benefits estimates included only one of the many HAP benefits associated with reduction of HAP. Nonetheless, the monetized benefits of MATS outweighed the estimated $9.6 billion in annual

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monetized costs by between 3-to-1 or 9-to-1 depending on the benefit estimate and discount rate used. The implementation of control technologies to reduce HAP emissions from EGU sources also led to reductions in emissions of SO_2, direct $PM_{2.5}$, as well as other precursors to $PM_{2.5}$ and ozone. In the 2011 RIA, the EPA did not quantify the benefits associated with ozone reductions resulting from the emissions controls under MATS, but we did include estimates of the projected benefits associated with reductions in $PM_{2.5}$. These benefits were quite substantial and had a large economic value. Newer scientific studies strengthen our understanding of the link between $PM_{2.5}$ exposure to a variety of health problems, including: premature death, lung cancer, non-fatal heart attacks, new onset asthma, irregular heartbeat, aggravated asthma, decreased lung function, and respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing. Furthermore, since the RIA was completed in 2011, the EPA has updated its conclusions about how $PM_{2.5}$ emissions can adversely affect the environment through acidic deposition, materials damage, visibility impairment, and exacerbating climate change (EPA, 2019).[120] In its most recent review of the effects of ozone pollution, the EPA concluded that ozone is associated with a separate but similarly significant set of adverse outcomes including respiratory-related premature death, increased frequency of asthma attacks, aggravated lung disease, and damage to vegetation (EPA, 2020).[121]

BCAs are a useful tool to "estimate the *total* costs and benefits to society of an activity or program," and "can be thought of as an accounting framework of the overall social welfare of a

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[120] U.S. EPA. *Integrated Science Assessment (ISA) for Particulate Matter* (Final Report, Dec 2019). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-19/188, 2019.
[121] U.S. EPA. *Integrated Science Assessment (ISA) for Ozone and Related Photochemical Oxidants* (Final Report, Apr 2020). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-20/012, 2020.

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program." EPA Economic Guidelines, Appendix A, A-6 (emphasis in original).[122] In a BCA, "[t]he favorable effects of a regulation are the benefits, and the foregone opportunities or losses in utility are the costs. Subtracting the total costs from the total monetized benefits provides an estimate of the regulation's net benefits to society." *Id.* Importantly, however, "[t]he key to performing BCA lies in the ability to measure both benefits and costs in monetary terms so that they are comparable." *Id.*; *see also* OMB Circular A-4 ("A distinctive feature of BCA is that both benefits and costs are expressed as monetary units, which allows you to evaluate different regulatory options with a variety of attributes using a common measure.").[123]

In the 2020 Final Action, the EPA rescinded the 2016 alternative approach on the basis that it was "fundamentally flawed" because it applied "a formal cost-benefit analysis" to the CAA section 112(n)(1)(A) determination. The Agency's objection at the time to the use of "a formal cost-benefit analysis" in the context of this determination was that doing so "implied that an equal weight was given to the non-HAP co-benefit emission reductions and the HAP-specific benefits of the regulation." *See* 85 FR 31299 (May 22, 2020). The Agency concluded that it was not appropriate to use a formal BCA in this situation because "to give equal weight to the monetized $PM_{2.5}$ co-benefits would permit those benefits to become the driver of the regulatory determination, which the EPA believes would not be appropriate." *Id.* The EPA reiterated in the 2020 Final Action that "HAP benefits, as compared to costs, must be the primary question in

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[122] U.S. EPA. 2014. *Guidelines for Preparing Economic Analyses*. EPA-240-R-10-001. National Center for Environmental Economics, Office of Policy. Washington, DC. December. Available at *https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses,* accessed July 23, 2021. Docket ID Item No. EPA-HQ-OAR-2009-0234-20503.

[123] U.S. OMB. 2003. *Circular A-4 Guidance to Federal Agencies on Preparation of Regulatory Analysis*. Available at *https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf,* accessed July 23, 2021.

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making the 'appropriate and necessary' determination" and "the massive disparity between co-benefits and HAP benefits on this record would mean that that alternative approach clearly elevated co-benefits beyond their permissible role." *Id.* at 31303. "To be valid, the EPA's analytical approach to [CAA section 112(n)(1)(A)] must recognize Congress' particular concern about risks associated with HAP and the benefits that would accrue from reducing those risks." *Id.* at 31301.

We agree that the analytical framework for the appropriate and necessary determination should first and foremost be one that is focused on "Congress' particular concern about risks associated with HAP and the benefits that would accrue from reducing those risks." *Id.* It is for this reason, as discussed in section III.C of this preamble, that we propose to revoke the analytical framework advanced for the appropriate and necessary determination by the 2020 Final Action, as being insufficiently attentive to the public health advantages of regulation. However, if the decisional framework is going to be one that considers advantages to regulation primarily in terms of potential monetized outcomes (*see* 85 FR 31296-97; May 22, 2020), a formal BCA that estimates net outcomes (*i.e.*, by comparing total losses and gains) and conforms to established economic best practices and accounts for *all* of the effects of the rule that can be quantified should be used.[124]

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[124] In addition, CAA section 112(n)(1)(A) directs the EPA to evaluate the hazards to public health from EGU HAP emissions that a reasonably anticipated "after imposition of the other requirements of the [CAA]." The direction to consider the impacts of non-CAA section 112 requirements on HAP emissions from EGUs demonstrates that Congress understood that criteria pollutant controls would achieve HAP reductions. Given this understanding, it is reasonable for the EPA to consider the consequent criteria pollutant reductions attributable to CAA section 112 standards if a BCA is used to evaluate cost in the context of the appropriate finding. Furthermore, CAA section 112 legislative history not specifically directed at EGUs also supports the consideration of criteria pollutant benefits attributable to the regulation of HAP emissions. Specifically, the Senate report for the 1990 CAA amendments states: "When establishing

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Consistent with scientific principles underlying BCA, both OMB Circular A-4 and the EPA's Guidelines for Preparation of Economic Analyses direct the Agency to include all benefits in a BCA. Per Circular A-4, OMB instructs "Your analysis should look beyond the direct benefits and direct costs of your rulemaking and consider any important ancillary benefits and countervailing risks. An ancillary benefit is a favorable impact of the rule that is typically unrelated or secondary to the statutory purpose of the rulemaking." Circular A-4 at 26. Similarly, the Guidelines state, "An economic analysis of regulatory or policy options should present all identifiable costs and benefits that are incremental to the regulation or policy under consideration. These should include directly intended effects and associated costs, as well as ancillary (or co-) benefits and costs." Guidelines at 11-2. As discussed in prior MATS rulemakings (*see, e.g.*, 80 FR 75041; December 1, 2015), installing control technologies and implementing the compliance strategies necessary to reduce the HAP emissions directly regulated by the MATS rule also results in reductions in the emissions of other pollutants such as directly emitted $PM_{2.5}$ and SO_2 (a $PM_{2.5}$ precursor). A particularly cost-effective control of emissions of particulate-bound mercury and non-mercury metal HAP is through the use of PM control devices that indiscriminately collect PM along with the metal HAP, which are predominately present as particles. Similarly, emissions of the acid gas HAP are reduced by acid gas controls that are also effective at reducing emissions of SO_2 (also an acid gas, but not a HAP). *Id.* While these $PM_{2.5}$ and SO_2 emission reductions are not the objective of the MATS

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technology-based [MACT] standards under this subsection, the Administrator may consider the benefits which result from control of air pollutants that are not listed but the emissions of which are, nevertheless, reduced by control technologies or practices necessary to meet the prescribed limitation." A Legislative History of the Clean Air Act Amendments of 1990 (CAA Legislative History), Vol. 5, pp. 8512 (CAA Amendments of 1989; p. 172; Report of the Committee on Environment and Public Works S. 1630).

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rule, the reductions are, in fact, a direct consequence of regulating the HAP emissions from EGUs. Specifically, controls on direct $PM_{2.5}$ emissions are required to reduce non-mercury metal HAP, while SO_2 emissions reductions come from controls needed to reduce acid gas emissions from power plants.

However, we recognize that there are significant reasons to question whether a formal BCA is the best way to interpret the Agency's mandate in CAA section 112(n)(1)(A), and we take comment on whether the Agency should continue to rely on this alternative basis for making its determination. We have consistently taken the position that a formal BCA is not required under CAA section 112(n)(1)(A). *See* 80 FR 75039 (December 1, 2015). As set forth above, in *Michigan*, the Supreme Court declined to hold that CAA section 112(n)(1)(A) required such an assessment, stating, "We need not and do not hold that the law unambiguously required the Agency, when making this preliminary estimate, to conduct a formal cost-benefit analysis in which each advantage and disadvantage is assigned a monetary value." *Michigan*, 576 U.S. at 759. However, the Court did note that "[c]onsideration of cost reflects the understanding that reasonable regulation ordinarily requires paying attention to the advantages *and* disadvantages of agency decisions." *Id.* at 2707. Moreover, in finding the EPA's decision not to consider cost irrational, the Court suggested that unintended disadvantages of a regulation could be considered costs as well, implying that such disadvantages should be accounted for. *Id.* at 2707 ("The Government concedes that if the Agency were to find that emissions from power plants do damage to human health, but that the technologies needed to eliminate these emissions do even more damage to human health, it would still deem regulation appropriate. No regulation is 'appropriate' if it does significantly more harm than good.").

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In the 2015 Proposal, we identified several policy reasons for preferring to apply a totality-of-the-circumstances approach to weighing costs and benefits over using a formal BCA as our decisional framework under CAA section 112(n)(1)(A). *See* 80 FR 75025 (December 1, 2015). We recognized that benefits like those associated with reduction of HAP can be difficult to monetize, and this incomplete quantitative characterization of the positive consequences can underestimate the monetary value of net benefits. *See* 80 FR 75039 (December 1, 2015). This is well-established in the economic literature. As noted in OMB Circular A-4, "[w]here all benefits and costs can be expressed as monetary units, BCA provides decision makers with a clear indication of the most efficient alternative." Circular A-4 at 2. However, "[w]hen important benefits and costs cannot be expressed in monetary units, BCA is less useful, and it can even be misleading, because the calculation of net benefits in such cases does not provide a full evaluation of all relevant benefits and costs." Circular A-4 at 10. The EPA's Guidelines for Preparation of Economic Analyses also recognizes the limitations of BCA, noting that "[m]ost important, [BCA] requires assigning monetized values to non-market benefits and costs. In practice it can be very difficult or even impossible to quantify gains and losses in monetary terms (*e.g.*, the loss of a species, intangible effects)." Guidelines, Appendix A at A-7.

We also pointed out in the 2015 Proposal that national level BCAs may not account for important distributional effects, such as impacts to the most exposed and most sensitive individuals in a population. *See* 80 FR 75040 (December 1, 2015). These distributional effects and equity considerations are often considered outside of (or supplementary to) analyses like BCAs that evaluate whether actions improve economic efficiency (*i.e.*, increase net benefits). For example, children near a facility emitting substantial amounts of lead are at significantly greater risk of neurocognitive effects (including lost IQ) and other adverse health effects. One

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perspective on the costs and benefits of controlling lead pollution would be to aggregate those costs and benefits across society, as in a BCA net benefits calculation. However, neither costs nor benefits are spread uniformly across society and failing to take account of that can overlook significant health risks for sensitive subpopulations, such as children exposed to lead pollution. Similarly, in the context of this determination, where we have found disproportionate risk for certain highly exposed or sensitive populations, such considerations are also particularly relevant. *See* section II.B; section III.A.

We note too that OMB Circular A-4 highlights the special challenges associated with the valuation of health outcomes for children and infants, because it is "rarely feasible to measure a child's willingness to pay for health improvement" and market valuations such as increased "wage premiums demanded by workers to accept hazardous jobs are not readily transferred to rules that accomplish health gains for children." Circular A-4 at 31. We take comment on whether a BCA, on its own, is an appropriate tool to make a determination of whether to regulate under CAA section 112(n)(1)(A), given that it may not meaningfully capture all the societal interests the statute intends the EPA to consider. *See* Guidelines, Appendix A at A-7 ("In some cases a policy may be considered desirable even if the benefits do not outweigh the costs, particularly if there are ethical or equity concerns.").

With those caveats, we propose to reaffirm using a BCA approach, based on the 2011 RIA performed as part of the original MATS rulemaking, as another way to make the CAA section 112(n)(1)(A) determination of whether it is appropriate to regulate HAP emissions from EGUs.

Applying the alternative approach, based on the 2011 RIA, we propose to find that it is appropriate to regulate EGUs for HAP under CAA section 112(n)(1)(A). In the 2011 RIA, the

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total benefits of MATS were estimated to vastly exceed the total costs of the regulation. As we found when applying the 2016 alternative approach, the formal BCA that the EPA performed for the 2012 MATS Final Rule estimated that the final MATS rule would yield annual monetized total benefits (in 2007 dollars) of between $37 billion to $90 billion using a 3-percent discount rate and between $33 billion to $81 billion using a 7-percent discount rate; this compares to projected annual compliance costs of $9.6 billion. This estimate of benefits was limited to those health outcomes the EPA was able to monetize. Despite the fact that these estimates captured only a portion of the benefits of the rule, excluding many important HAP and criteria pollutant-related endpoints which the Agency was unable to monetize (*see* section III.A.4) and instead discussed qualitatively in the 2011 RIA, it was clear that MATS was projected to generate overwhelmingly net positive effects on society. We continue to think that the BCA approach independently supports the conclusion that regulation of HAP emissions from EGUs is appropriate.

Although as discussed in section III.B.2 it was not possible for the EPA to update the entire comprehensive cost estimate found in the 2011 RIA, we think the new information presented in sections III.A and III.B directionally supports the net benefits calculation of the 2016 alternative approach. That is, we have attempted to quantify additional risks, including risks of premature death from heart attacks that result from exposure to methylmercury associated with domestic EGU emissions, and we believe the 2011 RIA's projected cost was almost certainly significantly overestimated. Therefore, we propose that if BCA is a reasonable tool to use in the context of the EPA's determination under CAA section 112(n)(1)(A), newer data collected since 2011 overwhelmingly support an affirmative determination. Further, that both analytical approaches to addressing the inquiry posed by *Michigan* lead to the same result

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reinforces the reasonableness of the EPA's ultimate decision that it is appropriate and necessary to regulate HAP emissions from EGUs after considering cost.

In this proposal, the EPA has re-examined the extensive record, amassed over 2 decades, identifying the advantages of regulating HAP from EGUs and evaluating the costs of doing so. We have, for purposes of this proposal, also updated information on both benefits and costs. Of note, we find that new scientific literature indicates that methylmercury exposure from EGUs, absent regulation, poses cardiovascular and neurodevelopmental risks to all Americans and particularly those most exposed to this pollution. With respect to costs, we explain the combination of factors that occurred since the promulgation of MATS that leads us to believe that the projected, sector-level $9.6 billion estimate of the cost of compliance of the rule in 2015 was almost certainly significantly overestimated. We propose two different approaches to considering all of this information, applying first a totality-of-the-circumstances methodology weighing of benefits and costs and focusing particularly on those factors that we were instructed by the statute to study under CAA section 112(n)(1), and next using a formal benefit-cost approach consistent with established guidance and economic principles. Under either approach, whether looking at only the information available at the time of our initial decision to regulate or at all currently available information, we propose to conclude that it remains appropriate and necessary to regulate EGUs for HAP. Substantial emission reductions have occurred after implementation of MATS, the emission limits established pursuant to the Agency's 2012 affirmative appropriate and necessary determination, and these limits provide the only Federal guarantee of these emission reductions from EGUs, which, absent regulation, were the largest domestic anthropogenic source of a number of HAP. Finalizing this affirmative threshold determination would provide important certainty about the future of MATS for regulated

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industry, states, other stakeholders, and the American public. We take comment on the information relied upon in this proposal and the EPA's proposed approaches to considering that information for this determination.

IV. Summary of Cost, Environmental, and Economic Impacts

The EPA estimates that there are 557 existing EGUs located at 265 facilities that are subject to the MATS rule. Because the EPA is not proposing any amendments to the MATS rule, there would not be any cost, environmental, or economic impacts as a result of the proposed action.

V. Request for Comments and for Information to Assist with Review of the 2020 RTR

On January 20, 2021, President Biden signed Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis" (86 FR 7037; January 25, 2021). That order, among other things, instructs the EPA to consider publishing a proposed rule suspending, revising, or rescinding the May 22, 2020 final action, "National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units–Reconsideration of Supplemental Finding and Residual Risk and Technology Review." The 2020 Final Action contained two distinct, but related, final actions – (1) a reconsideration of the 2016 Supplemental Finding and (2) the RTR. This notice fulfills the Agency's obligation to address the first action. We solicit comments on all aspects of this proposed action.

Separate from this proposal, the EPA has initiated a review of the RTR, taking into account the latest information available on the experience of EGUs in complying with MATS and implementing measures to reduce HAP emissions. As previously noted, since MATS was promulgated in 2012, power sector emissions of mercury, acid gas HAP, and non-mercury metal

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HAP have decreased by about 86 percent, 96 percent, and 81 percent, respectively, as compared to 2010 emissions levels (Table 4 at 84 FR 2689, February 7, 2019). While EGUs remain the largest domestic emitter of mercury (and other HAP), their emissions and contribution to total mercury in the environment is significantly less now than before MATS implementation. The EPA is seeking input into how both of these facts should factor into its review of the RTR.

In this notice, the EPA is soliciting information to allow for a more thorough review of the 2020 MATS RTR. The EPA is soliciting broadly for any data or information – including risk-related information – that will assist in the review of the RTR. The EPA is also soliciting specifically for any information on performance or cost of new or additional control technologies, improved methods of operation, or other practices and technologies that may result in cost-effective reductions of HAP emissions from coal- or oil-fired EGUs. In addition, the EPA is interested in receiving information on improvements or upgrades to existing controls that may result in cost-effective reductions of HAP emissions from coal- or oil-fired EGUs. The EPA also seeks information on the cost or performance of technologies and practices relating to monitoring of HAP emissions, and control of HAP emissions during startup and shutdown events, that could result in cost-effective reductions in HAP or assure improved operation of existing controls. We are seeking input from all interested stakeholders, including states, owners of EGUs, technology vendors and developers, and communities impacted by the emissions from EGUs.

VI. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at *https://www.epa.gov/laws-regulations/laws-and-executive-orders*.

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A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is a significant regulatory action that was submitted to OMB for review under Executive Order 12866. Any changes made in response to OMB recommendations have been documented in the docket. The EPA does not project any incremental costs or benefits associated with this action because it does not impose standards or other requirements on affected sources.

B. Paperwork Reduction Act (PRA)

This action does not impose any new information collection burden under the PRA. OMB has previously approved the information collection activities contained in the existing regulations and has assigned OMB control number 2060-0567. This action does not impose an information collection burden because the EPA is not proposing any changes to the information collection requirements.

C. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. This action will not impose any requirements on small entities. The EPA does not project any incremental costs or benefits associated with this action because it does not impose standards or other requirements on affected sources.

D. Unfunded Mandates Reform Act (UMRA)

This action does not contain an unfunded mandate of $100 million or more as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local, or tribal governments or the private sector.

E. Executive Order 13132: Federalism

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This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

This action does not have tribal implications as specified in Executive Order 13175. The executive order defines tribal implications as "actions that have substantial direct effects on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes." Revocation of the 2020 determination that it is not appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs under CAA section 112 and reaffirmation of the 2016 Supplemental Finding that it remains appropriate and necessary to regulate HAP emissions from EGUs after considering cost would not have a substantial direct effect on one or more tribes, change the relationship between the Federal Government and tribes, or affect the distribution of power and responsibilities between the Federal Government and Indian tribes. Thus, Executive Order 13175 does not apply to this action.

G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks

This action is not subject to Executive Order 13045 because it is not economically significant as defined in Executive Order 12866, and because this action does not impose new regulatory requirements that might present a disproportionate risk to children. This action reaffirms the 2016 Supplemental Finding that it is appropriate and necessary to regulate HAP emissions from U.S. EGUs, but does not impose control requirements, which were implemented through MATS (77 FR 9304; February 16, 2012). While this action does not impose or change

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any standards or other requirements, it addresses the underpinning for the HAP emission standards in MATS. The EPA believes the reductions in HAP emissions achieved under MATS have provided and will continue to provide significant benefits to children in the form of improved neurodevelopment and respiratory health and reduced risk of adverse outcomes. Analyses supporting the 2012 MATS Final Rule estimated substantial health improvements for children in 2016 in the form of 130,000 fewer asthma attacks, 3,100 fewer emergency room visits due to asthma, 6,300 fewer cases of acute bronchitis, and approximately 140,000 fewer cases of upper and lower respiratory illness. *See* 77 FR 9441 (February 16, 2012). Reaffirming the appropriate and necessary determination assures those benefits will continue to accrue among children.

H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This action is not a "significant energy action" because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. This action is not anticipated to have impacts on emissions, costs, or energy supply decisions for the affected electric utility industry as it does not impose standards or other requirements on affected sources.

I. National Technology Transfer and Advancement Act (NTTAA)

This action does not involve technical standards.

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

The EPA believes that this action will not have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, and/or indigenous peoples, as specified in Executive Order 12898 (59 FR 7629; February 16, 1994),

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because it does not impose standards or other requirements on affected sources and is limited in scope to only consider whether it is appropriate and necessary to regulate HAP emissions from coal- and oil-fired EGUs. While this action does not impose or modify any standards or other requirements, it provides the underpinning for the emission standards regulating HAP from EGUs. As documented in both the NAS Study and Mercury Study, fish and seafood consumption is the primary route of human exposure to methylmercury originating from U.S. EGUs, with populations engaged in subsistence-levels of consumption being of particular concern. As shown in section III.A.5 of this preamble, certain minority, low-income, and indigenous populations are more likely to experience elevated exposures, thus higher health risks relative of the general population due to subsistence fishing. Furthermore, subpopulations with the higher exposure tend to overlap with those subpopulations that are particularly vulnerability to small changes in health risk because of other social determinants of health (*e.g.*, lack of access to health care and access to strong schooling), thereby compounding the implications of the implications of mercury exposure. Reaffirming the appropriate and necessary determination assures that the reduction in risks achieved by MATS continue.

Michael S. Regan,

Administrator.

This document is a prepublication version, signed by EPA Administrator, Michael S. Regan on 1/31/2022. We have taken steps to ensure the accuracy of this version, but it is not the official version.

Message

From: Profeta, Timothy [Profeta.Timothy@epa.gov]
Sent: 2/1/2022 3:03:24 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Sasser, Erika [Sasser.Erika@epa.gov]; Grundler, Christopher [grundler.christopher@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Tsirigotis, Peter [Tsirigotis.Peter@epa.gov]; Culligan, Kevin [Culligan.Kevin@epa.gov]
Subject: RE: Proposed language for SOTU

All – Sorry for the need to amend my thought below, but I sent asap once I saw it and did not read it carefully enough. Reading more carefully, the proposal is to retire 12 units by 2028 and all units by 2035, so not all by 2028. I thought important enough to send clarification.

From: Profeta, Timothy
Sent: Tuesday, February 1, 2022 7:55 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Hello all –

In keeping with the language in the statement regarding increasing transition in the industry, GA power retiring the rest of it coal – 12 plants – by 2028. I thought I should ensure all saw.

Tim

**

Georgia Power plans to double renewables, ditch all coal

The state's largest utility plans to shutter 12 coal units.

BY:
KRISTI E. SWARTZ
| 02/01/2022 07:07 AM EST

Georgia Power plans to close two units at its Plant Bowen coal plant by the end of 2027. The electric company wants to upgrade the other two units so they can run through 2035.AP Photo/Mike Stewart

ENERGYWIRE | Southern Co.'s Georgia Power utility announced a plan yesterday to double its renewable energy footprint by 2035 as it maps out a path to close the rest of its coal fleet in that time.

The moves, which reflect the electric company's continued transition to cleaner fuel sources, would help Southern achieve a net-zero carbon goal by 2050 for electricity. Other steps at Georgia Power include extending the life of hydropower units and Plant Hatch nuclear reactors, adding 1,000 megawatts of energy storage, and revamping energy efficiency and solar programs.

Georgia Power plans to shutter 12 coal units, totaling about 3,500 megawatts, by 2028. It wants to replace that electricity with a combination of renewables as well as 2,356 MW of natural-gas-fired power that it plans to buy from power plants that are already running. For context, once two additional nuclear reactors at Georgia Power's Plant Vogtle start producing electricity, the total 4,536 MW from four units there will power up to 1 million homes.

The company delivered its highly anticipated 20-year-long-term energy plan to state utility regulators yesterday afternoon. The 200-page document outlines the utility's continued transition into one that is less reliant on baseload fossil fuel generation and more on distributed generation.

"We feel like this process affords us the opportunity to tell the story about how Georgia Power is preparing for this new energy landscape and how we transition the fleet and enhance our grid," Georgia Power CEO Chris Womack said in an interview with E&E News. "We're making a transition to a larger renewable fleet with a high focus on protecting the environment and supporting the communities and customers that we serve."

Georgia Power is the largest electric company in the Peach State as well as the biggest in Southern's utility system, which stretches across much of the Southeast. That means any shift in its electricity mix will affect carbon emissions in Georgia and within Southern's power grid.

The steps are in line with a nationwide trend of electric companies replacing coal plants with renewables and natural gas. What's notable about Georgia Power is it does not plan to build any natural gas plants right now, choosing to buy the electricity from elsewhere.

The decision is an economic one, according to Womack.

"There's some pricing advantages with the [power-purchase agreements] at this time," he said, acknowledging the company may decide later to build natural gas plants. "Right now, we see this as the best alternative to replace the energy that was made available through the coal units."

That alternative is to enter into six long-term purchase power agreements for a total capacity of 2,356 MW with Southern Power, Southern Co.'s wholesale power unit. Like most other electric companies, Georgia Power argues that it needs the additional gas generation to support the amount of renewables it wants to add to the power grid.

Clean energy advocates aren't buying the argument that the utility needs any more gas-fired generation at all, however.

"We welcome Georgia Power's proposed coal retirements, but by proposing to replace coal with more than 2,300 MW of new gas capacity, we don't see how this aligns with Southern Co.'s plans to be net zero by 2050," said Jill Kysor, senior attorney for the Southern Environmental Law Center. "We question the need for new gas capacity and are skeptical of whether cleaner, more affordable alternatives were adequately considered."

Every 3 years

Georgia Power files its integrated resource plan (IRP) every three years. In 2019, clean energy advocates criticized the company for not taking steps to align with Southern's net-zero carbon goals.

Indeed, the falling cost of renewables combined with widening options of cleaner technologies have made it more economically feasible for utilities to transition to emission-free sources of electricity. What's more, the Biden administration wants the U.S. power sector to decarbonize by 2035.

Southern is among the nation's major electric companies known for exercising its lobbying muscle in Washington and in the states where it operates to craft energy policies that will be favorable to the company and its customers.

Womack said elements of the Biden administration's bipartisan infrastructure law and the stalled "Build Back Better" plan that include beefing up electrification and enhancing reliability and resiliency would be important to the utility as it moves forward.

Georgia Power will work with the Department of Energy and other federal and state agencies "to see how we can partner to support enhanced reliability and resiliency in the state as well," he said.

The IRP reflects an expected 0.8 percent annual average growth in summer energy sales and 0.7 percent in winter between now and 2041 as Georgia's economy continues to expand, adding a wide range of manufacturers, tech companies and other businesses. The electric company has chosen not

to adjust its reserve margin — the amount of extra generation it needs to meet peak winter and summer loads.

Components of Georgia Power's IRP also can be a window into what may happen at sister companies. Mississippi Power is on its way to removing roughly 950 MW of fossil fuels from its generating fleet. And Alabama Power plans to cut roughly 3,000 MW of coal — the details of which are expected later this year.

Coal plant closures from Atlanta-based Southern are expected. The company has said it would close down roughly half of its coal fleet systemwide by the decade's end (Energywire, Nov. 5, 2021).

That is because all but two of its coal plants don't comply with federal wastewater regulations for power plant discharges. These can contain high levels of toxic chemicals like mercury, arsenic, nitrogen and selenium.

The proposed schedule includes closing units at some of the nation's largest coal plants: Scherer and Bowen. Georgia Power plans to close two units at Bowen by Dec. 31, 2027, and one unit at Scherer a year later.

Georgia Power owns a small share of Scherer's first two units, and no decision has been made on their fate. However, the utility states in the IRP that it is making future generation plans based upon their closure by Dec. 31, 2028, as well.

The utility plans to upgrade two other units at Bowen, arguing that they are needed for reliability reasons. The units will be closed by Dec. 31, 2035, if not before.

Adding renewables

Georgia Power wants to add 6,000 MW of renewables — likely including solar — by 2035, bringing the total amount of renewables on the grid to 11,000 MW by that time. It also plans to upgrade three of its hydropower plants so they can operate an additional 40 years.

Georgia Power is among the Southeast electric companies that lag in energy efficiency options for low-income customers, among others (Energywire, Aug. 6, 2020).

Residents in the South have the highest energy burden — paying a disproportionate amount of their income on utility bills — because of a combination of older housing stock, extreme heat and humidity, and a lack of updated building codes and energy efficiency measures.

Environmental justice advocates have been watching the company closely after Southern CEO Tom Fanning pledged to do "everything in my ability" to have the Atlanta-based energy giant and all its subsidiaries viewed as role models for the private entities forging change during the company's annual meeting last year.

Georgia Power has asked to end two of its energy efficiency programs and extend others. It also has proposed a community solar pilot program for low-income residents.

It's not enough, however, for some critics.

"The future of energy production in Georgia must be clean and carbon free," said Charline Whyte, senior campaign representative for the Sierra Club's Beyond Coal campaign in Georgia, in a statement. "Georgia Power's proposal seems to recognize this reality and is a step in the right direction, but doesn't go big enough."

Absent in the plan is discussion of the next generation of nuclear reactors, which are being billed as safer and more efficient, and transportation electrification. Executives from Southern and Georgia Power have made it clear that additional nuclear is needed by the next decade to continue on a net-zero carbon path, but Womack said those discussions are just that at the moment.

Georgia Power is building the nation's lone baseload nuclear power construction project, Plant Vogtle, with a group of public power utilities. It also plans to ask federal regulators to extend the operating license of its Plant Hatch reactors, so they can run for an additional 20 years.

Proposals about transportation electrification and charging networks will appear in a subsequent rate case that will start later this year.

"We are excited and bullish to expand the charging infrastructure and charging network," Womack said. "That platform will be discussed in the rate case."

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Monday, January 31, 2022 7:54 PM
To: Sasser, Erika <Sasser.Erika@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Thanks, Erika. I'm looking forward to seeing the stats. I've wondering what we would see if we looked backward at the RIAs for major power plant rules, like MATS and CSAPR and pulled the morbidity and mortality benefits. We couldn't project those forward in any meaningful way, could we? Could we revise the statement to say something like "when EPA has acted in the past to curb pollution from power plants, we saw X, Y, and Z illnesses and premature deaths avoided. I am directing the EPA to aim to achieve public health progress on the same scale by ..." Or, would that simply a different way of expressing the same fallacy?

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Sasser, Erika <Sasser.Erika@epa.gov>
Sent: Monday, January 31, 2022 5:06 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

After consultation with the team and re-crunching the numbers, we suggest that a statement like the following is the most accurate way to represent the potential impact. Given the lack of clarity about what "carbon pollution free" means (and actually, I think we mean carbon neutral?) in terms of policy content, it is virtually impossible to predict how NOx, SO2 and direct PM emissions would change. Current baseline is below 1 million tons for both NOx and SO2, but moving to low-carbon strategies would definitely still provide sizeable health benefits. The extent of strategies like renewables, hydrogen, continued fossil-generated power (+/- CCS) would make a difference in total amount though. However, this is accurate regardless:

"Our goal is to protect our children from millions of avoidable asthma attacks and our people from thousands of avoidable heart attacks, emergency department visits, and premature deaths that we can prevent by cutting pollution."

I need to get you some revised stats for the supporting rationale if this is going forward. We have not done PM2.5 benefits for EGUs with full scale modeling for quite a while (we've been using short-form benefit per ton, which lacks the delineation by health effect category). This modeling will be ready later this spring, but for this exercise we are cobbling together information from numerous sources and it's not straightforward. Let me know if I should keep pushing and if we have hard deadlines.

thanks

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Sunday, January 30, 2022 2:35 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

This is what I sent to Dan just now. I think we may want to go with Chris' suggestion of looking at some of our power plant RIA's to come up with ranges for preventable illnesses and premature deaths, rather than rely on the Ozone or PM NAAQS numbers since I assume they're not pegged to specific sectors? Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Goffman, Joseph
Sent: Sunday, January 30, 2022 11:51 AM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

OK. I'm about to disappear into a couple of hours of stakeholder calls on the MATS proposal, but I will turn to playing around with this language after that. Next stop will be Dan. Thanks, Tim, Tomas, and everyone for getting us to this point.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Sunday, January 30, 2022 11:41 AM
To: Grundler, Christopher <grundler.christopher@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Hello all –

I think Erika's team was working on an update on PM/Ozone that could give us some new numbers, but what we have is a placeholder. I would propose we can share with CPO given time and update when we are able to provide something more specific?

I also added a spirit of partnership with the private sector in the final sentence, reading into Joe's comments.

Looking at comments overall, I have the below as a working quote. Joe, it seems you have the best sense of what our audience desires – let me know if you want to jump on the phone to think how to further target to their interest?

Tim

**

"With this new fleet of clean running electric vehicles on the road, we now need to provide them with clean energy from a vibrant and innovative power sector. This is the pivotal moment for us to invest in transforming our power plants to reduce pollution and secure our economic future.

Therefore, tonight I announce that I'm directing my administration to develop a strategy that accelerates the transition to a clean power sector and puts our power plants on a trajectory to be carbon pollution free by 2035 – a strategy that ensures reliable and affordable electricity, secures clean air and a healthy environment for our communities, and propels jobs and investment across the nation. To get there, EPA will take action under our nation's environmental laws to accelerate clean, affordable electricity that comes free of pollution. This change will protect our children from thousands of asthma attacks and our people from avoidable cancers, heart attacks, and premature deaths that now burden all of us. [DOE and other agencies will invest in developing and deploying clean energy technologies…] And my administration will work with Congress to secure the incentives and investments we need to be a full partner with the companies pursuing this transition."

From: Grundler, Christopher <grundler.christopher@epa.gov>
Sent: Sunday, January 30, 2022 10:56 AM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

I was musing along the same lines re public health outcomes----while not a quantitative goal, would it be reasonable to say something like " and prevent [thousands] of premature deaths, tens of thousands of lost work days,…..". I've not read the RIA on the transport rule---perhaps we could go with something within the range of health benefits we are projecting

---

Christopher Grundler, Director
Office of Atmospheric Programs
U.S. Environmental Protection Agency
202.343.9140 (o)
734.645.5221 (m)

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Sunday, January 30, 2022 10:46 AM
To: Grundler, Christopher <grundler.christopher@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Chris and All – Chris' note prompted me to read Tomas' language yet again. I think we can disregard my note of last night; in fact, this version actually responds to what I was trying to say in last night's email. The one thing that we haven't really accounted for is the WH's desire for some kind of "concrete" goal, expressed in terms of public health outcomes. That said, I do think this version does get the construct right.

One additional thought: I have a sixth sense that the WH will be sensitive to anything that sounds like a criticism of the power sector. So, if in the course of trying to dream up something that is responsive to the appetite for a "concrete" public health goal, we can come up with something to temper even further *the dangerous soot, smog and toxins that bring harm to those downwind from smokestacks* we might be on even more attractive ground. Maybe *clean, affordable electricity that comes free of pollution. In accomplishing that our children will be protected from thousands of asthma attacks and our people will be protected from avoidable cancers, heart attacks, and premature deaths that now burden all of us.*

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Grundler, Christopher <grundler.christopher@epa.gov>
Sent: Sunday, January 30, 2022 10:30 AM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

I like this revision

Christopher Grundler, Director
Office of Atmospheric Programs
U.S. Environmental Protection Agency
202.343.9140 (o)
734.645.5221 (m)

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Saturday, January 29, 2022 5:22 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Thanks Tim, I thought both the memo and the pithier version below looked great. A couple of comments here, attempting to capture some of the ideas Joe and I discussed.

First, with respect to the notion of a quantitative goal and how to situate EPA's strategy relative to it, we had the same instinct that seems to be reflected in your new text below – to refer back to the goals the administration has already articulated for the power sector (zero carbon pollution by 2035, 80 percent clean by 2030, etc.) and explicitly frame the achievement of those goals as something that the executive branch as a whole will seek to achieve, maybe referencing the role of Congress as well. A couple of thoughts on your text: do we actually want the SOTU to commit us to develop a joint strategy with DOE? Also, is there some way that we can make clear that EPA will be acting to fulfill its responsibility to protect health/environment under our nation's laws? I've suggested a somewhat wordier variation of your text below that may be too involved, but takes a stab at addressing these issues. I'm also wondering whether we should recommend that the White House release a presidential memo or abbreviated strategy document around the SOTU that announces or directs actions by other agencies as part of the administration-wide power sector effort.

Second, to the extent the White House has an appetite to say something more quantitative about benefits, should we provide an estimate of topline health benefits (i.e., avoided premature deaths) that could result from achieving the goals above? We weren't sure if something like that already exists or could be readily developed, but tossing it out for consideration.

Best,

Tomás

"With this new fleet of clean running electric vehicles on the road, we now need to provide them with clean energy from a vibrant and innovative power sector. This is the pivotal moment for us to invest in transforming our power plants to reduce pollution and secure our economic future.

Therefore, tonight I announce that I'm directing my administration to develop a strategy that accelerates the transition to a clean power sector and puts our power plants on a trajectory to be carbon pollution free by 2035 – a strategy that ensures reliable and affordable electricity, secures clean air and a healthy environment for our communities, and propels jobs and investment across the nation. To get there, EPA will take action under our nation's environmental laws to immediately address the dangerous soot, smog and toxins that bring harm to those downwind from smokestacks. [DOE and other agencies will invest in developing and deploying clean energy technologies…] And my administration will work with Congress to secure the incentives and investments we need to create a clean power sector that benefits all Americans."

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Saturday, January 29, 2022 4:05 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

How is this for a pithy passage? I had trouble creating any metric that did not sound like the Administration was retreating from its campaign pledge, but I think we can recognize that the commitment is 13 years from now and use "trajectory" language to give us some wiggle room. But I would embrace a call to think together about what else might be a good approach.

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Saturday, January 29, 2022 2:54 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed language for SOTU

Hi, Everyone. Sorry for the weekend email, but time is pretty short on this and I'm not sure when on Monday we might have time to talk. I think the proposed SOTU language is excellent, but it is more fit for what I hope will be an eventual Administrator speech laying out his power sector vision in response to, or anticipation of, the SOTU.

My inclination right now is to pass along to Dan and CPO the entire document for its very useful background, but we also need to come up with language that is fit for the specific SOTU purpose here. That requires brevity and something that looks like a metric-expressed goal, which I believe the White House is looking for. For the latter, as we know, the WH preference would be for a percentage or tonnage reduction target, which we can't provide. The question is whether we can provide a surrogate.

I've highlighted in yellow in the Sharepoint two sentences that I think should be the focus of our efforts to achieve brevity and two quantitative items that we might be able to play with: a goal of improving public health somehow expressed in pollution-linked illnesses and deaths avoided, or a policy that reinforces or creates a level playing field for the cited utilities' commitments or targets.

Happy to chat if anyone is around this weekend. I will ask Thierry to find a time on Monday if you think that would be useful.

Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Friday, January 28, 2022 5:19 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Tsirigotis, Peter <Tsirigotis.Peter@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Sasser, Erika <Sasser.Erika@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: Proposed language for SOTU

Greetings Joe and Tomas –

I believe Peter foreshadowed this, but we have been discussing what language could be included in the State of the Union speech addressing the power sector. We devised the language in the attached document, and provided relevant background and context. It is a little longer than we intended, but thought it was good to share in its full form. We would love to hear your reaction and critique.

Have a great weekend!

Tim

Tim Profeta
Special Counsel for the Power Sector
Office of Air Quailty, Planning and Standards
U.S. Environmental Protection Agency
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Message

From: Shoaff, John [Shoaff.John@epa.gov]
Sent: 2/1/2022 5:33:26 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]
CC: Hooper, Daniel [hooper.daniel@epa.gov]; Hockstad, Leif [Hockstad.Leif@epa.gov]
Subject: FYI for 3:00 SAB mtg - background on potentially applicable actions to new process
Attachments: OAR past 2021 Tier 1-2 actions.xlsx; OAR upcoming Tier 1-2 actions.xlsx

Joe et al,

Attached is an extract from our reg process share point data on tier 1-2 proposals and final actions which are potentially subject to the SAB process for background with discussion at 3 later this PM. As you know we were able to consult on the LDV proposal in Dec., but may've missed opportunities on a few other actions, other proposals are on the street and several are upcoming. Operationally, we typically work with SABSO on the set of relevant actions and then with programs to pull together background related to the Appendix in the document Chris shared to discuss with the SAB WG where appropriate. Look forward to their presentation and discussion. Thanks!

John

JOHN SHOAFF (HE/HIM/HIS) | DIRECTOR
OFFICE OF AIR POLICY & PROGRAM SUPPORT (OAPPS)
OFFICE OF AIR & RADIATION | U.S. EPA | WJC NORTH 5442-C
1200 PENNSYLVANIA AVE. NW | MC 6103A | WASHINGTON, D.C. | 20460 | USA
Shoaff.john@epa.gov | **1-202-564-0531 DIRECT | 1-202-257-1755 MOBILE**

Office	SAN	Stage
OAQPS	7511	NPRM Extension
OAQPS	7546	NPRM Extension
OAP	7811	Final Rule
OAP	8458	NPRM
	6530.8	Interim Final
OAQPS	5562.1	Discontinued
OTAQ	8469	NPRM
OAP	8458	Final Rule
OAQPS	8635	Notice
OAQPS	8510	NPRM
OTAQ	8521	NPRM
OAQPS	8510	NPRM Extension
OTAQ	7558	NPRM
OTAQ	8469	Final Rule
OAQPS	7522	NPRM

Working Title	Actual Signature
Primary Magnesium Refining RTR	2/16/2021
Mercury Cell Chlor-Alkali RTR	2/16/2021
Revised Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS	3/15/2021
HFC Phasedown Rule under the AIM Act	4/30/2021
Rescinding the Rule on Increasing Consistency and Transparency in Considering Benefits and Costs in the Clean Air Act Rulemaking Process	5/11/2021
Regulatory Infrastructure for New HAP Additions to Part 63; Addition of 1-Bromopropane	6/22/2021
Revised Light-Duty Vehicle GHG Emissions Standards	7/29/2021
HFC Phasedown Rule under the AIM Act	9/23/2021
PM NAAQS Review	10/5/2021
New Source Performance Standards for Crude Oil and Natural Gas Facilities: Review of Policy and Technical Rules	11/1/2021
RFS Annual Rule	12/7/2021
New Source Performance Standards for Crude Oil and Natural Gas Facilities: Review of Policy and Technical Rules	12/13/2021
Control of Air Pollution from Aircraft Engines: Emission Standards and Test Procedures	12/17/2021
Revised Light-Duty Vehicle GHG Emissions Standards	12/17/2021
Primary Copper Smelting RTR	12/22/2021

Actual FR Publication	Tier Level	Item Type	Path
2/23/2021	2	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
2/23/2021	2	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
4/30/2021	1	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
5/19/2021	2	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
5/14/2021	2	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
	2	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
8/10/2021	1	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
10/5/2021	2	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
10/8/2021	1	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
11/15/2021	1	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
12/21/2021	1	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
12/17/2021	1	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
2/3/2022	2	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
12/30/2021	1	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker
1/11/2022	2	Item	sites/OARRegulatoryProcess/Lists/oar_reg_tracker

Office	SAN	Stage
OTAQ	7165	NPRM
OAQPS	8670	NPRM
OAQPS	6716.2	NPRM
OAQPS	7546	Final Rule
OAQPS	7522	Final Rule
	6530.8	Final Rule
OTAQ	8521	Final Rule
OAQPS	8471	NPRM
OTAQ	8514	NPRM
OAQPS	8606	NPRM
OAQPS	7055	NPRM

Working Title	Tier Level
Highway Heavy-Duty 2027+	1
Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standards	1
MATS A&N - Reconsideration	1
Mercury Cell Chlor-Alkali RTR	2
Primary Copper Smelting RTR	2
Rescinding the Rule on Increasing Consistency and Transparency in Considering Benefits and Costs in the Clean Air Act Rulemaking Process	2
RFS Annual Rule	1
Coke Ovens RTR	2
RFS Set Rule	1
Implementing Regulations under 40 CFR Part 60 Subpart Ba Adoption and Submittal of State Plans for Designated Facilities	2
Ethylene Oxide Sterilizers	2

Planned Signature	OP to OMB	Status	Signature Deadline Type
2/11/2022	12/4/2021	Stage 3 With OMB	
2/28/2022	1/25/2022	Stage 3 With OMB	Consent Decree
3/1/2022	8/3/2021	Stage 4 With OEX	
3/31/2022	1/20/2022	Stage 3 With OMB	
4/1/2022			Court Order
4/8/2022			
4/25/2022			Statutory
5/2/2022			
5/22/2022			
5/31/2022		Stage 1 With OAR (Pending to OP)	
5/31/2022			

Signature Deadline	Planned OP to OMB	Item Type
	12/3/2021	Item
2/28/2022	1/22/2022	Item
	7/30/2021	Item
	1/26/2022	Item
4/1/2022	3/18/2022	Item
	2/28/2022	Item
11/30/2021	3/21/2022	Item
	3/1/2022	Item
	3/22/2022	Item
5/31/2022	4/4/2022	Item
	3/31/2022	Item

Path	OAR Status	Actual FR Publication
sites/OARRegulatoryProcess/Lists/oar_reg_tracker		
sites/OARRegulatoryProcess/Lists/oar_reg_tracker		
sites/OARRegulatoryProcess/Lists/oar_reg_tracker		
sites/OARRegulatoryProcess/Lists/oar_reg_tracker		
sites/OARRegulatoryProcess/Lists/oar_reg_tracker		
sites/OARRegulatoryProcess/Lists/oar_reg_tracker		
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sites/OARRegulatoryProcess/Lists/oar_reg_tracker		
sites/OARRegulatoryProcess/Lists/oar_reg_tracker		

Actual Signature	Actual OP to OEX	Actual OAR to OP	Actual OMB Review Complete

Actual OAR to OP (OMBR)

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 2/1/2022 10:46:33 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]
Subject: RE: 2022 OAR Regulatory Agenda Outlook (draft)
Attachments: OAR 2022 Regulatory Outlook_02-01-2022.docx

Hi Joe,

Please see the updated 2022 draft Regulatory Agenda attached. OAQPPS updated the information on the first page to reflect "NPRM" or "Final Rule".

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Friday, January 28, 2022 4:58 PM
To: Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: 2022 OAR Regulatory Agenda Outlook (draft)

Thanks. Btw, please remind me whether we've delivered to OP what they're looking for on rules headed to OMB in the next few months. Or are we not at the deadline for that yet? Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Hooper, Daniel <hooper.daniel@epa.gov>
Sent: Friday, January 28, 2022 4:52 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: 2022 OAR Regulatory Agenda Outlook (draft)

Hi Joe,

It looks like the information on the first page is an image, and I don't have the Excel file to modify. I'll pass along your comment to OAPPS (who does have the file) and get it updated (latest Monday).

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Goffman, Joseph <Goffman.Joseph@epa.gov>
Sent: Friday, January 28, 2022 4:45 PM
To: Hooper, Daniel <hooper.daniel@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: RE: 2022 OAR Regulatory Agenda Outlook (draft)

Thanks. Quick catch – can we please get the appropriate "NPRM" and "FA" labels for each time on the first page? Thanks.

Joseph Goffman
Principal Deputy Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency

From: Hooper, Daniel <hooper.daniel@epa.gov>
Sent: Friday, January 28, 2022 4:09 PM
To: Goffman, Joseph <Goffman.Joseph@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>
Subject: 2022 OAR Regulatory Agenda Outlook (draft)

Hi Joe,

As you discussed with Ann, OAPPS has put together an initial draft document outlining OAR's 2022 Regulatory Agenda Outlook (see attached).

Please let me know if you have any questions or would like to schedule a briefing/presentation by OAPPS on the data, so we can identify next steps.

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Joseph, Lauretta [Joseph.Lauretta@epa.gov]
Sent: 2/1/2022 11:17:56 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]
CC: Shaw, Betsy [Shaw.Betsy@epa.gov]; Tsirigotis, Peter [Tsirigotis.Peter@epa.gov]; Koerber, Mike [Koerber.Mike@epa.gov]; Lassiter, Penny [Lassiter.Penny@epa.gov]; Cozzie, David [Cozzie.David@epa.gov]; South, Peter [South.Peter@epa.gov]; Shrager, Brian [Shrager.Brian@epa.gov]; Howard, Jodi [Howard.Jodi@epa.gov]; Purifoy, Tiffany [Purifoy.Tiffany@epa.gov]; Peacock, Grant [Peacock.Grant@epa.gov]; Bergstrand, Paul [Bergstrand.Paul@epa.gov]; Joseph, Lauretta [Joseph.Lauretta@epa.gov]; Barnes-Weaver, Erin [Barnes-Weaver.Erin@epa.gov]; Chuong, Bao [Chuong.Bao@epa.gov]; Drzewiecki, Jenny [Drzewiecki.Jenny@epa.gov]; O'Donnell, Sean [ODonnell.Sean@epa.gov]; Sheehan, Charles [Sheehan.Charles@epa.gov]; Shields, Edward [Shields.Ed@epa.gov]; Perez, Marc [Perez.Marc@epa.gov]; Wright, Stephanie L. [Wright.Stephanie@epa.gov]; Kaplan, Jennifer [Kaplan.Jennifer@epa.gov]; Lagda, Jeffrey [Lagda.Jeffrey@epa.gov]; May, Benjamin [May.Benjamin@epa.gov]; Trimble, Katherine [Trimble.Katherine@epa.gov]; Gilbride, Patrick [Gilbride.Patrick@epa.gov]
Subject: OIG Draft Report: EPA Needs to Develop a Strategy to Complete Overdue Residual Risk and Technology Reviews and Meet Statutory Deadlines for Upcoming Reviews (Project No. OSRE-FY21-0224)
Attachments: EPA OIG Draft Report Technical Comments_ORTR.docx; OIG DRAFT REPORT-Overdue RTRs and TRs (Project No. OSRE-FY21-0224).docx; OIG DRAFT REPORT-Overdue RTRs and TRs (Project No. OSRE-FY21-0224).pdf

Acting Assistant Administrator Goffman,

Attached is the draft OIG report: *EPA Needs to Develop a Strategy to Complete Overdue Residual Risk and Technology Reviews and Meet Statutory Deadlines for Upcoming Reviews,* Project No. OSRE-FY21-0224, for Agency review and comment. This draft report is subject to revision by the OIG and, therefore, does not represent the final position of the OIG.

This draft report should not be distributed or disclosed to others except that you may distribute it to other persons in your organization to obtain their review and comments on the subjects reported.

As noted in the draft report's transmittal memorandum, the Agency's response is due within 30 days of the draft report date or by March 3, 2022. The response should indicate planned completion dates for the report recommendations. If you do not concur with a proposed recommendation, please provide any alternative actions you wish to be considered for the final report. Your response should also identify any corrective actions already initiated or planned.

In order to ensure that technical comments are submitted separately from your official draft comments, we have also provided a template for your office to use to capture any optional technical comments you may have. This will help ensure that only your substantive draft comments are published in the final report.

We greatly appreciate the cooperation and assistance we have received from the Office of Air Quality Planning and Standards. If you or your staff have any questions, please contact me at (212) 637-3049 or Bao Chuong at (415) 947-4533.

Lauretta

Lauretta A.L. Joseph, MPH
Director
Programs, Offices, and Centers Oversight (POCO) Directorate

US Environmental Protection Agency
Office of Inspector General
Office of Special Reviews and Evaluation

290 Broadway, Suite 1520
New York, New York 10007-1866
212-637-3049 (office)
917-887-3536 (cell)
Joseph.lauretta@epa.gov

External Meeting Request Form for Joe Goffman

Today's Date: December 2, 2021

Requesting Organization: American Public Power Association

Title of the Meeting: Discussion with APPA

Purpose: To discuss public power's environmental and climate-related policy priorities, as well as EPA's regulatory priorities under the Clean Air Act, including the agency's review of the National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units-Reconsideration of Supplemental Finding and Residual Risk and Technology Review and rulemakings to address air emissions transport.

Background: The American Public Power Association is the voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide. We represent public power before the federal government to protect the interests of the more than 49 million people that public power utilities serve, and the 96,000 people they employ. Our association advocates and advises on electricity policy, technology, trends, training, and operations. APPA and its members have engaged with the agency over the past decade on all major rulemakings affecting the power sector.

Is this meeting related to ongoing litigation: No

Earliest possible date for the meeting:

- January 12, 2022 from 11:00 am- 12 noon
- January 14, 2022 from 11:00 am- 12 noon

Last possible date for the meeting:

- January 14, 2022 from 3:00 -4:00 pm

Is the meeting urgent and if so, why: No

Requested Time Length: 30-60 mins

Have you met with anyone within EPA: Tim Profetta

Invitees:

- Joy Ditto, President & CEO
- Delia Patterson, Senior VP Advocacy & Communications and General Counsel
- Desmarie Waterhouse, VP Government Relations and Counsel
- Carolyn Slaughter, Director, Environmental Policy

External Participants: N/A

Teleconference Required:

Video Conference Required: Yes (Microsoft Teams or Zoom)

Point of Contact for the Meeting: Carolyn Slaughter, phone (202)- 467-2943 or email cslaughter@publicpower.org.

Please email this form back to OAR_Invitations@epa.gov

Appointment

From: Kabanda, Thierry [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b1a9a772e3c946cb99a35da45f43de6c-Kabanda, Th]
Sent: 1/25/2022 9:06:06 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]; DeLuca, Isabel [DeLuca.Isabel@epa.gov]; Millett, John [Millett.John@epa.gov]; Koerber, Mike [Koerber.Mike@epa.gov]; Culligan, Kevin [culligan.kevin@epa.gov]; Noonan, Jenny [Noonan.Jenny@epa.gov]; Bremer, Kristen [Bremer.Kristen@epa.gov]; Hamilton, Lindsay [Hamilton.Lindsay@epa.gov]; Conger, Nick [Conger.Nick@epa.gov]; Niebling, William [Niebling.William@epa.gov]; Carroll, Timothy [Carroll.Timothy@epa.gov]; Grantham, Nancy [Grantham.Nancy@epa.gov]; Laverdiere, Maria [Laverdiere.Maria@epa.gov]; Katims, Casey [Katims.Casey@epa.gov]; Haman, Patricia [Haman.Patricia@epa.gov]; Bowles, Jack [Bowles.Jack@epa.gov]; Enobakhare, Rosemary [Enobakhare.Rosemary@epa.gov]; Cortez Russell, Loni [Russell.Loni@epa.gov]; Levy, Maxwell [Levy.Maxwell@epa.gov]; Alpern, Michael [Alpern.Michael@epa.gov]; Nazmi, Niloufar [Nazmi.Niloufar@epa.gov]; Cortelyou-Lee, Jan [Cortelyou-Lee.Jan@epa.gov]
CC: Thundiyil, Karen [Thundiyil.Karen@epa.gov]; Lucey, John [Lucey.John.D@epa.gov]; Harney, Alethea [Harney.Alethea@epa.gov]; Enesta Jones [Jones.Enesta@epa.gov]

Subject: MATs Rollout Discussion
Location: Microsoft Teams Meeting

Start: 1/26/2022 10:00:00 PM
End: 1/26/2022 10:25:00 PM
Show Time As: Busy

Required Attendees: Carbonell, Tomas; Kim, Eunjung; Campbell, Ann; Hooper, Daniel; DeLuca, Isabel; Millett, John; Koerber, Mike; Culligan, Kevin; Noonan, Jenny; Bremer, Kristen; Hamilton, Lindsay; Conger, Nick; Niebling, William; Carroll, Timothy; Grantham, Nancy; Laverdiere, Maria; Katims, Casey; Haman, Patricia; Bowles, Jack; Enobakhare, Rosemary; Cortez Russell, Loni; Levy, Maxwell; Alpern, Michael; Nazmi, Niloufar; Cortelyou-Lee, Jan
Optional Attendees: Thundiyil, Karen; Lucey, John; Harney, Alethea; Enesta Jones

---

Microsoft Teams meeting

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Join with a video conferencing device
sip:teams@video.epa.gov
Video Conference ID: Ex. 6 Personal Privacy (PP)
Alternate VTC instructions

Or call in (audio only)
Ex. 6 Personal Privacy (PP) ited States, Washington DC
Phone Conference ID: Ex. 6 Personal Privacy (PP)
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For all EPA meetings, there is no expectation of privacy regarding any communications. Participation in a recorded meeting will be deemed as consent to be recorded. Information on EPA systems is the property of the Agency and may become official records.

Learn More | Meeting options

Message

From: Carbonell, Tomas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=15EC2A6AD2934C669F6A675E7CF4961B-CARBONELL,]
Sent: 1/21/2022 10:07:10 PM
To: Profeta, Timothy [Profeta.Timothy@epa.gov]
Subject: RE: draft tp's

These look good to me! Thanks Tim. Best,

Tomás

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Friday, January 21, 2022 4:20 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: draft tp's

Ex. 5 Deliberative Process (DP)

From: Profeta, Timothy
Sent: Friday, January 21, 2022 1:42 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: draft tp's

I tried to keep these brief, in order to minimize risk,. I've also got an inquiry into Kevin to see if he has anything else into which we should specifically inquire. Let me know if you have any red or yellow flags?

I've not sent to OGC for review yet but would like to do so before day's end. Would that be ok?

Tim

**

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Tim Profeta
Special Counsel for the Power Sector
Office of Air Quailty, Planning and Standards
U.S. Environmental Protection Agency
Profeta.Timothy@epa.gov

Office: 919/541-5667
Mobile: 919/309-5395

Message

From: Carbonell, Tomas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=15EC2A6AD2934C669F6A675E7CF4961B-CARBONELL,]
Sent: 1/25/2022 1:37:32 PM
To: Katims, Casey [Katims.Casey@epa.gov]; Profeta, Timothy [Profeta.Timothy@epa.gov]
CC: Bowles, Jack [Bowles.Jack@epa.gov]
Subject: RE: Proposed run of show for tomorrow

Looks good to me as well, thanks. In case you haven't seen it:

New EPA Rules to Target Power Plant Pollution

Administrator Michael Regan says agency expects to propose tighter regulations on air and water emissions from electric utility plants

By
Jan. 25, 2022 7:00 am ET

The proposed rules could lead to the closing of some older coal-fired power plants.

Photo: Paul Hennessy/SOPA Images/Zuma Press

WASHINGTON—The Environmental Protection Agency is preparing to advance tougher regulations on power plants in coming months as part of President Biden's plan to cut greenhouse-gas emissions.

The agency wants to impose stricter air-quality standards for mercury and other toxic pollutants, as well as new restrictions on wastewater generated by power plants, EPA Administrator Michael Regan said in an interview.

Mr. Regan said the EPA is looking to roll out new proposals in a more coordinated approach to regulate the power sector, using the agency's broad array of powers to oversee air and water pollution as well as wastewater disposal.

"We don't have to overly rely on any one rule," Mr. Regan said. "It's looking at the full suite of authorities to maximize our ability to protect communities and public health."

EPA Administrator Michael Regan says the proposed rules are aimed at shielding poor and minority neighborhoods that often bear the brunt of power plant pollution.

Photo: Jose Luis Magana/Associated Press

Tom Kuhn, president of the Edison Electric Institute, an industry group that represents major utilities, said a coordinated approach "can help to provide a regulatory framework that supports these investments and accelerates the clean energy transition." But an industry group that represents smaller and rural power-plant owners expressed concern.

An onslaught of new rules could raise the cost of power to business and consumers if it isn't implemented carefully, and the cost of compliance could also force older plants powered by coal, oil and natural gas to close, said Louis Finkel, senior vice president of government relations for the National Rural Electric Cooperative Association.

"If the ambition is to create death by a thousand cuts, to make it more difficult to operate, yes—that's wildly problematic," Mr. Finkel said.

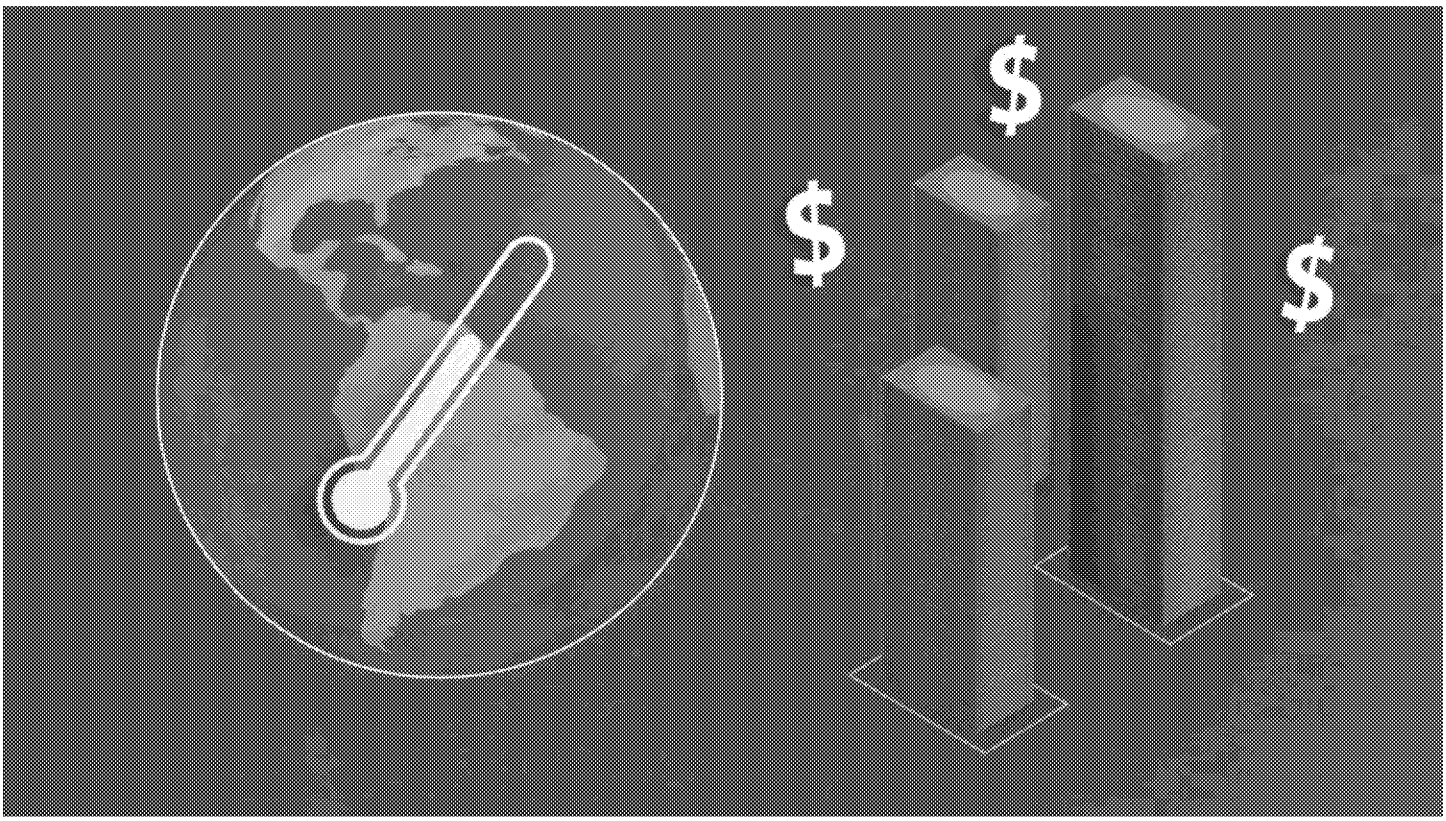
Mr. Finkel said the idea of a coordinated approach isn't by itself a big concern but he would be eager to hear more details from Mr. Regan about how exactly the EPA might implement the strategy.

He said environmentalists in the past have advocated for such a strategy as a way to target and close coal-fired power plants, which many states will see as a threat to low prices and reliable power.

Mr. Regan and agency officials wouldn't detail specific plans for each rule change. Mr. Regan said the proposed rules are aimed at shielding poor and minority neighborhoods that often get the brunt of power plant pollution, along with cutting greenhouse-gas emissions.

How Much Would It Cost to Reduce Global Warming? $131 Trillion Is One Answer

0:00 / 4:38



How Much Would It Cost to Reduce Global Warming? $131 Trillion Is One Answer

Money is a sticking point in climate-change negotiations around the world. As economists warn that limiting global warming to 1.5 degrees Celsius will cost many more trillions than anticipated, WSJ looks at how the funds could be spent, and who would pay. Illustration: Preston Jessee/WSJ

In addition to toxic pollutants such as mercury, the EPA also plans to propose tougher standards to reduce visible air pollution, or haze, generated by power plants.

Congress in 1977 required the EPA to improve air clarity in national parks and wilderness areas, primarily in the West. Advocates credit the Regional Haze Program for leading to the closure of several coal-fired power plants.

The EPA adopted its Mercury and Air Toxics Standards for power plants in 2012, but the Republican Trump administration revised those and other regulations, saying that they were too burdensome.

The White House is reviewing an EPA draft proposal to effectively reinstate the mercury rule and strengthen its limits on toxic emissions.

The EPA also announced last summer it would revisit changes made in 2020 to Effluent Guidelines for power-plant wastewater. It plans to issue a proposal by this fall to strengthen discharge limits.

More stringent power-plant regulations were relatively rare from the Biden administration in its first year. The EPA, under Mr. Regan, has finished rules that limit the use of coolant chemicals that are potent greenhouse

gases, and rules to lower emissions from passenger carsand trucks. The agency also has announced preliminary steps to limit greenhouse-gas emissions from the oil and gas industry.

Similar climate rules that Mr. Biden promised for power plants, however, haven't moved forward. The EPA so far has taken a back seat on the issue to Congress, which for months debated new clean-energy standards for power plants.

But late last year lawmakers dropped the idea under opposition from coal-state Sen. Joe Manchin (D., W.Va.).

And now, broader attempts to boost federal funding for cleaner electricity are also at risk of failing to get Mr. Manchin's likely essential vote to pass the Senate.

It would be a safe fallback for the EPA to pursue tighter regulations on other emissions more traditionally thought of as pollutants, said Jonathan Skinner-Thompson, a former EPA lawyer now a law professor at the University of Colorado.

The EPA has more explicit, direct authority from Congress to do things like reduce haze or lower mercury pollution, he said. And regulations to address those problems often end up addressing climate change, too, most significantly by encouraging the industry to replace old, fossil-fuel burning plants with new, more efficient, wind or solar units.

"If we make [coal-fired plants] more expensive from other pollutants, rather than spend money to retrofit, it may just be better for them to shut down," Mr. Skinner-Thompson said. "Then you get the climate benefits without necessarily having to directly regulate greenhouse gas emissions."

Mr. Regan said he isn't deploying the strategy because he sees any limits to the agency's authority to address climate change directly. He calls a "holistic approach" for power-plant regulation a better way to spur reductions from across the broad list of pollutants that come from these plants, while also expediting cuts to carbon dioxide and other greenhouse gases.

"It's much more than just a carbon strategy," Mr. Regan said. "I'm convinced if we're going to protect people and communities and the environment and the planet, we have to do all of the above."

—Katy Stech Ferek contributed to this article.

From: Katims, Casey <Katims.Casey@epa.gov>
Sent: Monday, January 24, 2022 9:02 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Bowles, Jack <Bowles.Jack@epa.gov>
Subject: RE: Proposed run of show for tomorrow

No concerns here, thanks Tim

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Monday, January 24, 2022 4:01 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Katims, Casey <Katims.Casey@epa.gov>
Cc: Bowles, Jack <Bowles.Jack@epa.gov>
Subject: Proposed run of show for tomorrow

Per our discussion – let me know your thoughts.

Tim Profeta
Special Counsel for the Power Sector
Office of Air Quailty, Planning and Standards
U.S. Environmental Protection Agency
Profeta.Timothy@epa.gov

Office: 919/541-5667
Mobile: 919/309-5395

Appointment

From: Carbonell, Tomas [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=15ec2a6ad2934c669f6a675e7cf4961b-Carbonell,]
Sent: 1/25/2022 10:15:51 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]

Subject: Accepted: MATs Rollout Discussion
Location: Microsoft Teams Meeting

Start: 1/26/2022 10:00:00 PM
End: 1/26/2022 10:25:00 PM
Show Time As: Busy

Message

From: Carbonell, Tomas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=15EC2A6AD2934C669F6A675E7CF4961B-CARBONELL,]
Sent: 1/31/2022 4:33:46 PM
To: Culligan, Kevin [Culligan.Kevin@epa.gov]
Subject: RE: MATS key points

Thank you!

From: Culligan, Kevin <Culligan.Kevin@epa.gov>
Sent: Monday, January 31, 2022 11:25 AM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: MATS key points

First one is probably biggest from our perspective – highlight the HAP benefits to lead.

Ex. 5 Deliberative Process (DP)

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Monday, January 31, 2022 11:20 AM
To: Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: MATS key points

Thanks Kevin, do you have any changes to these points? Think I need to get back to OPEEE right away

From: Culligan, Kevin <Culligan.Kevin@epa.gov>
Sent: Monday, January 31, 2022 9:11 AM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Goffman, Joseph <Goffman.Joseph@epa.gov>
Subject: RE: MATS key points

Tomas,

These bullets are all correct. We are working on a modification to the first bullet to Ex. 5 Deliberative Process (DP) We think it is important to remind folks that this rule makes sense not just because of the significant PM co-benefits but also because the HAP benefits in and of themselves are very important. Will send something shortly.

- Kevin

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Sunday, January 30, 2022 9:41 PM
To: Culligan, Kevin <Culligan.Kevin@epa.gov>
Cc: Goffman, Joseph <Goffman.Joseph@epa.gov>
Subject: MATS key points

Hi Kevin, hope you had a good weekend!

Joe and I are working to provide OPEEE with a few key points regarding the MATS proposal (particularly with regard to benefits/costs of the standards) that they can use in communicating with supportive stakeholders. Can you please tell me if we have the following info right? Are there any other notable facts that we might want to add? Thanks,

Tomás

Ex. 5 Deliberative Process (DP)

Message

From: Carbonell, Tomas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=15EC2A6AD2934C669F6A675E7CF4961B-CARBONELL,]
Sent: 1/31/2022 4:38:48 PM
To: Enobakhare, Rosemary [Enobakhare.Rosemary@epa.gov]; Cortez Russell, Loni [Russell.Loni@epa.gov]; Levy, Maxwell [Levy.Maxwell@epa.gov]
Subject: TPs re MATS proposal

Hi all – thanks very much for pulling together yesterday's stakeholder calls! Sorry for the delay on this - here are some suggested points for use in outreach with stakeholders today. Please let me know if you need anything else. Best,

Tomás

Ex. 5 Deliberative Process (DP)

Message

From: Carbonell, Tomas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=15EC2A6AD2934C669F6A675E7CF4961B-CARBONELL,]
Sent: 2/1/2022 2:19:29 AM
To: Culligan, Kevin [Culligan.Kevin@epa.gov]
Subject: RE: Signed today: MATS A&N proposal

Thanks Kevin.

From: Culligan, Kevin <Culligan.Kevin@epa.gov>
Sent: Monday, January 31, 2022 8:54 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: Fwd: Signed today: MATS A&N proposal

Based on Jackie's e-mail, I think you can share the materials even though they haven't posted.

- Kevin

Sent from my iPhone

Begin forwarded message:

From: "Ashley, Jackie" <Ashley.Jackie@epa.gov>
Date: January 31, 2022 at 4:15:19 PM EST
To: "Biton, Leiran" <biton.leiran@epa.gov>, "Haman, Patricia" <Haman.Patricia@epa.gov>, "Thundiyil, Karen" <Thundiyil.Karen@epa.gov>, "Koerber, Mike" <Koerber.Mike@epa.gov>, "Moeller, Njeri" <Moeller.Njeri@epa.gov>
Cc: "Culligan, Kevin" <Culligan.Kevin@epa.gov>, "Hutson, Nick" <Hutson.Nick@epa.gov>, "Profeta, Timothy" <Profeta.Timothy@epa.gov>, "King, Melanie" <King.Melanie@epa.gov>, "Dolwick, Pat" <Dolwick.Pat@epa.gov>, "Terry, Sara" <Terry.Sara@epa.gov>, "Macpherson, Alex" <Macpherson.Alex@epa.gov>, "LaCount, Melanie" <LaCount.Melanie@epa.gov>, "Gmyr, Joanna" <Gmyr.Joanna@epa.gov>, "McNerney, Matthew" <McNerney.Matthew@epa.gov>, "Cozzie, David" <Cozzie.David@epa.gov>, "Bremer, Kristen" <Bremer.Kristen@epa.gov>, "Weatherhead, Darryl" <Weatherhead.Darryl@epa.gov>, OAQPS OD PACS <OAQPS_OD_PACS@epa.gov>, "LaCount, Melanie" <LaCount.Melanie@epa.gov>, "Millett, John" <Millett.John@epa.gov>, "DeLuca, Isabel" <DeLuca.Isabel@epa.gov>, "Ting, Kaytrue" <Ting.Kaytrue@epa.gov>
Subject: Signed today: MATS A&N proposal

Good afternoon –
Today, the Administrator signed the proposal to reaffirm the scientific, economic, and legal underpinnings of the 2012 Mercury and Air Toxics Standards (MATS) for power plants. The press release (below) went out this afternoon.

Unfortunately, OAR Is not able to make updates to the web at this time, so have not yet been able to update the website and post documents. In the interim, attached please PDFs of

- the fact sheet
- pre-publication version of the preamble

OAQPS does not know when the web issues will be resolved. We will send around a link to the new MATS web page when it has been updated.

Thank you in advance for sharing with your key contacts as appropriate.

-Jackie

Jackie Ashley (she/her/hers)
US EPA - Office of Air Quality Planning and Standards
Policy Analysis and Communications Staff
919.541.7664 - ashley.jackie@epa.gov

EPA Reaffirms Scientific, Economic, and Legal Underpinnings of Limits on Toxic Emissions

Action Would Ensure Continued Protection for Children and Vulnerable Communities

Contact: EPA Press Office, press@epa.gov

WASHINGTON (Jan. 31, 2022) – Today, EPA is proposing to reaffirm the scientific, economic, and legal underpinnings of the 2012 Mercury and Air Toxics Standards (MATS) for power plants, which require significant reductions of mercury, acid gases, and other harmful pollutants. Controlling these emissions improves public health for all Americans by reducing fatal heart attacks, reducing cancer risks, avoiding neurodevelopmental delays in children, and helping to restore certain ecosystem functions that people and businesses value. These public health improvements are especially important for children and particularly vulnerable segments of the population such as Indigenous communities, low-income communities, and people of color who live near power plants or are affected by hazardous air pollution. The proposal, which responds to President Biden's January 20, 2021, Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis," would reverse a rule issued by the previous administration in May 2020, which undermined the legal basis for these vital health protections.

"Sound science makes it clear that we need to limit mercury and toxins in the air to protect children and vulnerable communities from dangerous pollution," said **EPA Administrator Michael S. Regan**. "EPA is committed to aggressively reducing pollution from the power sector so that all people, regardless of zip code or amount of money in their pocket, can breathe clean air and live healthy and productive lives."

The proposal would leave the current emissions standards unchanged but would ensure the continuation of public health protections provided by these requirements, while seeking information from the public on opportunities for additional pollution reductions. Taking account of the burden that hazardous air pollutants including mercury impose on public health as well as the costs of controlling these emissions, EPA proposes to find that it is appropriate and necessary to regulate emissions of air toxics from power plants under the Clean Air Act.

The MATS, combined with advancements in the power sector, have driven sharp reductions in harmful pollutants. EPA has estimated that by 2017, mercury emissions from power plants were reduced by 86 percent, acid gas emissions were reduced by 96 percent, and non-mercury metal emissions were reduced by 81 percent compared to pre-MATS levels in 2010.

Prior to the MATS, power plants were the largest domestic source of mercury and other toxic pollutants such as hydrogen chloride and selenium. They were also among the largest domestic contributors of arsenic, chromium, cobalt, nickel, hydrogen cyanide, beryllium, and cadmium.

The initial appropriate and necessary finding was made in 2000 and affirmed in 2012 and 2016. In May 2020, the previous administration reversed EPA's 2016 finding, undermining the legal basis for the Mercury and Air Toxics Standards. President Biden's Executive Order 13990 directed EPA to review that finding and consider an

action to rescind it. In today's action, EPA proposes to find that the 2020 action was based on a fundamentally flawed interpretation of the Clean Air Act that improperly ignored or undervalued vital health benefits from reducing hazardous air pollution from power plants. Based on a thorough review of these benefits, the reasonable costs of controls, and other relevant factors, EPA is proposing to reaffirm that it is appropriate and necessary to regulate emissions of hazardous air pollutants from coal- and oil-fired power plants.

The agency is also continuing to consider the MATS Risk and Technology Review, as directed by Executive Order 13990, to determine whether more stringent protections for hazardous air pollution from power plants are feasible and warranted. To support that review, EPA is soliciting information on the performance and cost of new or improved technologies or methods of operation to control hazardous air pollution emissions, as well as risk-related information, as a part of this proposal.

EPA will accept comment on the proposal for 60 days after publication in the *Federal Register*. The agency also plans to hold a virtual public hearing. Details about the hearing will be announced online in the coming weeks.

Please contact press@epa.gov for a copy of the proposal.

Message

From: Carbonell, Tomas [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=15EC2A6AD2934C669F6A675E7CF4961B-CARBONELL,]
Sent: 2/1/2022 7:08:01 PM
To: Patrick Drupp [patrick.drupp@sierraclub.org]
Subject: RE: Sierra Club Supports EPA's Air Toxics Announcement

Thanks for sharing this, Pat. Best,

Tomás

From: Patrick Drupp <patrick.drupp@sierraclub.org>
Sent: Tuesday, February 1, 2022 1:39 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: Fwd: Sierra Club Supports EPA's Air Toxics Announcement

Hi Tomás,

I just wanted to share with you Sierra Club's statement (and tweet) on the MATS proposal from yesterday.

Thanks

Pat

SIERRA CLUB

Patrick Drupp, PhD
Deputy Legislative Director
Climate and Clean Air
50 F St NW, 8th Floor, Washington DC, 20001
Cell: 717-586-7084
www.sierraclub.org

FOR IMMEDIATE RELEASE:
Monday, January 31, 2022

CONTACT: Jonathon Berman, jonathon.berman@sierraclub.org

View as webpage

Sierra Club Supports EPA's Air Toxics Announcement
Biden EPA Reverses Trump Guidance on Mercury and Air Toxics

WASHINGTON, D.C. - Today, President Biden's EPA announced a proposal to reverse the Trump Administration's decision eliminating the "appropriate and necessary" finding for regulating mercury and other hazardous air pollution from power plants. The move comes after an executive order signed by President Biden last year to review the Trump-era rollback and develop a new proposal.

The Mercury and Air Toxics Standards (MATS), finalized in 2012, limits hazardous pollutants like mercury, arsenic, and hydrochloric acid. EPA estimated MATS would prevent up to 11,000 premature deaths per year. In 2020, the Trump Administration's EPA, led by former coal lobbyist Andrew Wheeler, undermined the standard by eliminating the "appropriate and necessary" finding, dismissing the standards' enormous public health benefits as insufficient to justify their cost to polluters.

Today's proposal takes Americans' health into account by including health improvements and other public benefits in its cost-benefit analysis.

In response, Patrick Drupp, Deputy Legislative Director for Climate and Clean Air released the following statement:

"With today's announcement, President Biden's EPA is taking a critical first step in protecting communities – in particular, communities of color – from dangerous, toxic pollution from coal plants. Communities across the country continue to be saddled with poor air quality. As a result, our families – and especially our children and the elderly – have been burdened with skyrocketing cases of asthma, heart attacks, and premature deaths.

"President Biden's EPA must now strengthen the MATS rule. No amount of toxic pollution is acceptable in the air we breathe, especially when there are feasible, cost effective means of protecting public health."

###

About the Sierra Club

The Sierra Club is America's largest and most influential grassroots environmental organization, with millions of members and supporters. In addition to protecting every person's right to get outdoors and access the healing power of nature, the 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. For more information, visit www.sierraclub.org.

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To subscribe, email media.assistant@sierraclub.org
www.sierraclub.org/pressroom | sierra.news@sierraclub.org

SIERRA CLUB

Message

From: Keri N Powell [kpowell@powellenvironmentallaw.com]
Sent: 1/26/2022 4:36:50 PM
To: Brachtl, Megan [Brachtl.Megan@epa.gov]; Boyd, Rochelle [Boyd.Rochelle@epa.gov]; Kornylak, Vera S. [Kornylak.Vera@epa.gov]; Mathias, Scott [Mathias.Scott@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Patrick Anderson [panderson@powellenvironmentallaw.com]; ccocook20@gmail.com; Treva Gear [tygear2005@gmail.com]; Caliban70@msn.com; Adam Macon [adam@dogwoodalliance.org]; Heather Hillaker [hhillaker@selcnc.org]; Jessica Morehead [jessica.morehead@sierraclub.org]; Vicki Weeks [vicki@dogwoodalliance.org]; info@forestkeeper.org; Codi Norred [codi@gipl.org]; Veronica Butcher [director@mothersandothersforcleanair.org]; Bailey Shea [bshea@selcga.org]; Eric Schaeffer [eschaeffer@environmentalintegrity.org]; Nicha Rakpanichmanee [rnicha@selcga.org]; crpcg@googlegroups.com; J.D. McCrary [jdmccrary@gafw.org]; David Kyler [susdev@gate.net]; Karen Grainey [karengrainey@bellsouth.net]; Anne Heikkila [annelh@outlook.com]; Anne Mellinger Birdsong [anne@mothersandothersforcleanair.org]; Neil Sardana [neil.sardana@sierraclub.org]; daniel.blackman@sierraclub.org; Laura Early [laura@southwings.org]; WWALS Watershed Coalition [wwalswatershed@gmail.com]; Michael G Noll [mgnoll@valdosta.edu]; John Quarterman [jsq@quarterman.org]
Subject: RE: overdue for response: Petition re Georgia's failure to provide for public comment on draft minor NSR permits
Attachments: 2022.01.18 Brightmark_SELC_Comment Letter EPD.pdf; FINAL 2021.11.19 SELC and EIP Comments on Spectrum Energy Application.PDF; Final Petition Seeking EPA Orders Requiring Public Comment on Draft Minor Source Air Permits RBG 3_18_21.pdf

Nice to e-meet you, Rochelle. Congratulations on your new position as head of EPA's NSR group. I'm writing to provide some follow-up information pertaining to the attached March 2021 petition asking EPA to correct Georgia's failure to provide for public comment on air permits for non-major sources.

First, in the email below that I sent to EPA a couple weeks ago, I mentioned that Georgia's failure to provide for public comment on minor NSR permits—and especially on synthetic minor NSR permits—is also being raised in public comments on the permit application for the controversial Brightmark facility proposed to be built in Macon. In case you don't have them, I'm attaching SELC's comments to Georgia EPD.

Second, in addition to the RBG plant at issue in our March 2021 petition, yet ANOTHER wood pellet manufacturing plant has been proposed in Adel, Georgia. Specifically, in November 2021, Georgia EPD took comment on the *application* filed by Spectrum Energy. As with all other air permits for non-major sources, Georgia EPD indicates that it will not be providing comment on a draft permit for this facility, but will just be issuing it based on comment on the application. Adding insult to injury, simultaneous with releasing the application for public comment, Georgia EPD notified the applicant that the application is incomplete. In other words, **the only public comment opportunity is on an incomplete permit application** with no analysis whatsoever by Georgia EPD. For your reference, I am attaching our comments on that incomplete permit application.

It's been almost a year since we filed our petition asking EPA to correct Georgia's failure to provide for public comment on air permits for non-major sources and all we've heard is crickets. The Georgia groups that I am working with are dismayed by this inaction—**EPA knows that what Georgia EPD is doing is illegal, the IG's office has expressly directed EPA to correct this problem nationwide, and the lack of any public comment opportunity on non-major permits in Georgia is well documented. What's the holdup?** I know that EPA has a lot going on, but this is low-hanging fruit. Barring a significant investment by EPA in ensuring that state synthetic minor limits are accurate and enforceable, the public needs the ability to provide effective oversight—a right that is supposedly already required by law. Please make addressing the lack of a public comment opportunity on minor source air permits in Georgia a priority.

I'm happy to discuss this issue further with you and others at EPA. Please let us know what we should expect.

Thank you. We look forward to working with you to resolve this issue.

Keri

Keri N. Powell
Of Counsel, Environmental Integrity Project
Powell Environmental Law
315 W. Ponce de Leon Ave., Suite 842
Decatur, GA 30030
(917) 573-8853

From: Brachtl, Megan <Brachtl.Megan@epa.gov>
Sent: Tuesday, January 25, 2022 4:26 PM
To: Keri N Powell <kpowell@powellenvironmentallaw.com>
Cc: Boyd, Rochelle <Boyd.Rochelle@epa.gov>; Kornylak, Vera S. <Kornylak.Vera@epa.gov>
Subject: RE: overdue for response: Petition re Georgia's failure to provide for public comment on draft minor NSR permits

Hello Keri – Thank you for your email dated January 6, 2022, and I appreciated you following up last week via voicemail. I am copying Rochelle Boyd, the new Group Leader for the New Source Review Group, so you have her contact information going forward.

We are in touch with our colleagues in Region 4 on the issues you have raised.

Best regards,
Megan

Megan V. Brachtl
Pronouns: she/her/hers
Acting Associate Director
Air Quality Policy Division
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency
Research Triangle Park, NC
919-541-2648

From: Keri N Powell <kpowell@powellenvironmentallaw.com>
Sent: Thursday, January 6, 2022 10:39 AM
To: Brachtl, Megan <Brachtl.Megan@epa.gov>; Kornylak, Vera S. <Kornylak.Vera@epa.gov>
Cc: Patrick Anderson <panderson@powellenvironmentallaw.com>; ccocook20@gmail.com; Treva Gear <tygear2005@gmail.com>; Caliban70@msn.com; Jessica Morehead <jessica.morehead@sierraclub.org>; Vicki Weeks <vicki@dogwoodalliance.org>; info@forestkeeper.org; Codi Norred <codi@gipl.org>; Veronica Butcher <director@mothersandothersforcleanair.org>
Subject: overdue for response: Petition re Georgia's failure to provide for public comment on draft minor NSR permits

Dear Ms. Brachtl:

Attached please find the March 18, 2021 petition to EPA filed by Concerned Citizens of Cook County, Dr. Treva Gear, Dr. Victoria Meredith, Environmental Integrity Project, Dogwood Alliance, Georgia Interfaith Power and Light, Forest Keeper, Mothers & Others for Clean Air, and Sierra Club Georgia chapter. The petition seeks relief from Georgia's failure to provide a public comment opportunity on draft air permits authorizing construction of "minor" sources—including sources that are avoiding major New Source Review by accepting "synthetic minor" limits.

Because this petition addresses deficiencies in a specific state's Clean Air Act program, we directed the petition to the attention of the EPA Region 4 office. On March 31, 2021, representatives of the petitioning organizations met with Ms. Caroline Freeman and her staff via Zoom and presented their concerns. While this petition broadly addresses Georgia's

failure to provide public comment on any draft minor NSR permit, the petition emphasizes the need for Georgia's prompt intervention to address Georgia's issuance of a permit for the RBG wood pellet facility in Adel. Unfortunately, to date, the petitioners have received no response to their petition beyond an acknowledgment of its receipt.

In the meantime, Georgia has continued to issue minor NSR permits without an opportunity for public comment on draft permits—even after the public specifically requests that Georgia EPD provide them with a comment opportunity. Significantly, it appears that Georgia EPD believes that it does not even have the discretion to offer a public comment period on draft minor NSR permits. The latest such permit is for the Brightmark plastics-to-fuel plant in Macon, GA (Bibb County). Georgia EPD solicited comments on the facility's application, but has indicated that it will not provide a comment opportunity on the draft permit despite widespread public concern about the proposed facility.

In light of Region 4's failure to address the concerns raised in our petition, we respectfully request assistance from EPA headquarters in addressing this problem. Specifically with respect to the RBG permit addressed in the petition and the new Brightmark permit that is under development, time is of the essence.

Thank you for your attention to this matter.

Keri N. Powell
Of Counsel, Environmental Integrity Project
Powell Environmental Law
315 W. Ponce de Leon Ave., Suite 842
Decatur, GA 30030
(917) 573-8853

SOUTHERN ENVIRONMENTAL LAW CENTER

Ten 10th Street NW, Suite 1050
Atlanta, GA 30309

Telephone 404-521-9900
Facsimile 404-521-9909

January 18, 2022

By Electronic Mail to:

Eric Cornwell, Program Manager
Stationary Source Permitting Program
Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, GA 30354
epdcomments@dnr.ga.gov

RE: Public Comments on Air Permit Application No. 27904 for Brightmark Plastics Facility

Dear Mr. Cornwell,

The Southern Environmental Law Center ("SELC") submits the following comments on Air Permit Application No. 27904 submitted by Brightmark Plastics Renewal Georgia, LLC ("Brightmark") on March 29, 2021. These comments are submitted on behalf of SELC, Environment Georgia, Georgia Clinicians for Climate Action, Georgia Conservation Voters, Georgia Interfaith Power & Light, Middle Georgia Trout Unlimited Chapter 435, Mothers & Others for Clean Air, Save Oaky Woods, Save Our Rivers, Science for Georgia, the Sierra Club Georgia Chapter, and Southface Institute.

Brightmark seeks permission to construct what it describes as the world's largest plastics-to-fuel facility near Macon, Georgia. The facility would take in nearly 850,000 tons per year of plastic waste and, using a process known as pyrolysis, vaporize and condense the waste into diesel fuel and other petroleum products for resale. The process has the potential to emit large volumes of conventional and hazardous air pollutants, including carbon monoxide, nitrogen oxides, and volatile organic compounds. In fact, as the application reveals, the facility's potential emissions are significant enough for it to be considered a major source of air pollution under the Clean Air Act but for Brightmark's willingness to accept synthetic minor limits designed to ensure that its emissions do not exceed the major source thresholds for both criteria and toxic air pollutants. For this reason, it is especially important that the resulting permit impose limits that are both legally and practically enforceable.

Unfortunately, this appears to be yet another instance in which EPD is poised to forego public review and comment on a draft permit, despite considerable public concern regarding this facility.[1]

[1] *See, e.g.*, Christopher Quinn, *Massive Georgia Plant to Turn Plastic into Fuels, Chemicals*, THE ATLANTA-JOURNAL CONSTITUTION, July 12, 2021, https://www.ajc.com/news/massive-georgia-plant-to-turn-plastic-into-fuels-chemicals/BMU4MANAWNDRDANUNRH62CHAAM/; Ashlyn Webb, *Macon-Bibb Industrial Authority Hears*

EPD has proposed only to accept comment on the permit application – which is deficient in multiple critical respects, as detailed further below. The comment period ran from April 8th through May 7th, and is thus now officially closed.

For several reasons, we respectfully urge EPD to consider these comments, even though they arrive outside of EPD's window: (1) growing public concern about this new potential source of air pollution, whose emissions could include numerous toxic air pollutants, which by definition are toxic or carcinogenic even in small quantities; (2) the fact that the application was submitted under dubious claims of confidentiality, which EPD did not formally rule on until after the comment period passed, and which have now apparently been waived, as EPD has since produced the full application pursuant to Georgia's Open Records Act – as a result, the public did not have access to an unredacted version of the application during the comment period but does have such access now; (3) EPD itself requested more information on the application after the public comment period ended, underscoring the lack of sufficient information to permit informed public comment ahead of the deadline; and (4) it appears that the permit application remains under "management review" by EPD, such that EPD still can, and should, take public comment into account, particularly given the application's many deficiencies.

However, we also want to be clear that even if EPD grants consideration of these comments, we do not view the opportunity for public comment on the permit application as a valid substitute for the ability to comment on a proposed draft permit. Hence, before providing detailed comments on the application, our first comment is to urge EPD to release a draft permit for public review and comment.

EPD should issue a draft permit for public review and comment.

Unfortunately, this is yet another instance of EPD's objectionable and unlawful practice of refusing to entertain public comment on a draft permit for a facility requesting synthetic minor source status. As the application reveals, this facility has the potential to emit air pollution well above the Clean Air Act's major source thresholds for both criteria and hazardous air pollutants – for example, 60,783 tons per year of carbon monoxide (CO); 273.7 tons per year of nitrogen oxides (NOx); 52,898 tons per year of volatile organic compounds (VOCs); and 1,533.3 tons per year of total hazardous air pollutants. The facility would achieve status as a "minor" source of air pollution based only on its commitment to comply with supposedly enforceable emission limits as set forth in its permit – i.e., the "synthetic minor" limits. That commitment is only as good as the permit written to embody it. Therefore, it is critical that the public be given the opportunity to review and comment upon the draft permit, and not merely the application, particularly one that is deficient in as many respects as what Brightmark submitted.

---

from Public on Proposed $500 Million in Bonds for Recycling Plant, WMAZ, November 30, 2021, https://www.13wmaz.com/article/news/local/macon-bibb-industrial-authority-hears-from-public-proposed-500-million-in-bonds-for-recycling-plant/93-c7e0f5fd-0f93-40ea-bedf-5567f9ee67f0. On January 7, 2022, the Mayor of Macon-Bibb, Lester M. Miller, withdrew support for the project, citing "the long-term safety concerns of this unproven process that have been raised in the last several weeks." *See* Letter attached as Exhibit 1.

The opportunity to comment on Brightmark's deficient application, while better than nothing, is insufficient. It leaves no opportunity to scrutinize the actual proposed permit conditions that Brightmark would need to comply with to ensure that its emissions remain below major source thresholds. Nor does it include the opportunity to comment on EPD's evaluation of Brightmark's application and the facility's anticipated impact on ambient air quality.

Here, the ability to review and comment upon the proposed draft permit is especially important given the vast gulf between the facility's potential to emit various air pollutants and the limits it promises to achieve to avoid major source status. For example, Brightmark promises to achieve actual VOC emissions of just 36.2 tons per year, compared to a potential to emit of 60,783 tons per year – an assumed 99.9% emission control efficiency. Similarly, Brightmark promises to achieve a 99.5% reduction in total hazardous air pollutants (HAP), which includes individual HAP emission reductions of 99.6% for benzene, a known human carcinogen. Further, the individual HAP limits requested by the facility (9.9 tons per year) tread perilously close to the major source threshold for individual HAP emissions of 10 tons year. Given the extremely narrow margin between estimated controlled emissions and the major source threshold, it is vital that the facility's permit be written in a way that is enforceable and that requires adequate monitoring, recordkeeping, and reporting sufficient to document ongoing compliance with the requested limits.

As we have stated before in similar contexts, EPD's refusal to provide an opportunity for public comment on draft synthetic minor permits violates the public participation requirements in Georgia's approved State Implementation Plan (SIP). Specifically, under Georgia's EPA-approved regulations, a limit taken by a source to reduce its potential to emit to below a major source threshold (thereby making it a "synthetic minor" source) will only be effective if "the limitation or effect it would have on emissions is federally enforceable." Georgia SIP Rule 391-3-1-.01(ddd) (approved at 60 Fed. Reg. 12,668, Mar. 8, 1995) (defining "potential to emit"). Likewise, Georgia's SIP defines "Synthetic Minor Permit" to mean a permit "which imposes federally enforceable limits to restrict potential emissions. *Id.* (cccc). In accordance with Georgia SIP Rule 391-3-1-.03, subsections (2)(i) and 12(c), prior to the issuance of any federally enforceable operating permit, EPA and the public will be notified and given a chance for public comment on the draft permit.

In proposing to deny such opportunity for comment, EPD is presumably relying on revisions to its regulations that now define "potential to emit" in a way that eliminates the requirement that a synthetic minor limit be "federally enforceable." The revised regulation instead allows such limits to be merely "legally and practically enforceable."[2] Likewise, Georgia's current regulatory definition of "synthetic minor permit" allows a synthetic minor limit to be either "federally enforceable or enforceable as a practical matter."[3] These revisions, however, have yet to garner EPA's approval. Unless and until EPA approves a revision to Georgia's SIP, the prior SIP-

[2] Ga. Rules and Regulations, Rule 391-3-1-.01(ddd) (defining "potential to emit").
[3] Ga. Rules and Regulations, Rule 391-3-1-.01(cccc) (defining "synthetic minor permit").

approved rules remain enforceable and continue to govern the state's administration of Clean Air Act requirements.[4]

In July of last year, EPA released the results of an audit conducted to determine whether EPA was providing sufficient oversight to assure that synthetic-minor sources of air emissions were complying with the limits in their air permits.[5] EPA found a large number of instances in which state-issued synthetic-minor source permits lacked sufficient information in the permit or supporting documentation to determine whether the limits were technically accurate.[6] In a number of instances, the permit failed to specify the method for assessing compliance or lacked sufficient monitoring requirements to determine whether the facility's assumed pollution reduction from pollutant control devices was being achieved.[7] Elaborating on the significance of these findings, EPA noted:

> It is important to ensure that the limitations in synthetic-minor-source permits are clear and enforceable and that synthetic-minor sources comply with these limitations. If a synthetic-minor-source permit did not have permit limitations, the facility would be considered a major source and subject to the more stringent requirements of the major-source permitting programs. Although these facilities are not major sources, they may still be significant emitters of regulated pollutants.[8]

The audit recommended that EPA develop and issue new guidance setting forth its expectations for synthetic-minor source permitting and that EPA take steps to ensure that all states adhere to public participation requirements for synthetic-minor permits.[9]

Accordingly, while our remaining comments do suggest compliance assurance requirements that should be included in Brightmark's permit, EPD should not consider these comments a substitute for an opportunity to comment on a draft permit. An opportunity to comment only on the application materials provided by Brightmark does not satisfy the federal regulations governing state minor New Source Review programs, which require an opportunity for public comment on "the agency's analysis of the effect of construction or modification on ambient air quality, including the agency's approval or disapproval."[10] Were EPD to provide an opportunity to comment on the draft permit, we would be able to submit much more detailed and precise

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[4] 40 C.F.R. § 51.105 ("Revisions of a plan, or any portions thereof, will not be considered part of an applicable plan until such revisions have been approved by the Administrator in accordance with this part."). *See also, e.g., General Motors v. U.S.*, 496 U.S. 530, 540 (1990) ("There can be little or no doubt that the existing SIP remains the "applicable implementation plan" even after the State has submitted a proposed revision.").

[5] *See* https://www.epa.gov/system/files/documents/2021-07/_epaoig_20210708-21-p-0175.pdf.

[6] *Id.* at .pdf page 3.

[7] *Id.*

[8] *Id.* at p. 3 (main report) or pdf p. 9

[9] *Id.* at pdf 3. The audit examined natural gas extraction synthetic-minor source permits from Colorado and Oklahoma. Like Georgia, Oklahoma apparently "does not allow the public to participate in its permitting process for certain synthetic-minor source permits, as required by EPA regulations." *Id.*

[10] 40 CFR § 51.161(a).

comments on EPD's selected compliance assurance approach. We therefore respectfully urge EPD to afford us that opportunity.

Comments on Brightmark Permit Application

In preparing the following comments on Brightmark's air permit application, we were assisted by Ranajit Sahu, Ph.D. Dr. Sahu has over thirty years of experience in the fields of environmental, mechanical, and chemical engineering, including design and specification of pollution control equipment for a wide range of emissions sources; multimedia permitting (including air quality NSR/PSD permitting, Title V permitting, NPDES permitting for industrial and storm water discharges, RCRA permitting, etc.); multimedia/multi- pathway human health risk assessments for toxics; air dispersion modeling; and regulatory strategy development and support including negotiation of consent agreements and orders. A copy of Dr. Sahu's curriculum vitae is attached as Exhibit 2.

General Comments

Dr. Sahu has reviewed well over 500 air permits and air permit applications in all 50 states over the course of his career as an environmental and air pollution consultant and expert. Dr. Sahu considers the Brightmark application as well within the bottom quartile or even lowest decile of all applications he has reviewed and commented on. He found significant issues including, in multiple instances, the use of unsupported assumptions and inconsistencies. He cautions that any permit issued using this application as its basis and without significant enforceable permit conditions is likely to be equally deficient.

The application requests the plant be treated as a "synthetic minor" for numerous pollutants including particulate matter (PM)/PM_{10}/$PM_{2.5}$ (30 tons per year); VOCs (32 tons per year); NOx (42 tons per year); CO (37 tons per year); total HAPs (10 tons per year); and individual HAPs (9.9 tons per year).[11] Since the potential to emit (PTE) for these pollutants (except for the PM/PM_{10}/$PM_{2.5}$) are much higher than the corresponding major source thresholds, it is imperative that every contributing source of each of these pollutants be tested and verified for continuous compliance. That is the only way to ensure that the facility is truly a synthetic minor source. In addition, since testing may not be feasible during periods of startup, shutdown and malfunctions, and testing is not possible for sources such as elevated flares, significant additional details must be provided to show how, given these constraints, this facility can reasonably be assured to be a synthetic minor source of all these pollutants.

At a minimum, EPD must ensure that the proposed air permit for Brightmark contains conditions and requirements that:

[11] Application pdf p. 11.

(i) verify each process and emissions assumption including all emission factors and methods used in the application – preferably using continuous emissions monitors (CEMS) to the greatest extent possible or, at least frequent stack tests until such tests show robust compliance with the assumption in question;

(ii) provide for recordkeeping of all inputs used in all emissions calculations. These records should be made publicly available using a non-password protected website – thus fulfilling reporting requirements in a transparent manner; and

(iii) ensure ambient monitoring for critical pollutants for a reasonable period of time (e.g., 5 years) demonstrating no adverse health impacts from the facility under all operating conditions – especially startup, shutdown, malfunction, breakdown situations, which have not been fully characterized in the application, thus understating the emissions and their impacts (including health impacts) from the facility.

Specific Comments

Open-flame stack flares as pollution control devices. The facility includes two open-flame stack flares,[12] which have simply been assumed to provide very high levels of destruction efficiency for VOCs, including hazardous VOCs. Since these types of flares cannot be tested, EPD should require that their design be changed to enclosed flares (which can be tested) or require significant fenceline and open-path monitoring of these flares.

Because open flame flares are subject to invariable and fluctuating ambient conditions such as cross-winds and rain, they cannot ensure flame stability and, thus, are not properly considered air pollution control devices. Any VOC destruction in such flares is incidental and unpredictable and is certainly not assured to be 99% on a continuous basis,[13] as Brightmark assumes. The only monitoring proposed for the flares is the flow of gases to them[14] – which provides no information whatsoever about their composition nor the actual destruction efficiency of the flares.

In addition, such flares, like all combustion systems, create numerous so-called "products of incomplete combustion" (PICs), many of which are as hazardous or even more hazardous than the VOCs they purport to destroy. The permit application fails to account for any PICs from the flares.

The design capacity of the two flares is also misleading.[15] They are each noted to be 1.22 MMBtu/hr. However, this is likely only for the pilot burners and not the actual design capacity of each flare because the stated purpose of the flares is to quickly and safely dispose of a large quantity of combustible gas, such as during "emergencies."

[12] Application pdf p. 12.
[13] Application pdf p. 20.
[14] Application pdf p. 27.
[15] Application pdf p. 13. Form 2.01.

The velocity, temperatures, and flow rates provided for the flares are also perplexing and unsupported.[16] The velocity is noted to be 0.02 ft/second or 1.2 ft/minute, which is very low for any combustion device. The temperature is noted as a wide range, 300-2300 F. Clearly, it cannot be 300 F, which is far too low for a combustion device and not consistent with the assumed destruction efficiency of 99%. Finally, the flow rate is noted to be 2 acfm, which is simply not credible for any flaring.

Problems with reports of potential to emit versus actual emissions. The permit application states that the potential to emit (PTE) and the actual emissions for filterable PM, PM_{10}, $PM_{2.5}$ and sulfur dioxide (SO_2) are identical.[17] This is highly unlikely and a sign that the PTE for these pollutants is underestimated.

In contrast, the application shows that actual emissions of total hazardous air pollutants (HAPs), including specific air toxics like benzene, ethylbenzene, toluene, xylenes, 1,3 butadiene, and hexane are all dramatically lower than their respective PTEs.[18] This is simply a consequence of Brightmark's assumption that the underlying control or destruction efficiencies are very high. This reinforces our earlier point about the need to ensure that such assumptions are made verifiable and enforceable in the permit – via continuous monitoring and/or frequent testing.

Invalid assumptions regarding "non-condensable (NC) gas." The application states that NC gas will be used as fuel at various fuel-burning units such as the dryers, hot oil units, pyrolizers, fractionator heater, hydrotreater heater and reformer.[19] Curiously, the use of this NC gas is not shown in the Fuel Data form in the application.[20] Its composition is shown elsewhere in the application.[21] The methane content is 2.4%. It has substantial carbon monoxide (38.7%) and nitrogen (4.0%). This is very different from natural gas, which typically has a methane content of over 90% and little carbon monoxide or nitrogen. Yet, in spite of these very different compositions, the emissions calculations treat natural gas and NC gas as the same, using the same emission factors for both.[22] This has no basis whatsoever, and therefore all instances where the NC gas emissions (including criteria pollutants and HAPs) are treated the same as natural gas have no validity or support.

Lack of vendor data for most pollution control equipment. The application does not contain actual vendor data for most of the equipment, and specifically the air pollution control equipment.[23] Brightmark instead furnishes mere "specifications," which will presumably be the basis for procuring such controls. This includes specifications for the storage tanks (Attachment C); the SCR units for NOx control (Attachment D); the direct-fired oxidizer (Attachment E); and

[16] Application pdf p. 30.
[17] Application pdf p. 8.
[18] *Id.*
[19] Application pdf p. 9.
[20] Application pdf p. 14.
[21] Application pdf p. 46.
[22] Application pdf, p. 42, 43, 44, 45.
[23] Application pdf p. 18. Form 3.00.

the flare (Attachment F).[24] None of these specifications can be assumed to be vendor guarantees. Vendors may or may not be able to meet the specifications and, in any case, will likely impose constraints on the performance of their equipment as opposed to providing unlimited and unconditional guarantees of the sort that have been used in the emissions calculations. This is yet another reason that the permit should contain firm, enforceable verification conditions, as discussed above.

Problems related to Organic Compound Storage Tanks. Form 2.02 lists the various storage tanks and the materials that will be stored in these tanks along with their vapor pressures and type of tank.[25] Typically, higher vapor pressure liquids are stored in internal floating roof tanks. They are stored in fixed roof tanks only if the tanks are vented to a control device. Here, however, the table shows that higher vapor pressure liquids will be stored in fixed roof tanks (such as RRT-1 and WEF-1) and not in internal floating roof tanks, and there is no indication that the fixed tanks will be vented to a control device. This is true even of the substance with the highest vapor pressure – methyl ethyl ketone (MEK) – which would be stored in a 10,000-gallon tank (MEK-1).[26]

Improper reliance on AP-42 Emissions Factors. Emissions calculations and air pollution quantification in the application rely heavily on EPA's AP-42 compilation document.[27] This is problematic because EPA has explicitly warned – via an enforcement alert promulgated in November 2019 during the prior administration – that AP-42 should not be used in permitting.[28] The use of AP-42 is problematic because of the very poor ratings of most of the factors in AP-42. Even when they are better rated, AP-42 emission factors do not reflect maximum or potential emissions – by design they are average emission factors. Thus, any use of AP-42 to estimate PTE emissions, as had been repeatedly done in this application, is simply wrong and contrary to EPA's recent guidance. Brightmark's extensive reliance on AP-42 emission factors increases the likelihood that it will operate the facility without sufficient pollution control equipment, exposing itself to enforcement liability, while exposing surrounding communities to unlawful and unhealthy levels of air pollution.

Similarly, the use of *average* fugitive emission factors from Table 2-3, Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, November 1995, as has been used for estimating the PTE for fugitives,[29] is also wrong because using average emission factors can only underestimate the PTE.

For these reasons, EPD should require Brightmark to obtain and use the most representative emissions data, including source-specific data. Brightmark may already have such data from the operation of its similar (though much smaller) facility in Indiana. Any permit issued by EPD for

[24] Application pdf, p. 9-10.
[25] Application pdf p. 15.
[26] Application pdf p. 16.
[27] Application pdf p. 19-20, 22-26. *See also* references to AP-42 in many of the emission calculations provided in Attachment A.
[28] *See* https://www.epa.gov/compliance/epa-reminder-about-inappropriate-use-ap-42-emission-factors.
[29] Application pdf p. 26, 49.

the proposed Macon facility should require the use of a Continuous Emissions Monitoring System (CEMS) to quantify emissions and ensure continuous compliance.

Unexplained "scrubber" reference and lack of facility-specific flow diagram. The application states that for the SCRs, monitoring will be conducted for pH and "pressure drop across scrubber."[30] It is not clear what the "scrubber" refers to since there is no mention of such scrubbers anywhere else in the application other than in the flow diagram.[31] And the flow diagram is itself suspect. Unlike the site plan that appears on the immediately preceding page, the flow diagram refers not to the planned facility at 6979 Cochran Field Road in Macon, Georgia, but to Brightmark's facility in Ashley, Indiana. The flow diagram is also dated May 2020, whereas the site plan is dated March 2021. It is incumbent upon the applicant to provide a flow diagram for the actual facility it is seeking to permit, particularly given reports that the Georgia facility would be four times larger than the Indiana one.[32] Further, if the Georgia facility is to include a scrubber, the application should clearly indicate and discuss its intended purpose.

Lack of supporting evidence for assumed control efficiency of loading rack controls. The application states that the "overall capture/control efficiency" of the loading rack controls (direct-fired oxidizer, DFO) is 98.6%.[33] However, there is no supporting evidence or discussion of either the "capture" (98.7%)[34] or "control" (99.9%)[35] contributions that make up this 98.6% assumption. Similarly, the assumed 85% "control efficiency" for HAPs from the loading racks is also unsupported.[36]

Inadequate toxicity data. Form 7.00[37] shows toxicity data for several (but clearly not all) HAPs that will be emitted. For example, there is no discussion of flare PICs or even the highly volatile MEK that is to be stored in the 10,000-gallon tank. In addition, this Form shows OSHA STELs and OSHA CLs as the basis for the toxicity data shown. In it unclear why Brightmark considers such OSHA data to be relevant and sufficient given that the emissions of these (and other) HAPs will cause *public* (and not simply worker) exposures. Brightmark should be looking to applicable EPA standards instead of merely OSHA standards.

The application contains some comparisons to GA Minimum Emissions Rates (MERs) for selected HAPs.[38] However, these results are meaningless given Brightmark's use of AP-42 as the basis for its emission estimates. Because reliance on AP-42 likely understates emissions, and because Brightmark has otherwise made unsupported assumptions for pollution control efficiency, the

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[30] Application pdf p. 27.
[31] Application pdf p. 35.
[32] *See* Christopher Quinn, *Massive Georgia Plant to Turn Plastic into Fuels, Chemicals*, The Atlanta-Journal Constitution, July 12, 2021, https://www.ajc.com/news/massive-georgia-plant-to-turn-plastic-into-fuels-chemicals/BMU4MANAWNDRDANUNRH62CHAAM/.
[33] Application pdf p. 20, 29, 51.
[34] Application pdf p. 51.
[35] *Id.*
[36] Application pdf p. 52.
[37] Application pdf p. 32.
[38] Application pdf p. 57.

"pounds per year controlled concentrations" column does not contain reliable numbers for comparison against the MERs.

Conclusion

In closing, we respectfully urge EPD to consider these comments even though they come outside the window EPD provided for comment on the application. However, unless the application is withdrawn by Brightmark, we also urge that EPD issue a draft permit for public comment given the growing public concern about the proposed facility. We ask EPD to ensure that any permit issued for the construction of this facility contain conditions and requirements that ensure the facility will truly operate as a minor source of air pollution and that protect the health and safety of nearby residents.

Respectfully submitted,

Nicha Rakpanichmanee
Associate Attorney
Southern Environmental Law Center

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Stephen Adams, sadams@mbcia.com
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Exhibit 1

LESTER M. MILLER
MAYOR

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Macon-Bibb County

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MACON, GEORGIA 31202-0247
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January 7, 2022

Macon-Bibb County Industrial Authority
ATTN: Robby Fountain
439 Mulberry Street
Macon, GA 31201

RE: Brightmark

Dear Mr. Fountain,

As Mayor of Macon-Bibb, I am tasked with balancing the benefit of economic development with the health and safety concerns of the people we serve.

After careful consideration of the proposed Brightmark project, I believe it is in the best interest of the people of Macon-Bibb County that we withdraw our support.

While we should and will continue to support green energy, economic development, and technical jobs, we cannot ignore the long-term safety concerns of this unproven process that have been raised in the last several weeks.

Sincerely,

Lester M. Miller,
Mayor, Macon-Bibb County

Exhibit 2

RANAJIT (RON) SAHU, Ph.D, QEP, CEM (Nevada)

CONSULTANT, ENVIRONMENTAL AND ENERGY ISSUES

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Alhambra, CA 91801
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EXPERIENCE SUMMARY

Dr. Sahu has over thirty one years of experience in the fields of environmental, mechanical, and chemical engineering including: program and project management services; design and specification of pollution control equipment for a wide range of emissions sources including stationary and mobile sources; soils and groundwater remediation including landfills as remedy; combustion engineering evaluations; energy studies; multimedia environmental regulatory compliance (involving statutes and regulations such as the Federal CAA and its Amendments, Clean Water Act, TSCA, RCRA, CERCLA, SARA, OSHA, NEPA as well as various related state statutes); transportation air quality impact analysis; multimedia compliance audits; multimedia permitting (including air quality NSR/PSD permitting, Title V permitting, NPDES permitting for industrial and storm water discharges, RCRA permitting, etc.), multimedia/multi-pathway human health risk assessments for toxics; air dispersion modeling; and regulatory strategy development and support including negotiation of consent agreements and orders.

He has over twenty eight years of project management experience and has successfully managed and executed numerous projects in this time period. This includes basic and applied research projects, design projects, regulatory compliance projects, permitting projects, energy studies, risk assessment projects, and projects involving the communication of environmental data and information to the public.

He has provided consulting services to numerous private sector, public sector and public interest group clients. His major clients over the past twenty six years include various trade associations as well as individual companies such as steel mills, petroleum refineries, chemical plants, cement manufacturers, aerospace companies, power generation facilities, lawn and garden equipment manufacturers, spa manufacturers, chemical distribution facilities, land development companies, and various entities in the public sector including EPA, the US Dept. of Justice, several states (including Oregon, New Mexico, Pennsylvania, and others), various agencies such as the California DTSC, and various municipalities. Dr. Sahu has performed projects in all 50 states, numerous local jurisdictions and internationally.

In addition to consulting, for approximately twenty years, Dr. Sahu taught numerous courses in several Southern California universities including UCLA (air pollution), UC Riverside (air pollution, process hazard analysis), and Loyola Marymount University (air pollution, risk assessment, hazardous waste management). He also taught at Caltech, his alma mater (various engineering courses), at the University of Southern California (air pollution controls) and at California State University, Fullerton (transportation and air quality).

Dr. Sahu has and continues to provide expert witness services in a number of environmental areas discussed above in both state and Federal courts as well as before administrative bodies (please see Annex A).

EXPERIENCE RECORD

2000-present **Independent Consultant.** Providing a variety of private sector (industrial companies, land development companies, law firms, etc.), public sector (such as the US Department of Justice), and public interest group clients with project management, environmental

consulting, project management, as well as regulatory and engineering support consulting services.

1995-2000 Parsons ES, **Associate, Senior Project Manager and Department Manager for** Air Quality/Geosciences/Hazardous Waste Groups, Pasadena. Responsible for the management of a group of approximately 24 air quality and environmental professionals, 15 geoscience, and 10 hazardous waste professionals providing full-service consulting, project management, regulatory compliance and A/E design assistance in all areas.

Parsons ES, **Manager for Air Source Testing Services**. Responsible for the management of 8 individuals in the area of air source testing and air regulatory permitting projects located in Bakersfield, California.

1992-1995 Engineering-Science, Inc. **Principal Engineer and Senior Project Manager** in the air quality department. Responsibilities included multimedia regulatory compliance and permitting (including hazardous and nuclear materials), air pollution engineering (emissions from stationary and mobile sources, control of criteria and air toxics, dispersion modeling, risk assessment, visibility analysis, odor analysis), supervisory functions and project management.

1990-1992 Engineering-Science, Inc. **Principal Engineer and Project Manager** in the air quality department. Responsibilities included permitting, tracking regulatory issues, technical analysis, and supervisory functions on numerous air, water, and hazardous waste projects. Responsibilities also include client and agency interfacing, project cost and schedule control, and reporting to internal and external upper management regarding project status.

1989-1990 Kinetics Technology International, Corp. **Development Engineer.** Involved in thermal engineering R&D and project work related to low-NOx ceramic radiant burners, fired heater NOx reduction, SCR design, and fired heater retrofitting.

1988-1989 Heat Transfer Research, Inc. **Research Engineer**. Involved in the design of fired heaters, heat exchangers, air coolers, and other non-fired equipment. Also did research in the area of heat exchanger tube vibrations.

EDUCATION

1984-1988 Ph.D., Mechanical Engineering, California Institute of Technology (Caltech), Pasadena, CA.

1984 M. S., Mechanical Engineering, California Institute of Technology (Caltech), Pasadena, CA.

1978-1983 B. Tech (Honors), Mechanical Engineering, Indian Institute of Technology (IIT) Kharagpur, India

TEACHING EXPERIENCE

Caltech

"Thermodynamics," Teaching Assistant, California Institute of Technology, 1983, 1987.

"Air Pollution Control," Teaching Assistant, California Institute of Technology, 1985.

"Caltech Secondary and High School Saturday Program," - taught various mathematics (algebra through calculus) and science (physics and chemistry) courses to high school students, 1983-1989.

"Heat Transfer," - taught this course in the Fall and Winter terms of 1994-1995 in the Division of Engineering and Applied Science.

"Thermodynamics and Heat Transfer," Fall and Winter Terms of 1996-1997.

U.C. Riverside, Extension

"Toxic and Hazardous Air Contaminants," University of California Extension Program, Riverside, California. Various years since 1992.

"Prevention and Management of Accidental Air Emissions," University of California Extension Program, Riverside, California. Various years since 1992.

"Air Pollution Control Systems and Strategies," University of California Extension Program, Riverside, California, Summer 1992-93, Summer 1993-1994.

"Air Pollution Calculations," University of California Extension Program, Riverside, California, Fall 1993-94, Winter 1993-94, Fall 1994-95.

"Process Safety Management," University of California Extension Program, Riverside, California. Various years since 1992-2010.

"Process Safety Management," University of California Extension Program, Riverside, California, at SCAQMD, Spring 1993-94.

"Advanced Hazard Analysis - A Special Course for LEPCs," University of California Extension Program, Riverside, California, taught at San Diego, California, Spring 1993-1994.

"Advanced Hazardous Waste Management" University of California Extension Program, Riverside, California. 2005.

Loyola Marymount University

"Fundamentals of Air Pollution - Regulations, Controls and Engineering," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1993.

"Air Pollution Control," Loyola Marymount University, Dept. of Civil Engineering, Fall 1994.

"Environmental Risk Assessment," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1998.

"Hazardous Waste Remediation" Loyola Marymount University, Dept. of Civil Engineering. Various years since 2006.

University of Southern California

"Air Pollution Controls," University of Southern California, Dept. of Civil Engineering, Fall 1993, Fall 1994.

"Air Pollution Fundamentals," University of Southern California, Dept. of Civil Engineering, Winter 1994.

University of California, Los Angeles

"Air Pollution Fundamentals," University of California, Los Angeles, Dept. of Civil and Environmental Engineering, Spring 1994, Spring 1999, Spring 2000, Spring 2003, Spring 2006, Spring 2007, Spring 2008, Spring 2009.

International Programs

"Environmental Planning and Management," 5 week program for visiting Chinese delegation, 1994.

"Environmental Planning and Management," 1 day program for visiting Russian delegation, 1995.

"Air Pollution Planning and Management," IEP, UCR, Spring 1996.

"Environmental Issues and Air Pollution," IEP, UCR, October 1996.

PROFESSIONAL AFFILIATIONS AND HONORS

President of India Gold Medal, IIT Kharagpur, India, 1983.

Member of the Alternatives Assessment Committee of the Grand Canyon Visibility Transport Commission, established by the Clean Air Act Amendments of 1990, 1992.

American Society of Mechanical Engineers: Los Angeles Section Executive Committee, Heat Transfer Division, and Fuels and Combustion Technology Division, 1987-mid-1990s.

Air and Waste Management Association, West Coast Section, 1989-mid-2000s.

PROFESSIONAL CERTIFICATIONS

EIT, California (#XE088305), 1993.

REA I, California (#07438), 2000.

Certified Permitting Professional, South Coast AQMD (#C8320), since 1993.

QEP, Institute of Professional Environmental Practice, since 2000.

CEM, State of Nevada (#EM-1699). Expiration 10/07/2021.

PUBLICATIONS (PARTIAL LIST)

"Physical Properties and Oxidation Rates of Chars from Bituminous Coals," with Y.A. Levendis, R.C. Flagan and G.R. Gavalas, *Fuel*, **67**, 275-283 (1988).

"Char Combustion: Measurement and Analysis of Particle Temperature Histories," with R.C. Flagan, G.R. Gavalas and P.S. Northrop, *Comb. Sci. Tech.* **60**, 215-230 (1988).

"On the Combustion of Bituminous Coal Chars," PhD Thesis, California Institute of Technology (1988).

"Optical Pyrometry: A Powerful Tool for Coal Combustion Diagnostics," *J. Coal Quality*, **8**, 17-22 (1989).

"Post-Ignition Transients in the Combustion of Single Char Particles," with Y.A. Levendis, R.C. Flagan and G.R. Gavalas, *Fuel*, **68**, 849-855 (1989).

"A Model for Single Particle Combustion of Bituminous Coal Char." Proc. ASME National Heat Transfer Conference, Philadelphia, **HTD-Vol. 106**, 505-513 (1989).

"Discrete Simulation of Cenospheric Coal-Char Combustion," with R.C. Flagan and G.R. Gavalas, *Combust. Flame*, **77**, 337-346 (1989).

"Particle Measurements in Coal Combustion," with R.C. Flagan, in "**Combustion Measurements**" (ed. N. Chigier), Hemisphere Publishing Corp. (1991).

"Cross Linking in Pore Structures and Its Effect on Reactivity," with G.R. Gavalas in preparation.

"Natural Frequencies and Mode Shapes of Straight Tubes," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Optimal Tube Layouts for Kamui SL-Series Exchangers," with K. Ishihara, Proprietary Report for Kamui Company Limited, Tokyo, Japan (1990).

"HTRI Process Heater Conceptual Design," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Asymptotic Theory of Transonic Wind Tunnel Wall Interference," with N.D. Malmuth and others, Arnold Engineering Development Center, Air Force Systems Command, USAF (1990).

"Gas Radiation in a Fired Heater Convection Section," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1990).

"Heat Transfer and Pressure Drop in NTIW Heat Exchangers," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1991).

"NOx Control and Thermal Design," Thermal Engineering Tech Briefs, (1994).

"From Purchase of Landmark Environmental Insurance to Remediation: Case Study in Henderson, Nevada," with Robin E. Bain and Jill Quillin, presented at the AQMA Annual Meeting, Florida, 2001.

"The Jones Act Contribution to Global Warming, Acid Rain and Toxic Air Contaminants," with Charles W. Botsford, presented at the AQMA Annual Meeting, Florida, 2001.

PRESENTATIONS (PARTIAL LIST)

"Pore Structure and Combustion Kinetics - Interpretation of Single Particle Temperature-Time Histories," with P.S. Northrop, R.C. Flagan and G.R. Gavalas, presented at the AIChE Annual Meeting, New York (1987).

"Measurement of Temperature-Time Histories of Burning Single Coal Char Particles," with R.C. Flagan, presented at the American Flame Research Committee Fall International Symposium, Pittsburgh, (1988).

"Physical Characterization of a Cenospheric Coal Char Burned at High Temperatures," with R.C. Flagan and G.R. Gavalas, presented at the Fall Meeting of the Western States Section of the Combustion Institute, Laguna Beach, California (1988).

"Control of Nitrogen Oxide Emissions in Gas Fired Heaters - The Retrofit Experience," with G. P. Croce and R. Patel, presented at the International Conference on Environmental Control of Combustion Processes (Jointly sponsored by the American Flame Research Committee and the Japan Flame Research Committee), Honolulu, Hawaii (1991).

"Air Toxics - Past, Present and the Future," presented at the Joint AIChE/AAEE Breakfast Meeting at the AIChE 1991 Annual Meeting, Los Angeles, California, November 17-22 (1991).

"Air Toxics Emissions and Risk Impacts from Automobiles Using Reformulated Gasolines," presented at the Third Annual Current Issues in Air Toxics Conference, Sacramento, California, November 9-10 (1992).

"Air Toxics from Mobile Sources," presented at the Environmental Health Sciences (ESE) Seminar Series, UCLA, Los Angeles, California, November 12, (1992).

"Kilns, Ovens, and Dryers - Present and Future," presented at the Gas Company Air Quality Permit Assistance Seminar, Industry Hills Sheraton, California, November 20, (1992).

"The Design and Implementation of Vehicle Scrapping Programs," presented at the 86th Annual Meeting of the Air and Waste Management Association, Denver, Colorado, June 12, 1993.

"Air Quality Planning and Control in Beijing, China," presented at the 87th Annual Meeting of the Air and Waste Management Association, Cincinnati, Ohio, June 19-24, 1994.

Annex A

Expert Litigation Support

A. Occasions where Dr. Sahu has provided Written or Oral testimony before Congress:

1. In July 2012, provided expert written and oral testimony to the House Subcommittee on Energy and the Environment, Committee on Science, Space, and Technology at a Hearing entitled "Hitting the Ethanol Blend Wall – Examining the Science on E15."

B. Matters for which Dr. Sahu has provided affidavits and expert reports include:

2. Affidavit for Rocky Mountain Steel Mills, Inc. located in Pueblo Colorado – dealing with the technical uncertainties associated with night-time opacity measurements in general and at this steel mini-mill.
3. Expert reports and depositions (2/28/2002 and 3/1/2002; 12/2/2003 and 12/3/2003; 5/24/2004) on behalf of the United States in connection with the Ohio Edison NSR Cases. *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).
4. Expert reports and depositions (5/23/2002 and 5/24/2002) on behalf of the United States in connection with the Illinois Power NSR Case. *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).
5. Expert reports and depositions (11/25/2002 and 11/26/2002) on behalf of the United States in connection with the Duke Power NSR Case. *United States, et al. v. Duke Energy Corp.*, 1:00-CV-1262 (Middle District of North Carolina).
6. Expert reports and depositions (10/6/2004 and 10/7/2004; 7/10/2006) on behalf of the United States in connection with the American Electric Power NSR Cases. *United States, et al. v. American Electric Power Service Corp., et al.*, C2-99-1182, C2-99-1250 (Southern District of Ohio).
7. Affidavit (March 2005) on behalf of the Minnesota Center for Environmental Advocacy and others in the matter of the Application of Heron Lake BioEnergy LLC to construct and operate an ethanol production facility – submitted to the Minnesota Pollution Control Agency.
8. Expert Report and Deposition (10/31/2005 and 11/1/2005) on behalf of the United States in connection with the East Kentucky Power Cooperative NSR Case. *United States v. East Kentucky Power Cooperative, Inc.*, 5:04-cv-00034-KSF (Eastern District of Kentucky).
9. Affidavits and deposition on behalf of Basic Management Inc. (BMI) Companies in connection with the BMI vs. USA remediation cost recovery Case.
10. Expert Report on behalf of Penn Future and others in the Cambria Coke plant permit challenge in Pennsylvania.
11. Expert Report on behalf of the Appalachian Center for the Economy and the Environment and others in the Western Greenbrier permit challenge in West Virginia.
12. Expert Report, deposition (via telephone on January 26, 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women's Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) in the Thompson River Cogeneration LLC Permit No. 3175-04 challenge.
13. Expert Report and deposition (2/2/07) on behalf of the Texas Clean Air Cities Coalition at the Texas State Office of Administrative Hearings (SOAH) in the matter of the permit challenges to TXU Project Apollo's eight new proposed PRB-fired PC boilers located at seven TX sites.

14. Expert Testimony (July 2007) on behalf of the Izaak Walton League of America and others in connection with the acquisition of power by Xcel Energy from the proposed Gascoyne Power Plant – at the State of Minnesota, Office of Administrative Hearings for the Minnesota PUC (MPUC No. E002/CN-06-1518; OAH No. 12-2500-17857-2).

15. Affidavit (July 2007) Comments on the Big Cajun I Draft Permit on behalf of the Sierra Club – submitted to the Louisiana DEQ.

16. Expert Report and Deposition (12/13/2007) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case. *Plaintiffs v. Allegheny Energy Inc., et al.,* 2:05cv0885 (Western District of Pennsylvania).

17. Expert Reports and Pre-filed Testimony before the Utah Air Quality Board on behalf of Sierra Club in the Sevier Power Plant permit challenge.

18. Expert Report and Deposition (October 2007) on behalf of MTD Products Inc., in connection with *General Power Products, LLC v MTD Products Inc.*, 1:06 CVA 0143 (Southern District of Ohio, Western Division) .

19. Expert Report and Deposition (June 2008) on behalf of Sierra Club and others in the matter of permit challenges (Title V: 28.0801-29 and PSD: 28.0803-PSD) for the Big Stone II unit, proposed to be located near Milbank, South Dakota.

20. Expert Reports, Affidavit, and Deposition (August 15, 2008) on behalf of Earthjustice in the matter of air permit challenge (CT-4631) for the Basin Electric Dry Fork station, under construction near Gillette, Wyoming before the Environmental Quality Council of the State of Wyoming.

21. Affidavits (May 2010/June 2010 in the Office of Administrative Hearings))/Declaration and Expert Report (November 2009 in the Office of Administrative Hearings) on behalf of NRDC and the Southern Environmental Law Center in the matter of the air permit challenge for Duke Cliffside Unit 6. Office of Administrative Hearing Matters 08 EHR 0771, 0835 and 0836 and 09 HER 3102, 3174, and 3176 (consolidated).

22. Declaration (August 2008), Expert Report (January 2009), and Declaration (May 2009) on behalf of Southern Alliance for Clean Energy in the matter of the air permit challenge for Duke Cliffside Unit 6. *Southern Alliance for Clean Energy et al., v. Duke Energy Carolinas, LLC*, Case No. 1:08-cv-00318-LHT-DLH (Western District of North Carolina, Asheville Division).

23. Declaration (August 2008) on behalf of the Sierra Club in the matter of Dominion Wise County plant MACT.us

24. Expert Report (June 2008) on behalf of Sierra Club for the Green Energy Resource Recovery Project, MACT Analysis.

25. Expert Report (February 2009) on behalf of Sierra Club and the Environmental Integrity Project in the matter of the air permit challenge for NRG Limestone's proposed Unit 3 in Texas.

26. Expert Report (June 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al.*

27. Expert Report (August 2009) on behalf of Sierra Club and the Southern Environmental Law Center in the matter of the air permit challenge for Santee Cooper's proposed Pee Dee plant in South Carolina).

28. Statements (May 2008 and September 2009) on behalf of the Minnesota Center for Environmental Advocacy to the Minnesota Pollution Control Agency in the matter of the Minnesota Haze State Implementation Plans.

29. Expert Report (August 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

30. Expert Report and Rebuttal Report (September 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.

31. Expert Report (December 2009) and Rebuttal reports (May 2010 and June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).

32. Pre-filed Testimony (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

33. Pre-filed Testimony (July 2010) and Written Rebuttal Testimony (August 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions,* No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.

34. Expert Report (August 2010) and Rebuttal Expert Report (October 2010) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Liability Phase.

35. Declaration (August 2010), Reply Declaration (November 2010), Expert Report (April 2011), Supplemental and Rebuttal Expert Report (July 2011) on behalf of the United States in the matter of DTE Energy Company and Detroit Edison Company (Monroe Unit 2). *United States of America v. DTE Energy Company and Detroit Edison Company*, Civil Action No. 2:10-cv-13101-BAF-RSW (Eastern District of Michigan).

36. Expert Report and Deposition (August 2010) as well as Affidavit (September 2010) on behalf of Kentucky Waterways Alliance, Sierra Club, and Valley Watch in the matter of challenges to the NPDES permit issued for the Trimble County power plant by the Kentucky Energy and Environment Cabinet to Louisville Gas and Electric, File No. DOW-41106-047.

37. Expert Report (August 2010), Rebuttal Expert Report (September 2010), Supplemental Expert Report (September 2011), and Declaration (November 2011) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)'s Cherokee power plant. No. 09-cv-1862 (District of Colorado).

38. Written Direct Expert Testimony (August 2010) and Affidavit (February 2012) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).

39. Deposition (August 2010) on behalf of Environmental Defense, in the matter of the remanded permit challenge to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

40. Expert Report, Supplemental/Rebuttal Expert Report, and Declarations (October 2010, November 2010, September 2012) on behalf of New Mexico Environment Department (Plaintiff-Intervenor), Grand Canyon Trust and Sierra Club (Plaintiffs) in the matter of *Plaintiffs v. Public Service Company of New Mexico* (PNM), Civil No. 1:02-CV-0552 BB/ATC (ACE) (District of New Mexico).

41. Expert Report (October 2010) and Rebuttal Expert Report (November 2010) (BART Determinations for PSCo Hayden and CSU Martin Drake units) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.

42. Expert Report (November 2010) (BART Determinations for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.

43. Declaration (November 2010) on behalf of the Sierra Club in connection with the Martin Lake Station Units 1, 2, and 3. *Sierra Club v. Energy Future Holdings Corporation and Luminant*

Generation Company LLC, Case No. 5:10-cv-00156-DF-CMC (Eastern District of Texas, Texarkana Division).

44. Pre-Filed Testimony (January 2011) and Declaration (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).

45. Declaration (February 2011) in the matter of the Draft Title V Permit for RRI Energy MidAtlantic Power Holdings LLC Shawville Generating Station (Pennsylvania), ID No. 17-00001 on behalf of the Sierra Club.

46. Expert Report (March 2011), Rebuttal Expert Report (June 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (District of Colorado).

47. Declaration (April 2011) and Expert Report (July 16, 2012) in the matter of the Lower Colorado River Authority (LCRA)'s Fayette (Sam Seymour) Power Plant on behalf of the Texas Campaign for the Environment. *Texas Campaign for the Environment v. Lower Colorado River Authority,* Civil Action No. 4:11-cv-00791 (Southern District of Texas, Houston Division).

48. Declaration (June 2011) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.

49. Expert Report (June 2011) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).

50. Declaration (August 2011) in the matter of the Sandy Creek Energy Associates L.P. Sandy Creek Power Plant on behalf of Sierra Club and Public Citizen. *Sierra Club, Inc. and Public Citizen, Inc. v. Sandy Creek Energy Associates, L.P.,* Civil Action No. A-08-CA-648-LY (Western District of Texas, Austin Division).

51. Expert Report (October 2011) on behalf of the Defendants in the matter of *John Quiles and Jeanette Quiles et al. v. Bradford-White Corporation, MTD Products, Inc., Kohler Co., et al.,* Case No. 3:10-cv-747 (TJM/DEP) (Northern District of New York).

52. Declaration (October 2011) on behalf of the Plaintiffs in the matter of *American Nurses Association et. al. (Plaintiffs), v. US EPA (Defendant)*, Case No. 1:08-cv-02198-RMC (US District Court for the District of Columbia).

53. Declaration (February 2012) and Second Declaration (February 2012) in the matter of *Washington Environmental Council and Sierra Club Washington State Chapter v. Washington State Department of Ecology and Western States Petroleum Association,* Case No. 11-417-MJP (Western District of Washington).

54. Expert Report (March 2012) and Supplemental Expert Report (November 2013) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v. ExxonMobil Corporation et al.,* Civil Action No. 4:10-cv-4969 (Southern District of Texas, Houston Division).

55. Declaration (March 2012) in the matter of *Center for Biological Diversity, et al. v. United States Environmental Protection Agency,* Case No. 11-1101 (consolidated with 11-1285, 11-1328 and 11-1336) (US Court of Appeals for the District of Columbia Circuit).

56. Declaration (March 2012) in the matter of *Sierra Club v. The Kansas Department of Health and Environment*, Case No. 11-105,493-AS (Holcomb power plant) (Supreme Court of the State of Kansas).

57. Declaration (March 2012) in the matter of the Las Brisas Energy Center *Environmental Defense Fund et al., v. Texas Commission on Environmental Quality,* Cause No. D-1-GN-11-001364 (District Court of Travis County, Texas, 261st Judicial District).

58. Expert Report (April 2012), Supplemental and Rebuttal Expert Report (July 2012), and Supplemental Rebuttal Expert Report (August 2012) on behalf of the states of New Jersey and Connecticut in the matter of the Portland Power plant *State of New Jersey and State of Connecticut (Intervenor-Plaintiff) v. RRI Energy Mid-Atlantic Power Holdings et al.,* Civil Action No. 07-CV-5298 (JKG) (Eastern District of Pennsylvania).

59. Declaration (April 2012) in the matter of the EPA's EGU MATS Rule, on behalf of the Environmental Integrity Project.

60. Expert Report (August 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Harm Phase.

61. Declaration (September 2012) in the Matter of the Application of *Energy Answers Incinerator, Inc.* for a Certificate of Public Convenience and Necessity to Construct a 120 MW Generating Facility in Baltimore City, Maryland, before the Public Service Commission of Maryland, Case No. 9199.

62. Expert Report (October 2012) on behalf of the Appellants (Robert Concilus and Leah Humes) in the matter of Robert Concilus and Leah Humes v. Commonwealth of Pennsylvania Department of Environmental Protection and Crawford Renewable Energy, before the Commonwealth of Pennsylvania Environmental Hearing Board, Docket No. 2011-167-R.

63. Expert Report (October 2012), Supplemental Expert Report (January 2013), and Affidavit (June 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.

64. Pre-filed Testimony (October 2012) on behalf of No-Sag in the matter of the North Springfield Sustainable Energy Project before the State of Vermont, Public Service Board.

65. Pre-filed Testimony (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.

66. Expert Report (February 2013) on behalf of Petitioners in the matter of Credence Crematory, Cause No. 12-A-J-4538 before the Indiana Office of Environmental Adjudication.

67. Expert Report (April 2013), Rebuttal report (July 2013), and Declarations (October 2013, November 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).

68. Declaration (April 2013) on behalf of Petitioners in the matter of *Sierra Club, et al., (Petitioners) v Environmental Protection Agency et al. (Resppondents),* Case No., 13-1112, (Court of Appeals, District of Columbia Circuit).

69. Expert Report (May 2013) and Rebuttal Expert Report (July 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).

70. Declaration (August 2013) on behalf of A. J. Acosta Company, Inc., in the matter of *A. J. Acosta Company, Inc., v. County of San Bernardino*, Case No. CIVSS803651.

71. Comments (October 2013) on behalf of the Washington Environmental Council and the Sierra Club in the matter of the Washington State Oil Refinery RACT (for Greenhouse Gases), submitted to the Washington State Department of Ecology, the Northwest Clean Air Agency, and the Puget Sound Clean Air Agency.

72. Statement (November 2013) on behalf of various Environmental Organizations in the matter of the Boswell Energy Center (BEC) Unit 4 Environmental Retrofit Project, to the Minnesota Public Utilities Commission, Docket No. E-015/M-12-920.

73. Expert Report (December 2013) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).

74. Expert Testimony (December 2013) on behalf of the Sierra Club in the matter of Public Service Company of New Hampshire Merrimack Station Scrubber Project and Cost Recovery, Docket No. DE 11-250, to the State of New Hampshire Public Utilities Commission.

75. Expert Report (January 2014) on behalf of Baja, Inc., in *Baja, Inc., v. Automotive Testing and Development Services, Inc. et. al*, Civil Action No. 8:13-CV-02057-GRA (District of South Carolina, Anderson/Greenwood Division).

76. Declaration (March 2014) on behalf of the Center for International Environmental Law, Chesapeake Climate Action Network, Friends of the Earth, Pacific Environment, and the Sierra Club (Plaintiffs) in the matter of *Plaintiffs v. the Export-Import Bank (Ex-Im Bank) of the United States*, Civil Action No. 13-1820 RC (District Court for the District of Columbia).

77. Declaration (April 2014) on behalf of Respondent-Intervenors in the matter of *Mexichem Specialty Resins Inc., et al., (Petitioners) v Environmental Protection Agency et al.,* Case No., 12-1260 (and Consolidated Case Nos. 12-1263, 12-1265, 12-1266, and 12-1267), (Court of Appeals, District of Columbia Circuit).

78. Direct Prefiled Testimony (June 2014) on behalf of the Michigan Environmental Council and the Sierra Club in the matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery (PSCR) Plan in its Rate Schedules for 2014 Metered Jurisdictional Sales of Electricity, Case No. U-17319 (Michigan Public Service Commission).

79. Expert Report (June 2014) on behalf of ECM Biofilms in the matter of the US Federal Trade Commission (FTC) v. ECM Biofilms (FTC Docket #9358).

80. Direct Prefiled Testimony (August 2014) on behalf of the Michigan Environmental Council and the Sierra Club in the matter of the Application of Consumers Energy Company for Authority to Implement a Power Supply Cost Recovery (PSCR) Plan in its Rate Schedules for 2014 Metered Jurisdictional Sales of Electricity, Case No. U-17317 (Michigan Public Service Commission).

81. Declaration (July 2014) on behalf of Public Health Intervenors in the matter of *EME Homer City Generation v. US EPA* (Case No. 11-1302 and consolidated cases) relating to the lifting of the stay entered by the Court on December 30, 2011 (US Court of Appeals for the District of Columbia).

82. Expert Report (September 2014), Rebuttal Expert Report (December 2014) and Supplemental Expert Report (March 2015) on behalf of Plaintiffs in the matter of *Sierra Club and Montana Environmental Information Center (Plaintiffs) v. PPL Montana LLC, Avista Corporation, Puget Sound Energy, Portland General Electric Company, Northwestern Corporation, and Pacificorp (Defendants)*, Civil Action No. CV 13-32-BLG-DLC-JCL (US District Court for the District of Montana, Billings Division).

83. Expert Report (November 2014) on behalf of Niagara County, the Town of Lewiston, and the Villages of Lewiston and Youngstown in the matter of CWM Chemical Services, LLC New York State Department of Environmental Conservation (NYSDEC) Permit Application Nos.: 9-2934-00022/00225, 9-2934-00022/00231, 9-2934-00022/00232, and 9-2934-00022/00249 (pending).

84. *Declaration (January 2015) relating to Startup/Shutdown in the MATS Rule (EPA Docket ID No. EPA-HQ-OAR-2009-0234) on behalf of the Environmental Integrity Project.*

85. Pre-filed Direct Testimony (March 2015), Supplemental Testimony (May 2015), and Surrebuttal Testimony (December 2015) on behalf of Friends of the Columbia Gorge in the matter of the Application for a Site Certificate for the Troutdale Energy Center before the Oregon Energy Facility Siting Council.

86. Brief of Amici Curiae Experts in Air Pollution Control and Air Quality Regulation in Support of the Respondents, On Writs of Certiorari to the US Court of Appeals for the District of Columbia, No. 14-46, 47, 48. *Michigan et. al., (Petitioners) v. EPA et. al., Utility Air Regulatory Group (Petitioners) v. EPA et. al., National Mining Association et. al., (Petitioner) v. EPA et. al.,* (Supreme Court of the United States).

87. Expert Report (March 2015) and Rebuttal Expert Report (January 2016) on behalf of Plaintiffs in the matter of *Conservation Law Foundation v. Broadrock Gas Services LLC, Rhode Island LFG GENCO LLC, and Rhode Island Resource Recovery Corporation (Defendants)*, Civil Action No. 1:13-cv-00777-M-PAS (US District Court for the District of Rhode Island).

88. Declaration (April 2015) relating to various Technical Corrections for the MATS Rule (EPA Docket ID No. EPA-HQ-OAR-2009-0234) on behalf of the Environmental Integrity Project.

89. Direct Prefiled Testimony (May 2015) on behalf of the Michigan Environmental Council, the Natural Resources Defense Council, and the Sierra Club in the matter of the Application of DTE Electric Company for Authority to Increase its Rates, Amend its Rate Schedules and Rules Governing the Distribution and Supply of Electric Energy and for Miscellaneous Accounting Authority, Case No. U-17767 (Michigan Public Service Commission).

90. Expert Report (July 2015) and Rebuttal Expert Report (July 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).

91. Declaration (August 2015, Docket No. 1570376) in support of "Opposition of Respondent-Intervenors American Lung Association, et. al., to Tri-State Generation's Emergency Motion;" Declaration (September 2015, Docket No. 1574820) in support of "Joint Motion of the State, Local Government, and Public Health Respondent-Intervenors for Remand Without Vacatur;" Declaration (October 2015) in support of "Joint Motion of the State, Local Government, and Public Health Respondent-Intervenors to State and Certain Industry Petitioners' Motion to Govern, *White Stallion Energy Center, LLC v. US EPA*, Case No. 12-1100 (US Court of Appeals for the District of Columbia).

92. Declaration (September 2015) in support of the Draft Title V Permit for Dickerson Generating Station (Proposed Permit No 24-031-0019) on behalf of the Environmental Integrity Project.

93. Expert Report (Liability Phase) (December 2015) and Rebuttal Expert Report (February 2016) on behalf of Plaintiffs in the matter of *Natural Resources Defense Council, Inc., Sierra Club, Inc., Environmental Law and Policy Center, and Respiratory Health Association v. Illinois Power Resources LLC, and Illinois Power Resources Generating LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (US District Court for the Central District of Illinois, Peoria Division).

94. Declaration (December 2015) in support of the Petition to Object to the Title V Permit for Morgantown Generating Station (Proposed Permit No 24-017-0014) on behalf of the Environmental Integrity Project.

95. Expert Report (November 2015) on behalf of Appellants in the matter of *Sierra Club, et al. v. Craig W. Butler, Director of Ohio Environmental Protection Agency et al.,* ERAC Case No. 14-256814.

96. Affidavit (January 2016) on behalf of Bridgewatch Detroit in the matter of *Bridgewatch Detroit v. Waterfront Petroleum Terminal Co., and Waterfront Terminal Holdings, LLC.*, in the Circuit Court for the County of Wayne, State of Michigan.

97. Expert Report (February 2016) and Rebuttal Expert Report (July 2016) on behalf of the challengers in the matter of the Delaware Riverkeeper Network, Clean Air Council, et. al., vs. Commonwealth of Pennsylvania Department of Environmental Protection and R. E. Gas Development LLC regarding the Geyer well site before the Pennsylvania Environmental Hearing Board.

98. Direct Testimony (May 2016) in the matter of Tesoro Savage LLC Vancouver Energy Distribution Terminal, Case No. 15-001 before the State of Washington Energy Facility Site Evaluation Council.

99. Declaration (June 2016) relating to deficiencies in air quality analysis for the proposed Millenium Bulk Terminal, Port of Longview, Washington.

100. Declaration (December 2016) relating to EPA's refusal to set limits on PM emissions from coal-fired power plants that reflect pollution reductions achievable with fabric filters on behalf of Environmental Integrity Project, Clean Air Council, Chesapeake Climate Action Network, Downwinders at Risk represented by Earthjustice in the matter of *ARIPPA v EPA, Case No. 15-1180.* (D.C. Circuit Court of Appeals).

101. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Huntley and Huntley Poseidon Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

102. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Apex Energy Backus Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

103. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Apex Energy Drakulic Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

104. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Apex Energy Deutsch Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

105. Affidavit (February 2017) pertaining to deficiencies water discharge compliance issues at the Wood River Refinery in the matter of *People of the State of Illinois (Plaintiff) v. Phillips 66 Company, ConocoPhillips Company, WRB Refining LP (Defendants)*, Case No. 16-CH-656, (Circuit Court for the Third Judicial Circuit, Madison County, Illinois).

106. Expert Report (March 2017) on behalf of the Plaintiff pertaining to non-degradation analysis for waste water discharges from a power plant in the matter of *Sierra Club (Plaintiff) v. Pennsylvania Department of Environmental Protection (PADEP) and Lackawanna Energy Center*, Docket No. 2016-047-L (consolidated), (Pennsylvania Environmental Hearing Board).

107. Expert Report (March 2017) on behalf of the Plaintiff pertaining to air emissions from the Heritage incinerator in East Liverpool, Ohio in the matter of *Save our County (Plaintiff) v. Heritage Thermal Services, Inc. (Defendant), Case No. 4:16-CV-1544-BYP*, (US District Court for the Northern District of Ohio, Eastern Division).

108. Rebuttal Expert Report (June 2017) on behalf of Plaintiffs in the matter of *Casey Voight and Julie Voight (Plaintiffs) v Coyote Creek Mining Company LLC (Defendant),* Civil Action No. 1:15-CV-00109 (US District Court for the District of North Dakota, Western Division).

109. Expert Affidavit (August 2017) and Penalty/Remedy Expert Affidavit (October 2017) on behalf of Plaintiff in the matter of *Wildearth Guardians (Plaintiff) v Colorado Springs Utility Board (Defendant,)* Civil Action No. 1:15-cv-00357-CMA-CBS (US District Court for the District of Colorado).

110. Expert Report (August 2017) on behalf of Appellant in the matter of *Patricia Ann Troiano (Appellant) v. Upper Burrell Township Zoning Hearing Board (Appellee)*, Court of Common Pleas of Westmoreland County, Pennsylvania, Civil Division.

111. Expert Report (October 2017), Supplemental Expert Report (October 2017), and Rebuttal Expert Report (November 2017) on behalf of Defendant in the matter of *Oakland Bulk and Oversized Terminal (Plaintiff) v City of Oakland (Defendant,)* Civil Action No. 3:16-cv-07014-VC (US District Court for the Northern District of California, San Francisco Division).

112. Declaration (December 2017) on behalf of the Environmental Integrity Project in the matter of permit issuance for ATI Flat Rolled Products Holdings, Breckenridge, PA to the Allegheny County Health Department.

113. Expert Report (Harm Phase) (January 2018), Rebuttal Expert Report (Harm Phase) (May 2018) and Supplemental Expert Report (Harm Phase) (April 2019) on behalf of Plaintiffs in the matter of *Natural Resources Defense Council, Inc., Sierra Club, Inc., and Respiratory Health Association v. Illinois Power Resources LLC, and Illinois Power Resources Generating LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (US District Court for the Central District of Illinois, Peoria Division).

114. Declaration (February 2018) on behalf of the Chesapeake Bay Foundation, et. al., in the matter of the Section 126 Petition filed by the state of Maryland in *State of Maryland v. Pruitt (Defendant)*, Civil Action No. JKB-17-2939 (Consolidated with No. JKB-17-2873) (US District Court for the District of Maryland).

115. Direct Pre-filed Testimony (March 2018) on behalf of the National Parks Conservation Association (NPCA) in the matter of *NPCA v State of Washington, Department of Ecology and BP West Coast Products, LLC*, PCHB No. 17-055 (Pollution Control Hearings Board for the State of Washington.

116. Expert Affidavit (April 2018) and Second Expert Affidavit (May 2018) on behalf of Petitioners in the matter of *Coosa River Basin Initiative and Sierra Club (Petitioners) v State of Georgia Environmental Protection Division, Georgia Department of Natural Resources (Respondent) and Georgia Power Company (Intervenor/Respondent)*, Docket Nos: 1825406-BNR-WW-57-Howells and 1826761-BNR-WW-57-Howells, Office of State Administrative Hearings, State of Georgia.

117. Direct Pre-filed Testimony and Affidavit (December 2018) on behalf of Sierra Club and Texas Campaign for the Environment (Appellants) in the contested case hearing before the Texas State Office of Administrative Hearings in Docket Nos. 582-18-4846, 582-18-4847 (Application of GCGV Asset Holding, LLC for Air Quality Permit Nos. 146425/PSDTX1518 and 146459/PSDTX1520 in San Patricio County, Texas).

118. Expert Report (February 2019) on behalf of Sierra Club in the State of Florida, Division of Administrative Hearings, Case No. 18-2124EPP, Tampa Electric Company Big Bend Unit 1 Modernization Project Power Plant Siting Application No. PA79-12-A2.

119. Declaration (March 2019) on behalf of Earthjustice in the matter of comments on the renewal of the Title V Federal Operating Permit for Valero Houston refinery.

120. Expert Report (March 2019) on behalf of Plaintiffs for Class Certification in the matter of *Resendez et al v Precision Castparts Corporation* in the Circuit Court for the State of Oregon, County of Multnomah, Case No. 16cv16164.

121. Expert Report (June 2019), Affidavit (July 2019) and Rebuttal Expert Report (September 2019) on behalf of Appellants relating to the NPDES permit for the Cheswick power plant in the matter of *Three Rivers Waterkeeper and Sierra Club (Appellants) v. State of Pennsylvania Department of Environmental Protection (Appellee) and NRG Power Midwest (Permittee)*, before the Commonwealth of Pennsylvania Environmental Hearing Board, EHB Docket No. 2018-088-R.

122. Affidavit/Expert Report (August 2019) relating to the appeal of air permits issued to PTTGCA on behalf of Appellants in the matter of *Sierra Club (Appellants) v. Craig Butler, Director, et. al., Ohio EPA (Appellees)* before the State of Ohio Environmental Review Appeals Commission (ERAC), Case Nos. ERAC-19-6988 through -6991.

123. Expert Report (October 2019) relating to the appeal of air permit (Plan Approval) on behalf of Appellants in the matter of *Clean Air Council and Environmental Integrity Project (Appellants) v. Commonwealth of Pennsylvania Department of Environmental Protection and Sunoco Partners Marketing and Terminals L.P.*, before the Commonwealth of Pennsylvania Environmental Hearing Board, EHB Docket No. 2018-057-L.

124. Expert Report (December 2019), Affidavit (March 2020), Supplemental Expert Report (July 2020), and Declaration (February 2021) on behalf of Earthjustice in the matter of *Objection to the*

Issuance of PSD/NSR and Title V permits for Riverview Energy Corporation, Dale, Indiana, before the Indiana Office of Environmental Adjudication, Cause No. 19-A-J-5073.

125. Affidavit (December 2019) on behalf of Plaintiff-Intervenor (Surfrider Foundation) in the matter of *United States and the State of Indiana (Plaintiffs), Surfrider Foundation (Plaintiff-Intervenor), and City of Chicago (Plaintiff-Intervenor) v. United States Steel Corporation (Defendant),* Civil Action No. 2:18-cv-00127 (US District Court for the Northern District of Indiana, Hammond Division).

126. Declarations (January 2020, February 2020, May 2020, July 2020, and August 2020) and Pre-filed Testimony (April 2021) in support of Petitioner's Motion for Stay of PSCAA NOC Order of Approval No. 11386 in the matter of the *Puyallup Tribe of Indians v. Puget Sound Clean Air Agency (PSCAA) and Puget Sound Energy (PSE),* before the State of Washington Pollution Control Hearings Board, PCHB No. P19-088.

127. Expert Report (April 2020) on behalf of the plaintiff in the matter of Orion Engineered Carbons, GmbH (Plaintiff) vs. Evonik Operations, GmbH (formerly Evonik Degussa GmbH) (Respondent), before the German Arbitration Institute, Case No. DIS-SV-2019-00216.

128. Expert Independent Evaluation Report (June 2020) for *PacifiCorp's Decommissioning Costs Study Reports dated January 15, 2020 and March 13, 2020 relating to the closures of the Hunter, Huntington, Dave Johnston, Jim Bridger, Naughton, Wyodak, Hayden, and Colstrip (Units 3&4) plants*, prepared for the Oregon Public Utility Commission (Oregon PUC).

129. Direct Pre-filed Testimony (July 2020) on behalf of the Sierra Club in the matter of *the Application of the Ohio State University for a certificate of Environmental Compatibility and Public Need to Construct a Combined Heat and Power Facility in Franklin County, Ohio*, before the Ohio Power Siting Board, Case No. 19-1641-EL-BGN.

130. Expert Report (August 2020) and Rebuttal Expert Report (September 2020) on behalf of WildEarth Guardians (petitioners) in the matter of *the Appeals of the Air Quality Permit No. 7482-M1 Issued to 3 Bear Delaware Operating – NM LLC (EIB No. 20-21(A) and Registrations Nos. 8729, 8730, and 8733 under General Construction Permit for Oil and Gas Facilities (EIB No. 20-33 (A)*, before the State of New Mexico, Environmental Improvement Board.

131. Expert Report (July 2020) on the *Initial Economic Impact Analysis (EIA) for A Proposal To* Regulate *NOx Emissions from Natural Gas Fired Rich-Burn Natural Gas Reciprocating Internal Combustion Engines (RICE) Greater Than 100 Horsepower* prepared on behalf of Earthjustice and the National Parks Conservation Association in the matter of Regulation Number 7, Alternate Rules before the Colorado Air Quality Control Commission.

132. Expert Report (August 2020) and Supplemental Expert Report (February 2021) on the Potential Remedies to Avoid Adverse Thermal Impacts from the Merrimack Station on behalf of Plaintiffs in the matter of *Sierra Club Inc. and the* Conservation *Law Foundation (Plaintiffs) v. Granite Shore Power, LLC et. al., (Defendants)*, Civil Action No. 19-cv-216-JL (US District Court for the District of New Hampshire.)

133. Expert Report (August 2020) and Supplemental Expert Report (December 2020) on behalf of Plaintiffs in the matter of *PennEnvironment Inc., and Clean Air Council (Plaintiffs) and Allegheny County Health Department (Plaintiff-Intervenor) v. United States Steel Corporation (Defendant)*, Civil Action No. 2-19-cv-00484-MJH (US District Court for the Western District of Pennsylvania.)

134. Pre-filed Direct Testimony (October 2020) and Sur-rebuttal Testimony (November 2020) on behalf of petitioners (Ten Persons Group, including citizens, the Town of Braintree, the Town of Hingham, and the City of Quincy) in the matter of Algonquin Gas Transmission LLC, Weymouth MA, No. X266786 Air Quality Plan Approval, before the Commonwealth of Massachusetts, Department of Environmental Protection, the Office of Appeals and Dispute Resolution, OADR Docket Nos. 2019-008, 2019-009, 2019010, 2019-011, 2019-012 and 2019-013.

135. Expert Report (November 2020) on behalf of Protect PT in the matter of *Protect PT v. Commonwealth of Pennsylvania Department of Environmental Protection and Apex Energy (PA) LLC*, before the Commonwealth of Pennsylvania Environmental Hearing Board, Docket No. 2018-080-R (consolidated with 2019-101-R)(the "Drakulic Appeal").

136. Expert Report (December 2020) on behalf of Plaintiffs in the matter of *Sierra Club Inc. (Plaintiff) v. GenOn Power Midwest LP (Defendants)*, Civil Action No. 2-19-cv-01284-WSS (US District Court for the Western District of Pennsylvania.)

137. Pre-filed Testimony (January 2021) on behalf of the Plaintiffs (Shrimpers and Fishermen of the Rio Grande Valley represented by Texas RioGrande Legal Aid, Inc.) in the matter of the Appeal of Texas Commission on Environmental Quality (TCEQ) Permit Nos. 147681, PSDTX1522, GHGPSDTX172 for the Jupiter Brownsville Heavy Condensate Upgrader Facility, Cameron County, before the Texas State Office of Administrative Hearings, SOAH Docket No. 582-21-0111, TCEQ Docket No. 2020-1080-AIR.

138. Expert Report (June 2021) and Declarations (May 2021 and June 2021) on behalf of Plaintiffs in the matter of *Sierra Club (Plaintiff) v. Woodville Pellets, LLC (Defendant)*, Civil Action No. 9:20-cv-00178-MJT (US District Court for the Eastern District of Texas, Lufkin Division.)

139. Declaration (July 2021) on behalf of Plaintiffs in the matter of *Stephanie Mackey and Nick Migliore, on behalf of themselves and all others similarly situated (Plaintiffs) v. Chemtool Inc. and Lubrizol Corporation (Defendants)*, Case No. 2021-L-0000165, State of Illinois, Circuit Court of the 17th Judicial Circuit, Winnebago County.

140. Expert Report (April 2021) and Sur-Rebuttal Report (June 2021) on behalf of the Plaintiffs in the matter of *Modern Holdings, LLC, et al. (Plaintiffs) v. Corning Inc., et al. (Defendants)*, Civil Action No. 5:13-cv-00405-GFVT, (US District Court for the Eastern District of Kentucky, Central Division at Lexington).

141. Expert Witness Disclosure (June 2021) on behalf of the Plaintiffs in the matter of *Jay Burdick, et. al., (Plaintiffs) v. Tanoga Inc. (d/b/a Taconic) (Defendant)*, Index No. 253835, (State of New York Supreme Court, County of Rensselaer).

142. Expert Report (June 2021) on behalf of Appellants in the matter of *PennEnvironment and Earthworks (Appellants) v. Commonwealth of Pennsylvania Department of Environmental Protection (Appellee) and MarkWest Liberty Midstream and resource, LLC (Permittee)*, before the Commonwealth of Pennsylvania Environmental Hearing Board, EHB Docket No. 2020-002-R.

143. Expert Reports (March 2021 and May 2021) regarding the Aries Newark LLC Sludge Processing Facility, Application No. CPB 20-74, Central Planning Board, City of Newark, New Jersey.

144. Expert Report (April 2021) for *Charles Johnson Jr. (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant),* Civil Action No. 2:20-CV-01329. (US District Court for the Eastern District of Louisiana, New Orleans Division).

145. Expert Report (April 2021) for *Floyd Ruffin (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 2:20-cv-00334-CJB-JCW (US District Court for the Eastern District of Louisiana, New Orleans Division).

146. Expert Report (May 2021) for *Clifford Osmer (Plaintiff) v. BP Exploration and Production Inc., et. al., (Defendants)* related to No. 2:19-CV-10331 (US District Court for the Eastern District of Louisiana, New Orleans Division).

147. Expert Report (June 2021) for *Antonia Saavedra-Vargas (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 2:18-CV-11461 (US District Court for the Eastern District of Louisiana, New Orleans Division).

148. Affidavit (June 2021) for Lourdes Rubi in the matter of *Lourdes Rubi (Plaintiff) v. BP Exploration and Production Inc., et. al., (Defendants)*, related to 12-968 BELO in MDL No. 2179 (US District Court for the Eastern District of Louisiana, New Orleans Division).

149. Expert Report (May 2021) for *James Noel (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant),* Civil Action No. 1:19-CV-00694 (US District Court for the Southern District of Alabama, Mobile Division).

150. Expert Report (June 2021) for *Wallace Smitht (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 2:19-CV-12880 (US District Court for the Eastern District of Louisiana, New Orleans Division).

C. Occasions where Dr. Sahu has provided oral testimony in depositions, at trial or in similar proceedings include the following:

151. Deposition on behalf of Rocky Mountain Steel Mills, Inc. located in Pueblo, Colorado – dealing with the manufacture of steel in mini-mills including methods of air pollution control and BACT in steel mini-mills and opacity issues at this steel mini-mill.

152. Trial Testimony (February 2002) on behalf of Rocky Mountain Steel Mills, Inc. in Denver District Court.

153. Trial Testimony (February 2003) on behalf of the United States in the Ohio Edison NSR Cases, *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).

154. Trial Testimony (June 2003) on behalf of the United States in the Illinois Power NSR Case, *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).

155. Deposition (10/20/2005) on behalf of the United States in connection with the Cinergy NSR Case. *United States, et* al. *v. Cinergy Corp., et al.*, IP 99-1693-C-M/S (Southern District of Indiana).

156. Oral Testimony (August 2006) on behalf of the Appalachian Center for the Economy and the Environment re. the Western Greenbrier plant, WV before the West Virginia DEP.

157. Oral Testimony (May 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women's Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) re. the Thompson River Cogeneration plant before the Montana Board of Environmental Review.

158. Oral Testimony (October 2007) on behalf of the Sierra Club re. the Sevier Power Plant before the Utah Air Quality Board.

159. Oral Testimony (August 2008) on behalf of the Sierra Club and Clean Water re. Big Stone Unit II before the South Dakota Board of Minerals and the Environment.

160. Oral Testimony (February 2009) on behalf of the Sierra Club and the Southern Environmental Law Center re. Santee Cooper Pee Dee units before the South Carolina Board of Health and Environmental Control.

161. Oral Testimony (February 2009) on behalf of the Sierra Club and the Environmental Integrity Project re. NRG Limestone Unit 3 before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

162. Deposition (July 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al.*

163. Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Coleto Creek coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

164. Deposition (October 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

165. Deposition (October 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.

166. Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Tenaska coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH). (April 2010).

167. Oral Testimony (November 2009) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

168. Deposition (December 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

169. Oral Testimony (February 2010) on behalf of the Environmental Defense Fund re. the White Stallion Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

170. Deposition (June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).

171. Trial Testimony (September 2010) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, State of Maryland, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case in US District Court in the Western District of Pennsylvania. *Plaintiffs v. Allegheny Energy Inc., et al.*, 2:05cv0885 (Western District of Pennsylvania).

172. Oral Direct and Rebuttal Testimony (September 2010) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).

173. Oral Testimony (September 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions,* No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.

174. Oral Testimony (October 2010) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.

175. Oral Testimony (November 2010) regarding BART for PSCo Hayden, CSU Martin Drake units before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.

176. Oral Testimony (December 2010) regarding BART for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.

177. Deposition (December 2010) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).

178. Deposition (February 2011 and January 2012) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)'s Cherokee power plant. No. 09-cv-1862 (D. Colo.).

179. Oral Testimony (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).

180. Deposition (August 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (District of Colorado).

181. Deposition (July 2011) and Oral Testimony at Hearing (February 2012) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.

182. Oral Testimony at Hearing (March 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).

183. Oral Testimony at Hearing (April 2012) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).

184. Oral Testimony at Hearing (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.

185. Deposition (March 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.

186. Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).

187. Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).

188. Deposition (February 2014) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).

189. Trial Testimony (February 2014) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v. ExxonMobil Corporation et al.,* Civil Action No. 4:10-cv-4969 (Southern District of Texas, Houston Division).

190. Trial Testimony (February 2014) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).

191. Deposition (June 2014) and Trial (August 2014) on behalf of ECM Biofilms in the matter of the *US Federal Trade Commission (FTC) v. ECM Biofilms* (FTC Docket #9358).

192. Deposition (February 2015) on behalf of Plaintiffs in the matter of *Sierra Club and Montana Environmental Information Center (Plaintiffs) v. PPL Montana LLC, Avista Corporation, Puget Sound Energy, Portland General Electric Company, Northwestern Corporation, and Pacificorp (Defendants)*, Civil Action No. CV 13-32-BLG-DLC-JCL (US District Court for the District of Montana, Billings Division).

193. Oral Testimony at Hearing (April 2015) on behalf of Niagara County, the Town of Lewiston, and the Villages of Lewiston and Youngstown in the matter of CWM Chemical Services, LLC New York State Department of Environmental Conservation (NYSDEC) Permit Application Nos.: 9-2934-00022/00225, 9-2934-00022/00231, 9-2934-00022/00232, and 9-2934-00022/00249 (pending).

194. Deposition (August 2015) on behalf of Plaintiff in the matter of *Conservation Law Foundation (Plaintiff) v. Broadrock Gas Services LLC, Rhode Island LFG GENCO LLC, and Rhode Island*

Resource Recovery Corporation (Defendants), Civil Action No. 1:13-cv-00777-M-PAS (US District Court for the District of Rhode Island).

195. Testimony at Hearing (August 2015) on behalf of the Sierra Club in the matter of *Amendments to 35 Illinois Administrative Code Parts 214, 217, and 225* before the Illinois Pollution Control Board, R15-21.

196. Deposition (May 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., (Plaintiffs) v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).

197. Trial Testimony (October 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., (Plaintiffs) v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).

198. Deposition (April 2016) on behalf of the Plaintiffs in *UNatural Resources Defense Council, Respiratory Health Association, and Sierra Club (Plaintiffs) v. Illinois Power Resources LLC and Illinois Power Resources Generation LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (Central District of Illinois, Peoria Division).

199. Trial Testimony at Hearing (July 2016) in the matter of Tesoro Savage LLC Vancouver Energy Distribution Terminal, Case No. 15-001 before the State of Washington Energy Facility Site Evaluation Council.

200. Trial Testimony (December 2016) on behalf of the challengers in the matter of the Delaware Riverkeeper Network, Clean Air Council, et. al., vs. Commonwealth of Pennsylvania Department of Environmental Protection and R. E. Gas Development LLC regarding the Geyer well site before the Pennsylvania Environmental Hearing Board.

201. Trial Testimony (July-August 2016) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).

202. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Huntley and Huntley Poseidon Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

203. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Apex energy Backus Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

204. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Apex energy Drakulic Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

205. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Apex energy Deutsch Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.

206. Deposition Testimony (July 2017) on behalf of Plaintiffs in the matter of *Casey Voight and Julie Voight v Coyote Creek Mining Company LLC (Defendant)* Civil Action No. 1:15-CV-00109 (US District Court for the District of North Dakota, Western Division).

207. Deposition Testimony (November 2017) on behalf of Defendant in the matter of *Oakland Bulk and Oversized Terminal (Plaintiff) v City of Oakland (Defendant,)* Civil Action No. 3:16-cv-07014-VC (US District Court for the Northern District of California, San Francisco Division).

208. Deposition Testimony (December 2017) on behalf of Plaintiff in the matter of *Wildearth Guardians (Plaintiff) v Colorado Springs Utility Board (Defendant)* Civil Action No. 1:15-cv-00357-CMA-CBS (US District Court for the District of Colorado).

209. Deposition Testimony (January 2018) in the matter of National Parks Conservation Association (NPCA) v. State of Washington Department of Ecology and British Petroleum (BP) before the Washington Pollution Control Hearing Board, Case No. 17-055.

210. Trial Testimony (January 2018) on behalf of Defendant in the matter of *Oakland Bulk and Oversized Terminal (Plaintiff) v City of Oakland (Defendant,)* Civil Action No. 3:16-cv-07014-VC (US District Court for the Northern District of California, San Francisco Division).

211. Trial Testimony (April 2018) on behalf of the National Parks Conservation Association (NPCA) in the matter of NPCA v State of Washington, Department of Ecology and BP West Coast Products, LLC, PCHB No. 17-055 (Pollution Control Hearings Board for the State of Washington.

212. Deposition (June 2018) (harm Phase) on behalf of Plaintiffs in the matter of *Natural Resources Defense Council, Inc., Sierra Club, Inc., and Respiratory Health Association v. Illinois Power Resources LLC, and Illinois Power Resources Generating LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (US District Court for the Central District of Illinois, Peoria Division).

213. Trial Testimony (July 2018) on behalf of Petitioners in the matter of *Coosa River Basin Initiative and Sierra Club (Petitioners) v State of Georgia Environmental Protection Division, Georgia Department of Natural Resources (Respondent) and Georgia Power Company (Intervenor/Respondent)*, Docket Nos: 1825406-BNR-WW-57-Howells and 1826761-BNR-WW-57-Howells, Office of State Administrative Hearings, State of Georgia.

214. Deposition (January 2019) and Trial Testimony (January 2019) on behalf of Sierra Club and Texas Campaign for the Environment (Appellants) in the contested case hearing before the Texas State Office of Administrative Hearings in Docket Nos. 582-18-4846, 582-18-4847 (Application of GCGV Asset Holding, LLC for Air Quality Permit Nos. 146425/PSDTX1518 and 146459/PSDTX1520 in San Patricio County, Texas).

215. Deposition (February 2019) and Trial Testimony (March 2019) on behalf of Sierra Club in the State of Florida, Division of Administrative Hearings, Case No. 18-2124EPP, Tampa Electric Company Big Bend Unit 1 Modernization Project Power Plant Siting Application No. PA79-12-A2.

216. Deposition (June 2019) relating to the appeal of air permits issued to PTTGCA on behalf of Appellants in the matter of *Sierra Club (Appellants) v. Craig Butler, Director, et. al., Ohio EPA (Appellees)* before the State of Ohio Environmental Review Appeals Commission (ERAC), Case Nos. ERAC-19-6988 through -6991.

217. Deposition (September 2019) on behalf of Appellants relating to the NPDES permit for the Cheswick power plant in the matter of *Three Rivers Waterkeeper and Sierra Club (Appellants) v. State of Pennsylvania Department of Environmental Protection (Appellee) and NRG Power Midwest (Permittee)*, before the Commonwealth of Pennsylvania Environmental Hearing Board, EHB Docket No. 2018-088-R.

218. Deposition (December 2019) on behalf of the Plaintiffs in the matter of David Kovac, individually and on behalf of wrongful death class of Irene Kovac v. BP Corporation North America Inc., Circuit Court of Jackson County, Missouri (Independence), Case No. 1816-CV12417.

219. Deposition (February 2020, virtual) and testimony at Hearing (August 2020, virtual) on behalf of Earthjustice in the matter of *Objection to the Issuance of PSD/NSR and Title V permits for Riverview Energy Corporation*, Dale, Indiana, before the Indiana Office of Environmental Adjudication, Cause No. 19-A-J-5073.

220. Hearing (July 14-15, 2020, virtual) on behalf of the Sierra Club in the matter of *the Application of the Ohio State University for a certificate of Environmental Compatibility and Public Need to Construct a Combined Heat and Power Facility in Franklin County, Ohio*, before the Ohio Power Siting Board, Case No. 19-1641-EL-BGN.

221. Hearing (September 2020, virtual) on behalf of WildEarth Guardians (petitioners) in the matter of *the Appeals of the Air Quality Permit No. 7482-M1 Issued to 3 Bear Delaware* Operating – *NM LLC (EIB No. 20-21(A) and Registrations Nos. 8729, 8730, and 8733 under General Construction*

Permit for Oil and Gas Facilities (EIB No. 20-33 (A), before the State of New Mexico, Environmental Improvement Board.

222. Deposition (December 2020, March 4-5, 2021, all virtual) and Hearing (April 2021, virtual) in support of Petitioner's Motion for Stay of PSCAA NOC Order of Approval No. 11386 in the matter of the *Puyallup Tribe of Indians v. Puget Sound Clean Air Agency (PSCAA) and Puget Sound Energy (PSE),* before the State of Washington Pollution Control Hearings Board, PCHB No. P19-088.

223. Hearing (September 2020, virtual) on the *Initial Economic Impact Analysis (EIA) for A Proposal To* Regulate *NOx Emissions from Natural Gas Fired Rich-Burn Natural Gas Reciprocating Internal Combustion Engines (RICE) Greater Than 100 Horsepower* prepared on behalf of Earthjustice and the National Parks Conservation Association in the matter of Regulation Number 7, Alternate Rules before the Colorado Air Quality Control Commission.

224. Deposition (December 2020, virtual and Hearing February 2021, virtual) on behalf of the Plaintiffs (Shrimpers and Fishermen of the Rio Grande Valley represented by Texas RioGrande Legal Aid, Inc.) in the matter of the Appeal of Texas Commission on Environmental Quality (TCEQ) Permit Nos. 147681, PSDTX1522, GHGPSDTX172 for the Jupiter Brownsville Heavy Condensate Upgrader Facility, Cameron County, before the Texas State Office of Administrative Hearings, SOAH Docket No. 582-21-0111, TCEQ Docket No. 2020-1080-AIR.

225. Deposition (January 2021, virtual) on behalf of Plaintiffs in the matter of *PennEnvironment Inc., and Clean Air Council (Plaintiffs) and Allegheny County Health Department (Plaintiff-Intervenor) v. United States Steel Corporation (Defendant)*, Civil Action No. 2-19-cv-00484-MJH (US District Court for the Western District of Pennsylvania.)

226. Deposition (February 2021, virtual) on behalf of Plaintiffs in the matter of *Sierra Club Inc. (Plaintiff) v. GenOn Power Midwest LP (*Defendants*)*, Civil Action No. 2-19-cv-01284-WSS (US District Court for the Western District of Pennsylvania.)

227. Deposition (April 2021, virtual) on the Potential Remedies to Avoid Adverse Thermal Impacts from the Merrimack Station on behalf of Plaintiffs in the matter of *Sierra Club Inc. and the* Conservation *Law Foundation (Plaintiffs) v. Granite Shore Power, LLC et. al., (Defendants)*, Civil Action No. 19-cv-216-JL (US District Court for the District of New Hampshire.)

228. Deposition (June 2021, virtual) on behalf of Plaintiffs in the matter of *Sierra Club (Plaintiff) v. Woodville Pellets, LLC (Defendant)*, Civil Action No. 9:20-cv-00178-MJT (US District Court for the Eastern District of Texas, Lufkin Division).

229. Deposition (June 2021, virtual) on behalf of the Plaintiffs in the matter of *Modern Holdings, LLC, et al. (Plaintiffs) v. Corning Inc., et al. (Defendants)*, Civil Action No. 5:13-cv-00405-GFVT, (US District Court for the Eastern District of Kentucky, Central Division at Lexington).

230. Testimony (June 2021, virtual) regarding the Aries Newark LLC Sludge Processing Facility, Application No. CPB 20-74, Central Planning Board, City of Newark, New Jersey.

Appointment

From: Goffman, Joseph [Goffman.Joseph@epa.gov]
Sent: 1/5/2022 5:12:10 PM
To: Goffman, Joseph [Goffman.Joseph@epa.gov]; Profeta, Timothy [Profeta.Timothy@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Culligan, Kevin [culligan.kevin@epa.gov]; Birnbaum, Rona [Birnbaum.Rona@epa.gov]; jditto@publicpower.org; dpatterson@publicpower.org; dwaterhouse@publicpower.org; Carolyn Slaughter [cslaughter@publicpower.org]; cparks-williams@publicpower.org

Subject: Meeting with American Public Power Assoc re: Clean Air Act & NESHAP
Attachments: APPA_12022021_ External meeting requests pdf.pdf
Location: Microsoft Teams Meeting

Start: 1/14/2022 4:00:00 PM
End: 1/14/2022 4:30:00 PM
Show Time As: Busy

Required Attendees: Profeta, Timothy; Carbonell, Tomas; Culligan, Kevin; Birnbaum, Rona; jditto@publicpower.org; dpatterson@publicpower.org; dwaterhouse@publicpower.org; Carolyn Slaughter; cparks-williams@publicpower.org

APPA_12022021_ External meeting...

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Join with a video conferencing device
sip:teams@video.epa.gov
Video Conference ID: 117 468 149 0
Alternate VTC instructions
Or call in (audio only)
+1 202-991-0477,,239390548# United States, Washington DC
Phone Conference ID: 239 390 548#
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For all EPA meetings, there is no expectation of privacy regarding any communications. Participation in a recorded meeting will be deemed as consent to be recorded. Information on EPA systems is the property of the Agency and may become official records.
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Appointment

From: Rakosnik, Delaney [rakosnik.delaney@epa.gov]
Sent: 1/5/2022 5:12:10 PM
To: Profeta, Timothy [Profeta.Timothy@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Culligan, Kevin [Culligan.Kevin@epa.gov]; Birnbaum, Rona [Birnbaum.Rona@epa.gov]; jditto@publicpower.org; dpatterson@publicpower.org; dwaterhouse@publicpower.org; Carolyn Slaughter [cslaughter@publicpower.org]; cparks-williams@publicpower.org

Subject: Canceled: Meeting with American Public Power Assoc re: Clean Air Act & NESHAP
Attachments: APPA_12022021_ External meeting requests pdf.pdf

Start: 1/14/2022 4:00:00 PM
End: 1/14/2022 4:30:00 PM
Show Time As: Free

Importance: High

Required Attendees: Profeta, Timothy; Carbonell, Tomas; Culligan, Kevin; Birnbaum, Rona; jditto@publicpower.org; dpatterson@publicpower.org; dwaterhouse@publicpower.org; Carolyn Slaughter; cparks-williams@publicpower.org

APPA_12022021_
External meeting...

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/5/2022 10:32:46 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Thursday, January 6
Attachments: OAR Minamata and APMMN Background Rev.docx; Pre-Brief for DA McCabe meeting prep_Goffman_Jan 6 2022.pptx; OAR EJ Coordinator Final Candidates Discussion - Thur or Mon

Carbonell, Tomas Calendar
Carbonell.Tomas@epa.gov
On Thursday, January 6, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

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Busy | Tentative | Free
Out of Office | Working Elsewhere | Outside of Working Hours

January 2022

Thu, Jan 6

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 9:55 AM	Comms weekly
	9:55 AM – 10:30 AM	**Free**
	10:30 AM – 10:55 AM	OAR EJ Coordinator Candidates Discussion (1 email)
	10:55 AM – 11:00 AM	**Free**
	11:00 AM – 12:00 PM	RE: Follow up on GMP and methane capture
	12:00 PM – 1:00 PM	Lunch/Management Time

■	1:00 PM – 2:00 PM	AA Level Coordination Meeting on Minamata Convention on Mercury (1 word doc)
■	1:00 PM – 2:00 PM	Briefing: EPA's New Source Performance Standards Updates, Emissions Guidelines to Reduce Methane and Other Harmful Pollution from the Oil and Natural Gas Industry
□	**2:00 PM – 2:10 PM**	**Free**
▨	2:10 PM – 2:40 PM	OAR Meet & Greet with Region 6
□	**2:40 PM – 2:45 PM**	**Free**
■	2:45 PM – 3:25 PM	Pre-briefing on preparing DA McCabe for upcoming meetings with RAs and with AdvaMed (1 ppt)
□	**3:25 PM – 3:30 PM**	**Free**
■	3:30 PM – 3:55 PM	Scheduling Meeting
□	**3:55 PM – 4:30 PM**	**Free**
■	4:30 PM – 5:00 PM	EtO Discussion (to discuss EtO monitoring and what tools the agency has at its disposal to do so and also what funding is needed for it)
□	**After 5:00 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Koerber, Mike [Koerber.Mike@epa.gov]
Sent: 1/6/2022 7:01:02 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Subject: FW: 12/27/21 WY Gov Letter and JB proposed SIP status
Attachments: Jim Bridger_PROPOSED RULE_disapproval.docx

Flag: Follow up

Hi, Tomas. Here is the draft proposal for Region 8's action on Jim Bridger. Also, as indicated Brian's note below, we're wondering if you have a thought on Ex. 5 Deliberative Process (DP)

Mike

From: Timin, Brian <Timin.Brian@epa.gov>
Sent: Thursday, January 6, 2022 11:03 AM
To: Koerber, Mike <Koerber.Mike@epa.gov>
Cc: Palma, Elizabeth <Palma.Elizabeth@epa.gov>; Mathias, Scott <Mathias.Scott@epa.gov>; Kornylak, Vera S. <Kornylak.Vera@epa.gov>
Subject: RE: 12/27/21 WY Gov Letter and JB proposed SIP status

Mike,

Ex. 5 Deliberative Process (DP)

Thanks,
Brian

Message

From: Profeta, Timothy [Profeta.Timothy@epa.gov]
Sent: 1/10/2022 10:13:36 PM
To: Levy, Maxwell [Levy.Maxwell@epa.gov]; Enobakhare, Rosemary [Enobakhare.Rosemary@epa.gov]; Cortez Russell, Loni [Russell.Loni@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Kim, Eunjung [Kim.Eun@epa.gov]
Subject: RE: General Check In
Attachments: Outreach-Air-Climate-Power-Sector-Strategy workplan draft v3 (002).docx

Great to touch base all. Per our conversation, attached is our living document on a power sector strategy that I worked on with our OAR comms team – notably Jenny Noonan and Jackie Ashley of OAQPS and Melanie LaCount and Richard Heuber of OAP. (Clearly the dates are past and need updating, but the general strategy is still viable).

I have a regular meeting with them as well, next to be held on Wednesday, should you have any desires for me to relay something back.

-----Original Appointment-----
From: Levy, Maxwell <Levy.Maxwell@epa.gov>
Sent: Monday, January 10, 2022 12:08 PM
To: Enobakhare, Rosemary; Cortez Russell, Loni; Carbonell, Tomas
Cc: Kim, Eunjung; Profeta, Timothy
Subject: General Check In
When: Monday, January 10, 2022 4:30 PM-5:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

Microsoft Teams meeting

Join on your computer or mobile app
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sip:teams@video.epa.gov
Video Conference ID: Ex. 6 Personal Privacy (PP)
Alternate VTC instructions

Or call in (audio only)
Ex. 6 Personal Privacy (PP) United States, Washington DC
Phone Conference ID: Ex. 6 Personal Privacy (PP)
Find a local number | Reset PIN

For all EPA meetings, there is no expectation of privacy regarding any communications. Participation in a recorded meeting will be deemed as consent to be recorded. Information on EPA systems is the property of the Agency and may become official records.

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Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/10/2022 10:16:53 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: RE: READING: Materials for Tuesday, January 11
Attachments: Taconite INTERNAL Background Pager-OAR_01-11-2022.docx

Hi Tomas,

Please see the additional reading materials attached to this email that just came in for:

Tuesday, January 11 @ 4:00pm – Pre-call in advance of Consultation on Taconite RTR

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Hooper, Daniel
Sent: Monday, January 10, 2022 5:07 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>
Subject: READING: Materials for Tuesday, January 11

Carbonell, Tomas Calendar
Carbonell.Tomas@epa.gov
On Tuesday, January 11, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

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Busy Tentative Free

Out of Office Working Elsewhere Outside of Working Hours

January 2022

Tue, Jan 11

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:00 AM – 10:00 AM	GMP meeting
	9:30 AM – 9:55 AM	OAR Senior Staff
	10:00 AM – 12:00 PM	**Free**
	12:00 PM – 1:00 PM	Lunch/Management Time
	1:00 PM – 1:15 PM	Hold: Enhanced Air Quality Monitoring
	1:00 PM – 2:00 PM	Canceled: EPA's Enhanced Air Quality Monitoring for Communities Grant Competition: Informational Webinar about $20 million in American Rescue Plan funding
	1:30 PM – 2:10 PM	OTAQ Weekly
	2:10 PM – 2:30 PM	**Free**
	2:30 PM – 3:20 PM	OAR/Region 2 Pre-Meeting to discuss questions that will be raised to Administrator Regan on 1/19 by the possible re-start of the Limetree Bay Refinery, on St. Croix, U.S. Virgin Islands (2 word docs)
	3:20 PM – 3:30 PM	**Free**
	3:30 PM – 3:55 PM	AIM Update
	3:55 PM – 4:00 PM	**Free**
	4:00 PM – 4:30 PM	Pre-call in advance of Consultation on Taconite RTR
	4:30 PM – 5:00 PM	Video-call: Prebrief for Advanced Medical Technology Association (AdvaMed) CEO on 1/13 at 2:30pm (2 word docs, 1 ppt)
	5:00 PM – 6:00 PM	OECA/OAR/OGC/Region 2 Meeting on Limetree Matter
	6:00 PM – 6:25 PM	General Discussion
	After 6:25 PM	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Koerber, Mike [Koerber.Mike@epa.gov]
Sent: 1/11/2022 9:16:52 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Subject: FW: Consultation on Taconite RTR- Talking Points for Tomás
Attachments: Suggested Talking Points - Consultation on Taconite RTR2.docx

Tomas: This will come up through formal channels but I thought you might want to see it before you talk with Joe later today. Please let me know if you have any questions.

Mike

SUGGESTED REMARKS

Consultation with the Fond du Lac Band of Lake Superior Chippewa and the Leech Lake Band of Ojibwe on Notice of Proposed Rulemaking (NPRM) for the Taconite National Emissions Standards for Hazardous Air Pollutants (NESHAP)

January 12, 2022

3:00 – 4:00PM pm Central |4:00 – 5:00PM Eastern

How to Join

Join on your computer or mobile app
[HYPERLINK "https://teams.microsoft.com/l/meetup-

Ex. 6 Personal Privacy (PP)

Join with a video conferencing device
[HYPERLINK "sip:teams@video.epa.gov"]
Video Conference ID: Ex. 6 Personal Privacy (PP)
[HYPERLINK "

Ex. 6 Personal Privacy (PP)

Or call in (audio only)
[HYPERLINK

Ex. 6 Personal Privacy (PP)

] United States, Washington DC
Phone Conference ID: Ex. 6 Personal Privacy (PP)

Ex. 6 Personal Privacy (PP)

AGENDA

- Introductions (Fond du Lac Band, Leech Lake Band, EPA) - Toni Colón
- Welcome/Opening Remarks - Tomás Carbonell
- Discussion (All)
- Next Steps/Closing – Tomás Carbonell

SCRIPT

INTRODUCTIONS [Toni]

WELCOME / GENERAL OPENING [Tomás]

Ex. 5 Deliberative Process (DP)

SUGGESTED REMARKS

Ex. 5 Deliberative Process (DP)

SUGGESTED REMARKS

Ex. 5 Deliberative Process (DP)

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/11/2022 9:27:00 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: RE: READING: Materials for Wednesday, January 12
Attachments: Suggested Talking Points - Consultation on Taconite RTR2 (002).docx

Hi Tomas,

I just received the attached talking points for your meeting tomorrow regarding the Taconite RTR at 4 pm.

Thanks
Dan

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

From: Hooper, Daniel
Sent: Tuesday, January 11, 2022 3:47 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Cc: Campbell, Ann <Campbell.Ann@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>
Subject: READING: Materials for Wednesday, January 12

Additional materials: Draft call sheet for AdvaMed meeting with Janet McCabe (1 word doc) – **input needed by 12 pm tomorrow (Wednesday)**

Carbonell, Tomas Calendar
Carbonell.Tomas@epa.gov
On Wednesday, January 12, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

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Busy Tentative Free

■ Out of Office ▨ Working Elsewhere □ Outside of Working Hours

January 2022

Wed, Jan 12

□	**Before 8:00 AM**	**Free**
□	**8:00 AM – 9:00 AM**	**Free**
■	9:00 AM – 9:25 AM	Management Roundtable
□	**9:25 AM – 9:30 AM**	**Free**
■	9:30 AM – 9:55 AM	Air Issues Meeting
□	**9:55 AM – 10:30 AM**	**Free**
■	10:30 AM – 11:00 AM	Monthly ORD/OAR
□	**11:00 AM – 12:00 PM**	**Free**
■	12:00 PM – 1:00 PM	Lunch/Management Time
▨	1:00 PM – 1:50 PM	Hemispheric Transport and Methane as an Ozone Precursor (1 ppt)
□	**1:50 PM – 2:30 PM**	**Free**
▨	2:30 PM – 2:55 PM	One-on-One with Chris Grundler
▨	2:30 PM – 3:00 PM	General Discussion: Power sector engagement strategy
□	**3:00 PM – 3:30 PM**	**Free**
▨	3:30 PM – 3:45 PM	check-in: Dan Hooper
□	**3:45 PM – 4:00 PM**	**Free**
■	4:00 PM – 5:00 PM	Consultation on Taconite RTR (1 word doc, 1 pdf)
□	**After 5:00 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/11/2022 8:46:46 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Wednesday, January 12
Attachments: Methane and Ozone and LRTAP.pptx; Taconite INTERNAL Background Pager-OAR_01-11-2022.docx; Taconite Rule Consultation Request_USEPA 2021.11.16 (002).pdf; Call Sheet - AdvaMed 01112022_OAR.docx

Additional materials: Draft call sheet for AdvaMed meeting with Janet McCabe (1 word doc) – **input needed by 12 pm tomorrow (Wednesday)**

Carbonell, Tomas Calendar
Carbonell.Tomas@epa.gov
On Wednesday, January 12, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

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Busy
Out of Office
Tentative
Working Elsewhere
Free
Outside of Working Hours

January 2022

Wed, Jan 12

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 9:55 AM	Air Issues Meeting
	9:55 AM – 10:30 AM	**Free**
	10:30 AM – 11:00 AM	Monthly ORD/OAR
	11:00 AM – 12:00 PM	**Free**
	12:00 PM – 1:00 PM	Lunch/Management Time
	1:00 PM – 1:50 PM	Hemispheric Transport and Methane as an Ozone Precursor (1 ppt)

☐	**1:50 PM – 2:30 PM**	**Free**
▨	2:30 PM – 2:55 PM	One-on-One with Chris Grundler
▨	2:30 PM – 3:00 PM	General Discussion: Power sector engagement strategy
☐	**3:00 PM – 3:30 PM**	**Free**
▨	3:30 PM – 3:45 PM	check-in: Dan Hooper
☐	**3:45 PM – 4:00 PM**	**Free**
■	4:00 PM – 5:00 PM	Consultation on Taconite RTR (1 word doc, 1 pdf)
☐	**After 5:00 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/14/2022 8:23:46 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Tuesday, January 18
Attachments: FOR YOUR REVIEW: Uintah & Ouray Reservation Oil and Gas FIP: Transmittal to OP through OAR Requesting OMB Review; For Your Review and Concurrence: OMB Package - Proposed Rule: FIP Addressing Regional Ozone Transport for the 2015 Ozone NAAQS (SAN 8670); For Review: OMB Package: NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Amendments Final Rule (SAN 6312); MM2A.OARUpdate01.18.22.docx; January Business Review Materials

Additional materials:

- (1 email): FOR YOUR REVIEW: Uintah & Ouray Reservation Oil and Gas FIP: Transmittal to OP through OAR Requesting OMB Review
- (1 email): 2015 ozone transport – comments by Tuesday, January 18
- (1 email): Boiler MACT

Carbonell, Tomas Calendar
Carbonell.Tomas@epa.gov
On Tuesday, January 18, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

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Busy | Tentative | Free
Out of Office | Working Elsewhere | Outside of Working Hours

January 2022

Tue, Jan 18

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**

▨	9:00 AM – 9:25 AM	Management Roundtable
☐	**9:25 AM – 9:30 AM**	**Free**
▨	9:30 AM – 10:00 AM	OAR Senior Staff
■	10:00 AM – 10:30 AM	HOLD - call MB
☐	**10:30 AM – 10:45 AM**	**Free**
■	10:45 AM – 11:25 AM	Major MACT to Area (MM2A) Potential to Emit (PTE) Rulemaking (1 word doc)
☐	**11:25 AM – 11:30 AM**	**Free**
▨	11:30 AM – 12:00 PM	OTAQ Weekly
■	12:00 PM – 1:00 PM	Lunch/Management Time
☐	**1:00 PM – 1:30 PM**	**Free**
▨	1:30 PM – 1:55 PM	Climate Visioning Session
☐	**1:55 PM – 2:00 PM**	**Free**
▨	2:00 PM – 3:00 PM	Senior Staff Meeting
☐	**3:00 PM – 4:00 PM**	**Free**
■	4:00 PM – 5:00 PM	OAR Business Review (1 email)
▨	4:00 PM – 5:00 PM	Global Methane Pledge - next steps
■	5:00 PM – 5:25 PM	General Discussion
☐	**5:25 PM – 5:30 PM**	**Free**
▨	5:30 PM – 6:00 PM	Discussion on ARP Air Monitoring Grants
☐	**After 6:00 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/19/2022 9:45:59 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Thursday, January 20
Attachments: FW: For OAR Review to OMB: RIA and Revised Preamble for 2015 Ozone Transport Proposal; RE: REVIEW - Administrator EJ Tour Air Monitoring Plans; CPO Ozone Transport Overview 1-19-22_CAMDv3+ESS.pptx; RE: January NGO RT Call

Additional Materials:

- RIA and Revised Preamble for 2015 Ozone Transport Proposal (1 email) - comments/review required by tomorrow (Thursday) at 9 am

- Administrator EJ Tour Air Monitoring Plans (1 email) - - comments/review required by tomorrow (Thursday) at 9 am

Carbonell, Tomas Calendar
Carbonell.Tomas@epa.gov
On Thursday, January 20, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

Su	Mo	Tu	We	Th	Fr	Sa
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2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	**20**	21	22
23	24	25	26	27	28	29
30	31					

Busy
Out of Office
Tentative
Working Elsewhere
Free
Outside of Working Hours

January 2022

Thu, Jan 20

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable

☐	**9:25 AM – 9:30 AM**	**Free**
▨	9:30 AM – 10:00 AM	BRIEFING: re CSAPR (1 ppt)
☐	**10:00 AM – 10:30 AM**	**Free**
▨	10:30 AM – 10:55 AM	Limetree Discussion (OAR)
☐	**10:55 AM – 12:00 PM**	**Free**
■	12:00 PM – 1:00 PM	Global Methane Pledge - waste sector strategy
■	12:00 PM – 1:00 PM	Lunch/Management Time
▨	1:00 PM – 1:25 PM	OAR/OP Monthly Meeting
☐	**1:25 PM – 1:30 PM**	**Free**
■	1:30 PM – 1:55 PM	WY Regional Haze Next Steps
☐	**1:55 PM – 2:00 PM**	**Free**
■	2:00 PM – 3:00 PM	Limetree
■	3:00 PM – 4:00 PM	NGO Round Table (1 email)
■	4:00 PM – 4:25 PM	Scheduling Meeting
☐	**4:25 PM – 4:30 PM**	**Free**
☐	**After 4:30 PM**	**Free**

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Kim, Eunjung [Kim.Eun@epa.gov]
Sent: 1/20/2022 9:39:36 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Nunez, Alejandra [Nunez.Alejandra@epa.gov]
Subject: FYA - TA from Rep Stefanik on Acid Rain Program
Attachments: MONITORING_STEFANIK_STAFF.pdf

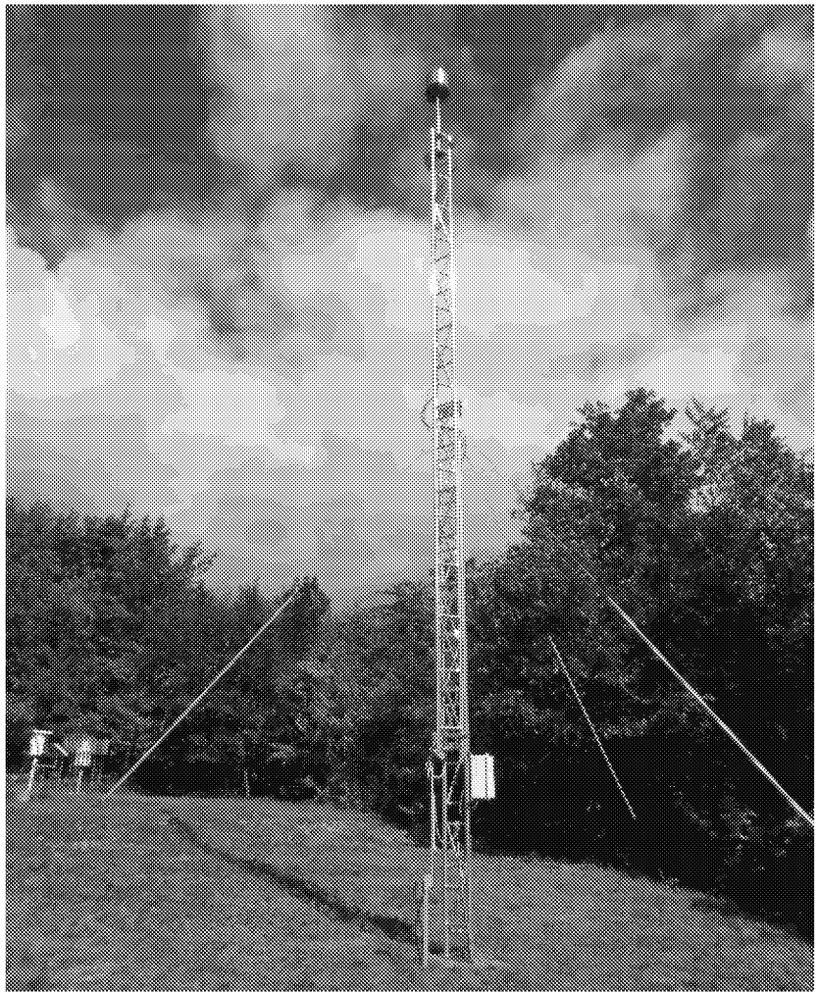
Hey Tomas,
Rep Stefanik's office reached out about our acid rain program and OAP provided them with a 101 briefing. Stefanik's team wants to see how they can be helpful with our program, given her district in NY deals a lot with acid rain. As a follow-up, OAP is providing them with the attached PPT.
I unfortunately missed the briefing with Stefanik's office, but based on the readout it sounds like there is a potential that there could be a follow-up meeting with Stefanik's team that might be elevated to your level. We will send these slides over and see how things shake out. Please let me know if you have any questions or concerns.

Thanks!

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

Long-term monitoring of acid deposition and water quality recovery from acidification

LTM sampling site, Biscuit Brook, NY



CASTNET & NADP site at Whiteface Mountain, NY

United States Environmental Protection Agency

Outline

- **Clean Air Status and Trends Network (CASTNET)**
  - CASTNET Overview
  - National Atmospheric Deposition Program (NADP)
  - Program Results
  - Importance of CASTNET
- **Long Term Monitoring Program (LTM)**
  - LTM History
  - Current Program Status
  - Program Results
  - Importance of LTM

CASTNET site located in Huntington Wildlife Forest, NY. The research forest is managed by SUNY-ESF in the Central ADKs

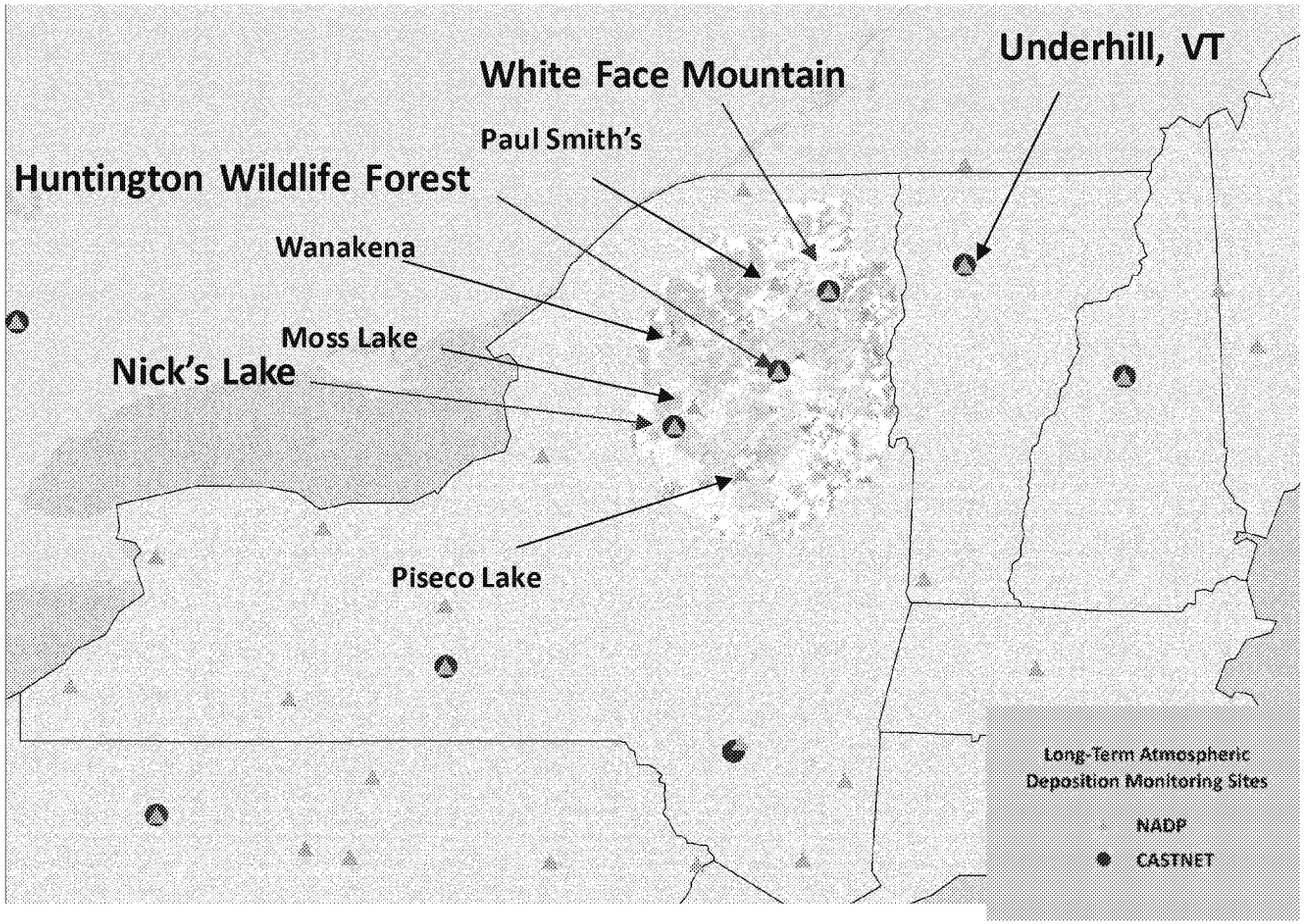
Long-Term Acid Deposition Monitoring Programs

NADP

- Established in 1978 to measure sulfur and nitrogen pollutants in precipitation (acid rain)
- Many network partners support operation and analysis: 7 federal agencies and 87 other organizations, including universities, state agencies, tribes, cities, and industry
- NADP/NTN only: Paul Smith's, Wanakena, Piseco Lake are funded by NYSERDA; Moss Lake is funded by USGS

CASTNET

- Established in 1987 to measure ambient sulfur and nitrogen pollutants used to estimate dry deposition
- Managed by EPA/OAR/OAP/CAMD
- Many network partners including Tribes, NYSDEC, NPS, BLM, Environment and Climate Change Canada
- Huntington Wildlife Forest began operating in 2002; Whiteface Mountain (base) and Nicks Lake began in 2012
- Whiteface Mountain (base), Nick's Lake, and the nearby Underhill, VT CASTNET sites were established as part of a pilot study and funded by EPA, NY and VT;
  - Long-term state support/commitment to operate these sites is unknown

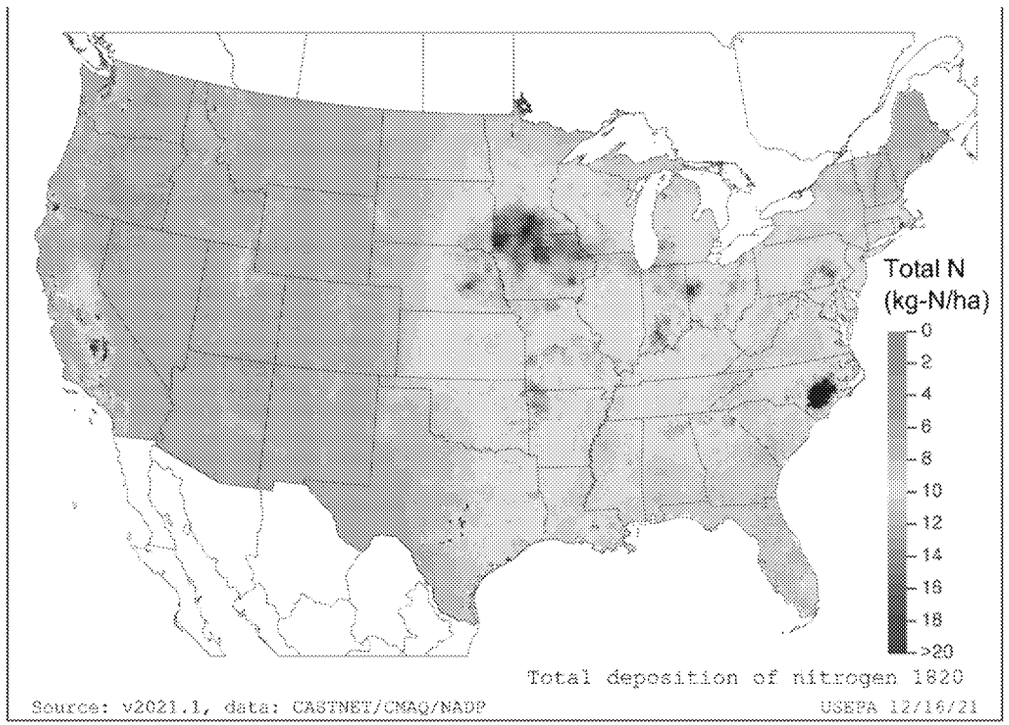


- NADP and CASTNET sites are located in rural areas to provide data to assess long-term, regionally representative trends in sulfur and nitrogen pollutants
- Wet deposition (NADP) + dry deposition (CASTNET) = Total atmospheric deposition

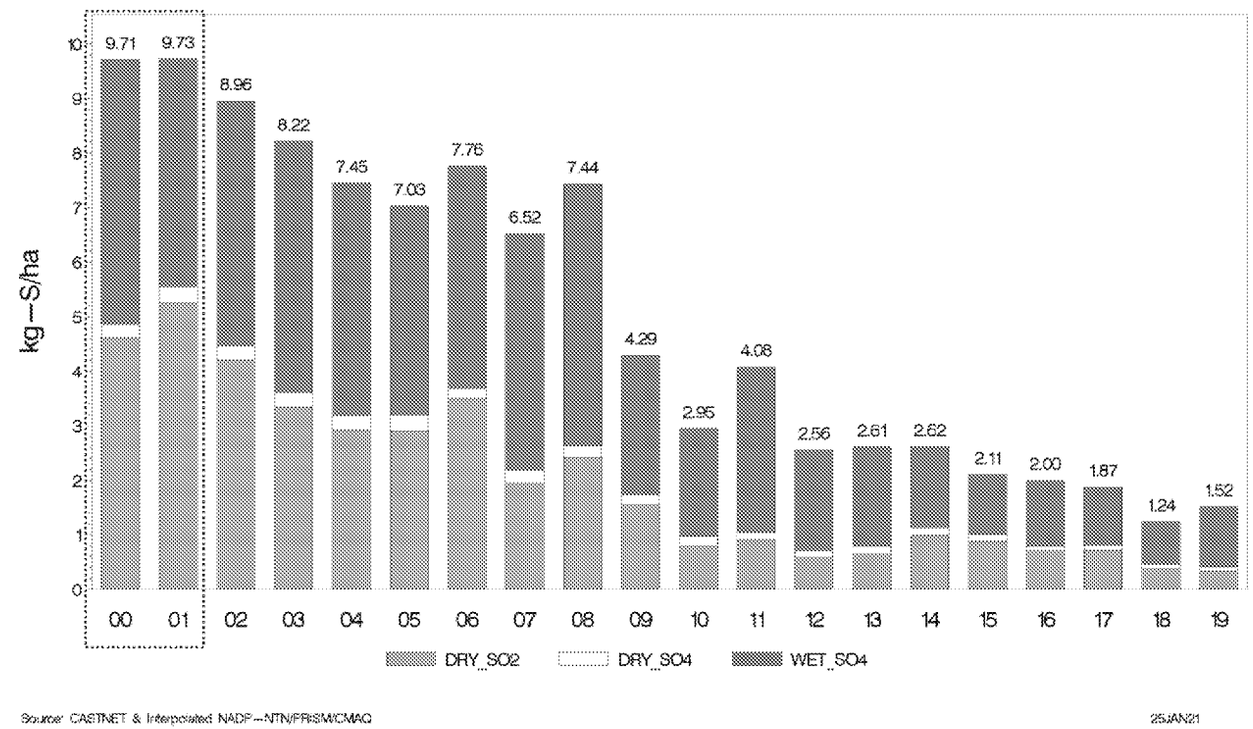
Key Uses of CASTNET and NADP Data

- Program Review and Assessment
  - Data provide accountability for emission reduction programs
- Basis of ecological assessments
  - Maps are used to assess critical loads and ecosystem effects in areas where monitoring is sparse
- Advanced the science of total (wet + dry) atmospheric deposition
- Validation and development of Agency air quality models

Total (wet + dry) Nitrogen Deposition 2018-2020



Total Sulfur Deposition (2000-2019)
Huntington Wildlife Forest, NY



*2000-2001 based on model estimates

Long-Term (LTM) Water Quality Monitoring Overview

- Assesses aquatic ecosystem health in response to changing air pollution and associated acid deposition
  - Monitor surface water chemistry (directly impacted by acid rain)
  - Network of lakes and streams in the Northeast and Mid-Atlantic
  - 3 to 15 times per year
  - Sensitive and remote forested catchments (deposition is the primary source of pollution)

Physical Parameters

- Water Temperature
- Water Color
- Water Clarity
- Flow

Chemical Parameters

- NO_3
- NH_4^+
- SO_4^{2-}
- Base Cations (Ca, Mg, Na, K)
- Cl^-
- Al
- PO_4^{2-}
- ANC and pH
- DOC

Long Term Monitoring (LTM) Program History

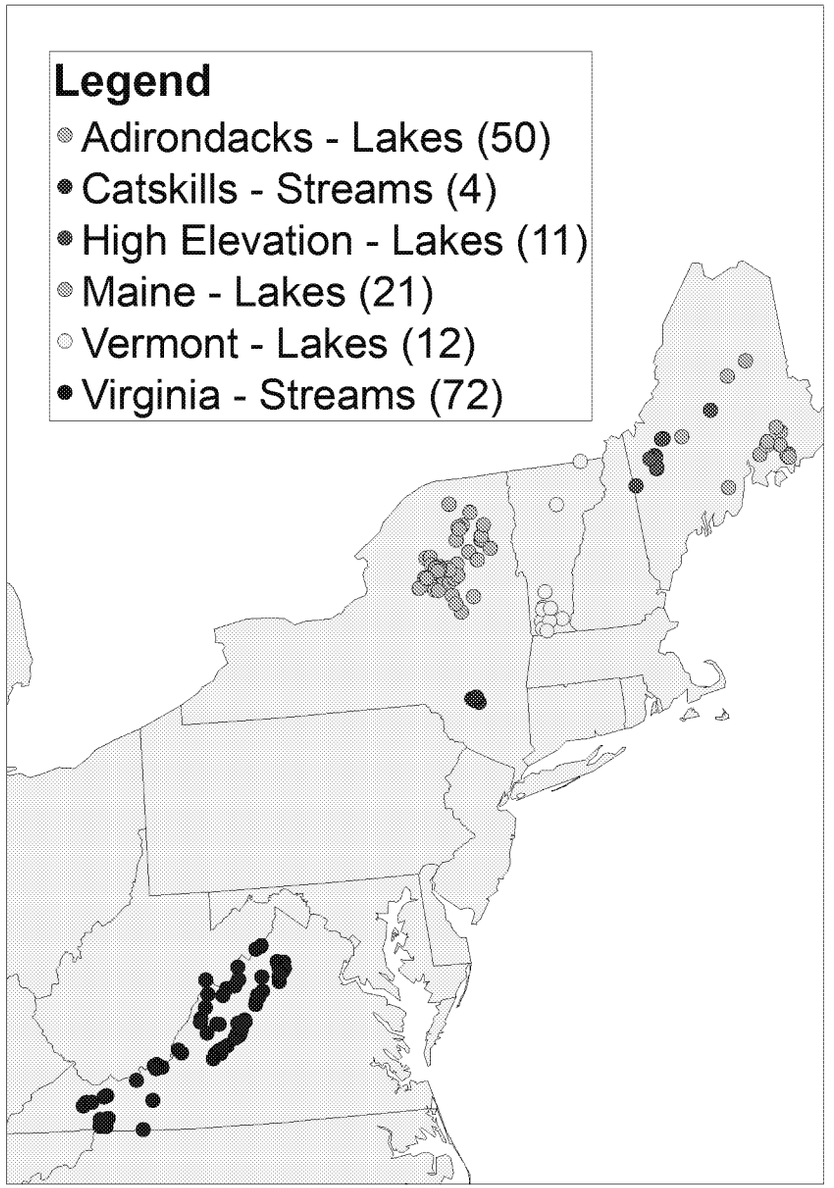
1970s	– Scientists discovered lakes impacted by acidification
1980s	– Individual researchers established sites to understand acid rain
Early 1990s	– Combined all sites to form LTM network (Vermont, Adirondacks, Maine, Colorado, Midwest, Catskills, Pennsylvania and Virginia streams)
1995	– Dropped: Midwest and Colorado sites
2015	– Dropped: Pennsylvania stream sites

For 38 years:

- 30+ chemical and physical parameters collected on numerous lakes and streams
- 60,000 individual samples collected (through 2017)
- Longest running EPA water quality network

Big Muddy Pond, VT

Current LTM Network



- Managed by EPA/OAR/OAP/CAMD
- 170 locations, ~1200 samples annually
- 220 peer-reviewed publications (and counting)
- Accomplished cooperatively through network partners:

Vermont Lakes – 12 lakes , VT Department of Environmental Protection

Maine/High Elevation Lakes – 32 lakes, US Geological Survey (USGS) and the University of New Hampshire and University of Maine

Adirondack Lakes – 50 lakes, USGS, Adirondacks Lakes Survey Corporation (ALSC), the New York State Department of Environmental Conservation (NYSDEC), & New York State Energy and Research Development Authority (NYSERDA)

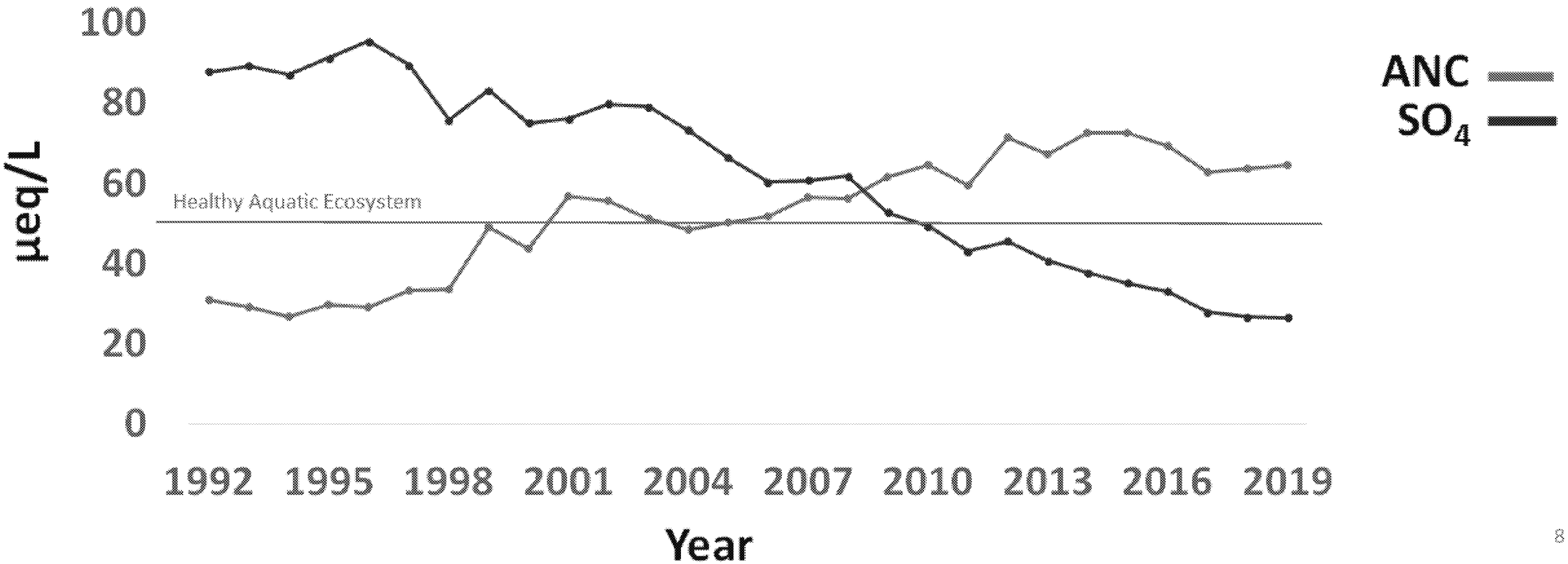
Catskills Streams – 4 streams, USGS

Ridge and Blue Ridge (VA) Streams –72 streams, Shenandoah National Park and the University of Virginia

LTM Results and Trends

Big Hope Pond, NY

- Lakes and streams are recovering from acidification
- The results for Big Hope Pond are consistent with results for the 50 sites monitored in the Adirondack region
- Streams outside of the northeast are not consistent



Existing Monitoring Networks Offer an Established Platform for Potential Health and Environmental Assessments

NADP precipitation

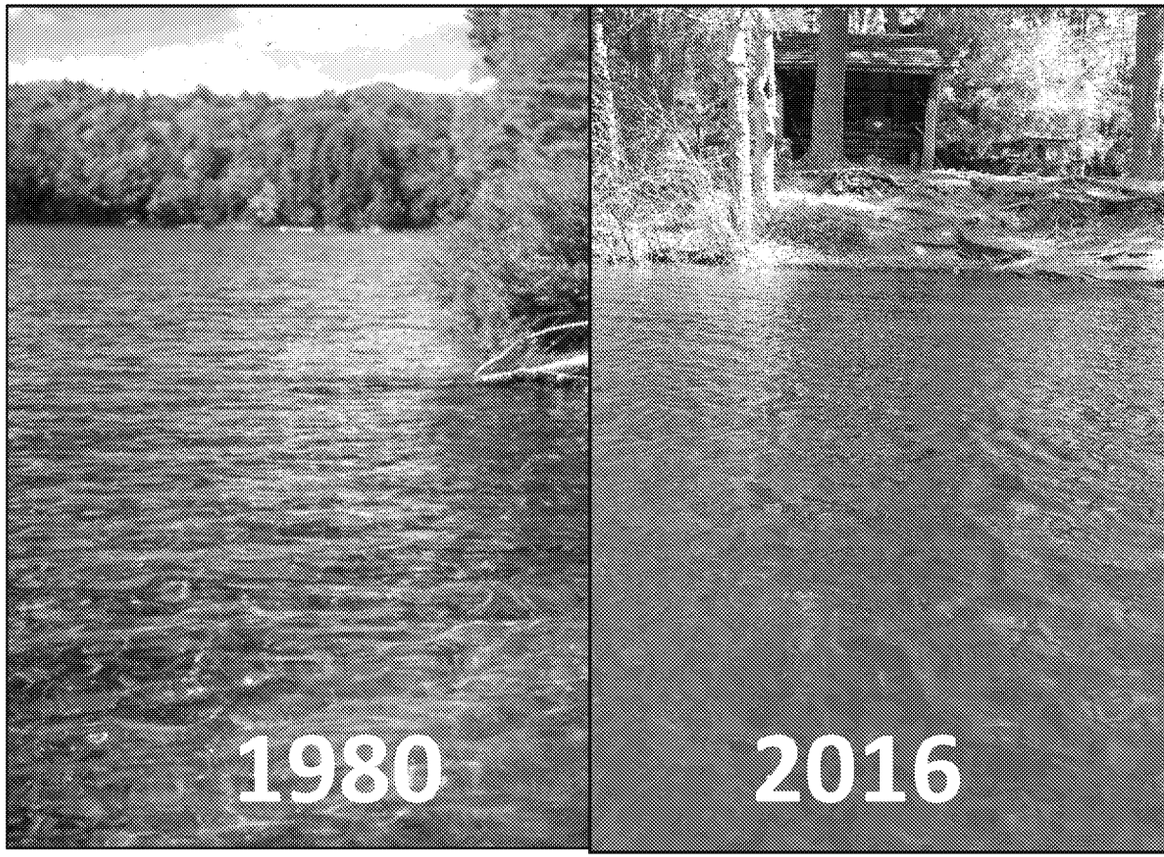
- Analysis of PFAS compounds
- Microplastics
- Mercury deposition
- Organic nitrogen & phosphorous

CASTNET

- Ozone transport from upwind states
- Impacts from long-range transport of wildfire plumes
- Aeroallergens
- Ozone impacts to vegetation (trees, crops)

LTM

- Microplastics
- Dissolved organic carbon
- Increased nutrient loads
- Extreme weather events

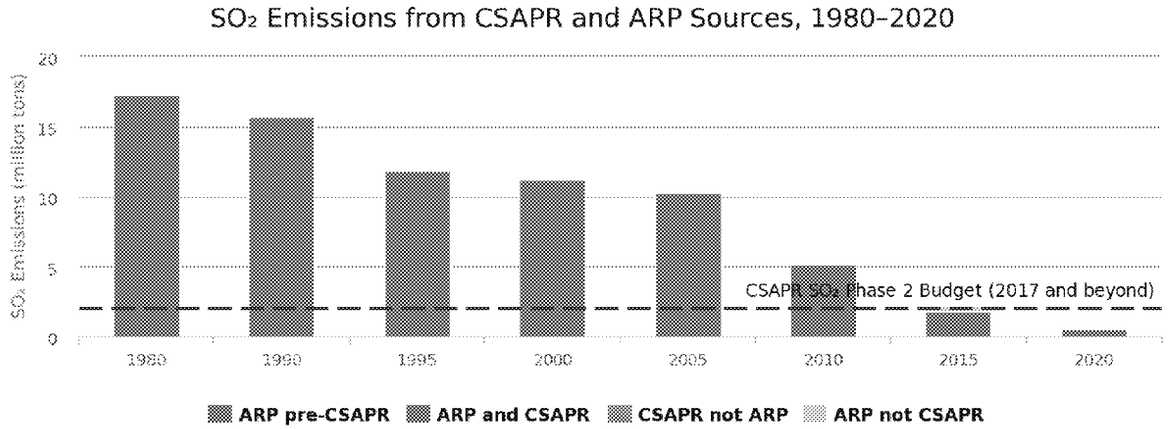


Bear Lake, NY

Dr. Curt Stager, Paul Smith's College

Appendix

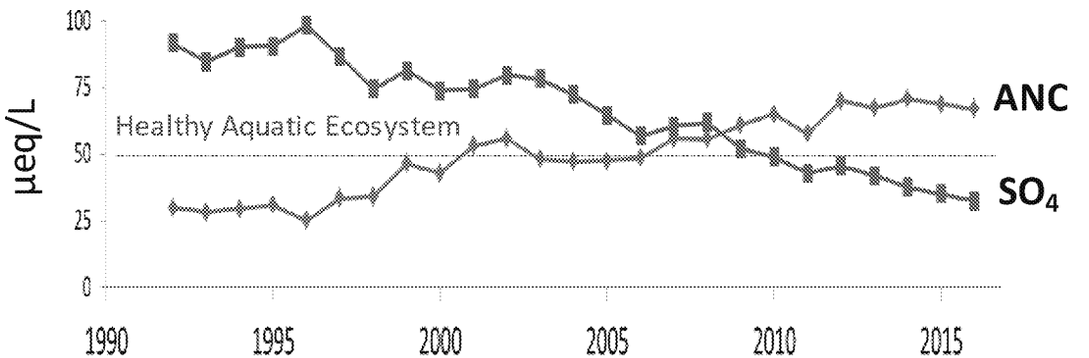
Demonstrating Program Effectiveness: Assessing Environmental Change Over Time and Space – An Acid Rain Example



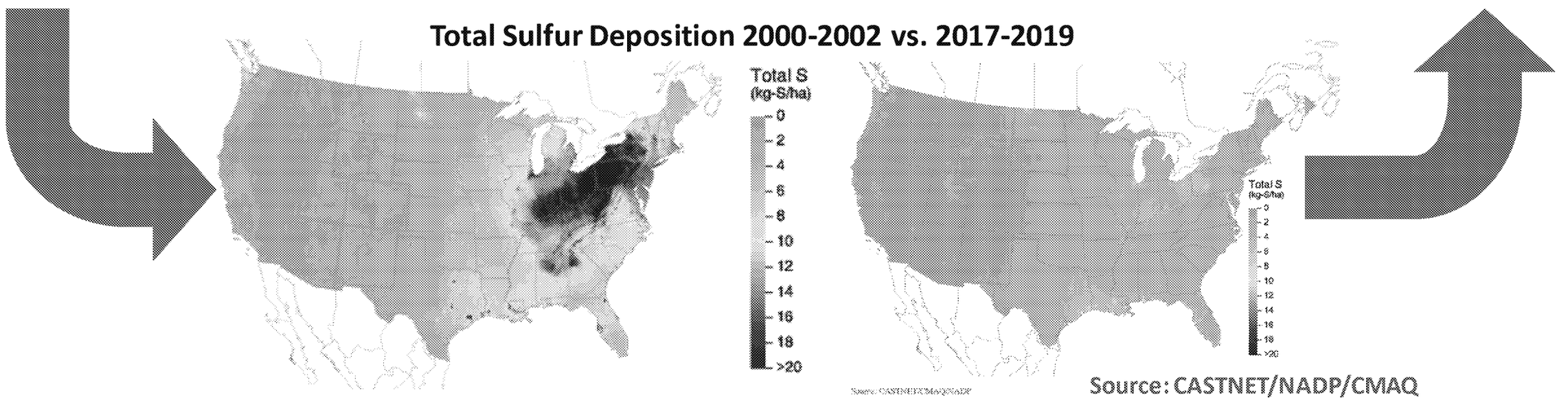
Notes:
- SO_2 values are shown as millions of tons.
- The data shown here reflect totals for those units required to comply with each program in each respective year. This means that the CSAPR-only SO_2 program units are not included in the SO_2 data prior to 2015.
- There are a small number of sources in CSAPR but not in the ARP. Emissions from these sources comprise about 1 percent of total emissions and are not easily visible on the full chart.

Source: EPA, 2021.

Acid Lake Response: Trends in Sulfate and ANC at LTM sites 1990 - 2017



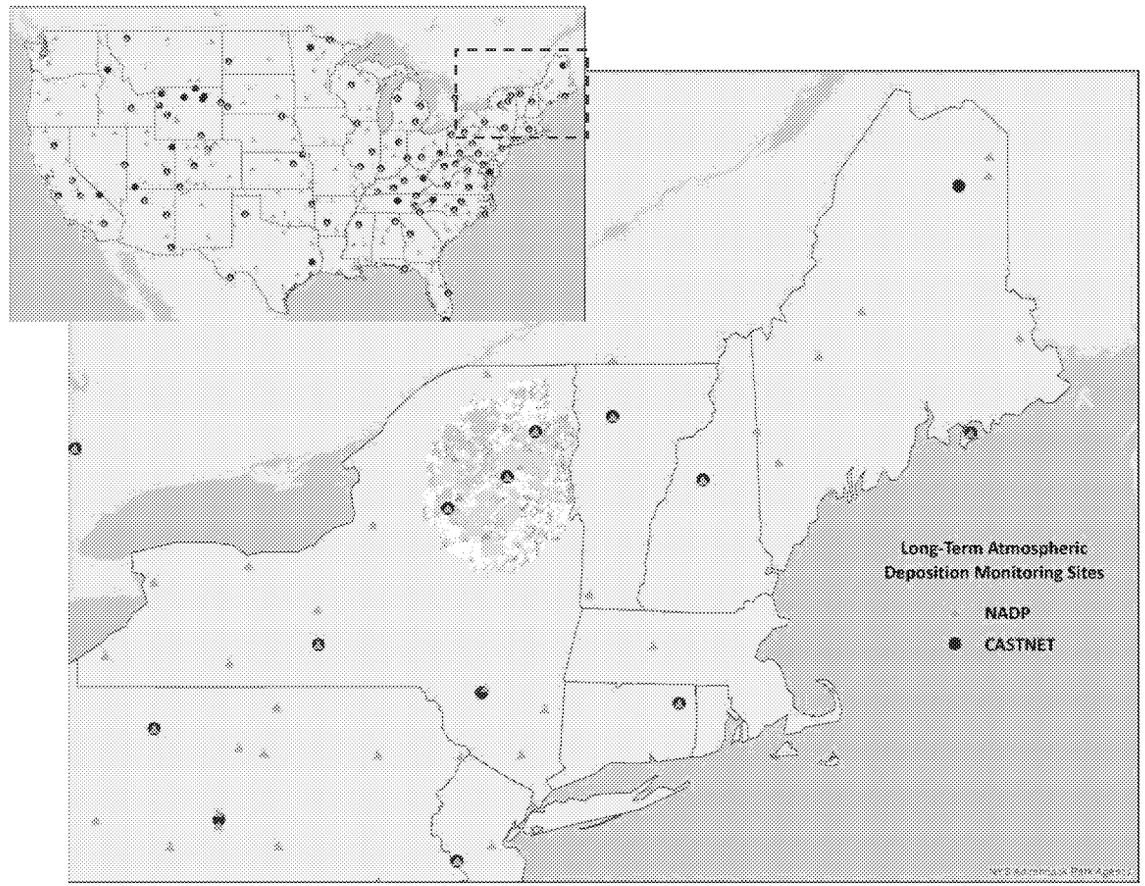
Total Sulfur Deposition 2000-2002 vs. 2017-2019



National Atmospheric Deposition Network (NADP)

- Established in 1978 to measure pollutants in precipitation (acid rain)
- Many network partners: 7 federal agencies and 87 other organizations, including universities, state agencies, tribes, cities, and industry
- 5 subnetworks: National Trends Network (NTN); Mercury Deposition Network (MDN); Atmospheric Mercury Network (AMNet); Ammonia Monitoring (AMoN); Mercury Litterfall Network (MLN)
- NTN measures weekly wet deposition of SO_4^{2-}, NO_3^-, NH_4^+, pH, cations, Cl^- at more than 250 sites
  - Nearly all CASTNET sites are co-located with NTN
- MDN measures weekly wet deposition of mercury
- AMNet semi-continuously measures concentrations of ambient mercury fractions
- AMoN provides bi-weekly concentrations of ambient ammonia
  - Over 60 AMoN sites co-located with CASTNET

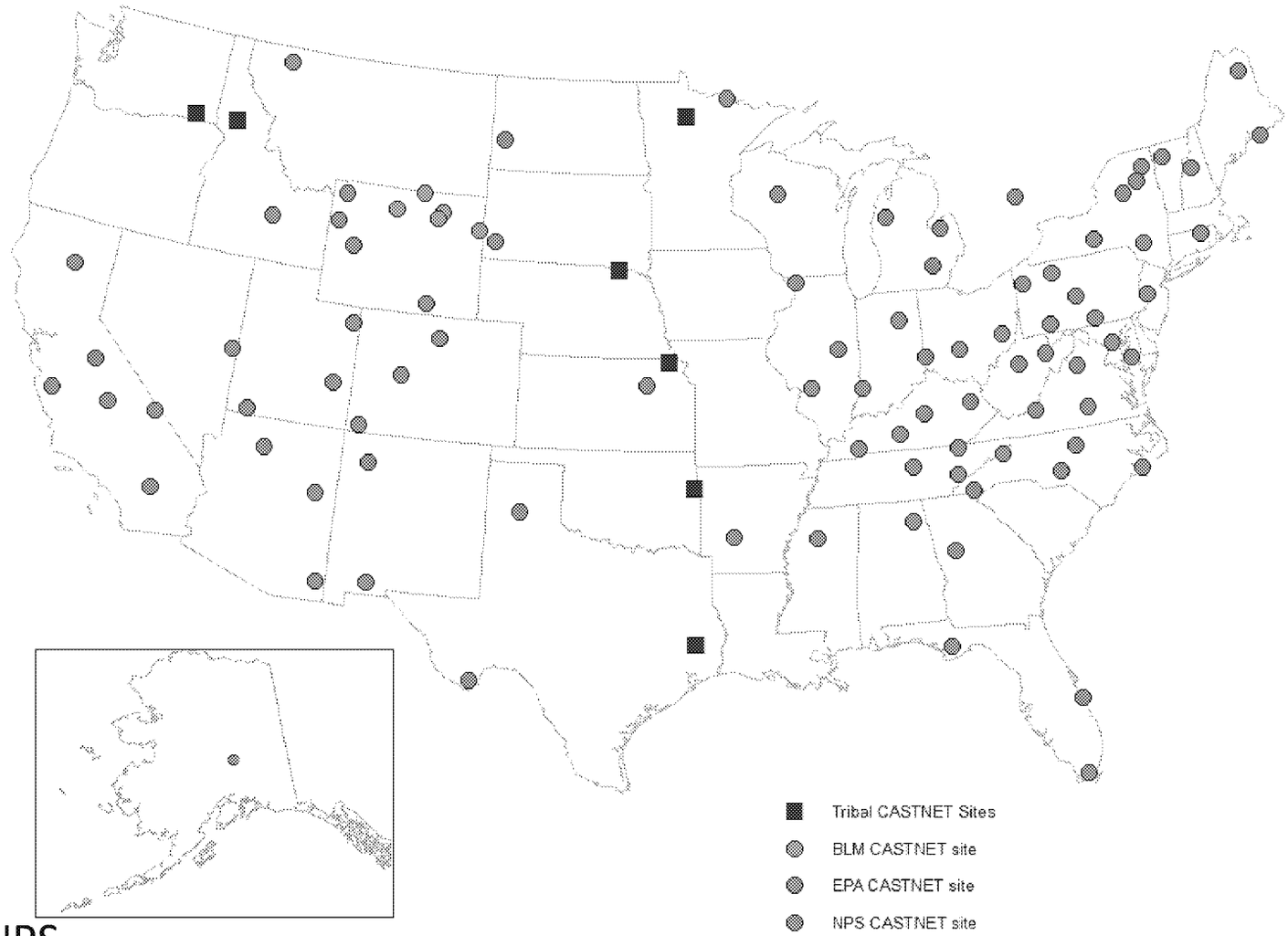
Long-Term Atmospheric Deposition Monitoring Networks NADP & CASTNET



MLN seasonally measures mercury concentrations in leaf litter and other plant material that has fallen to the ground

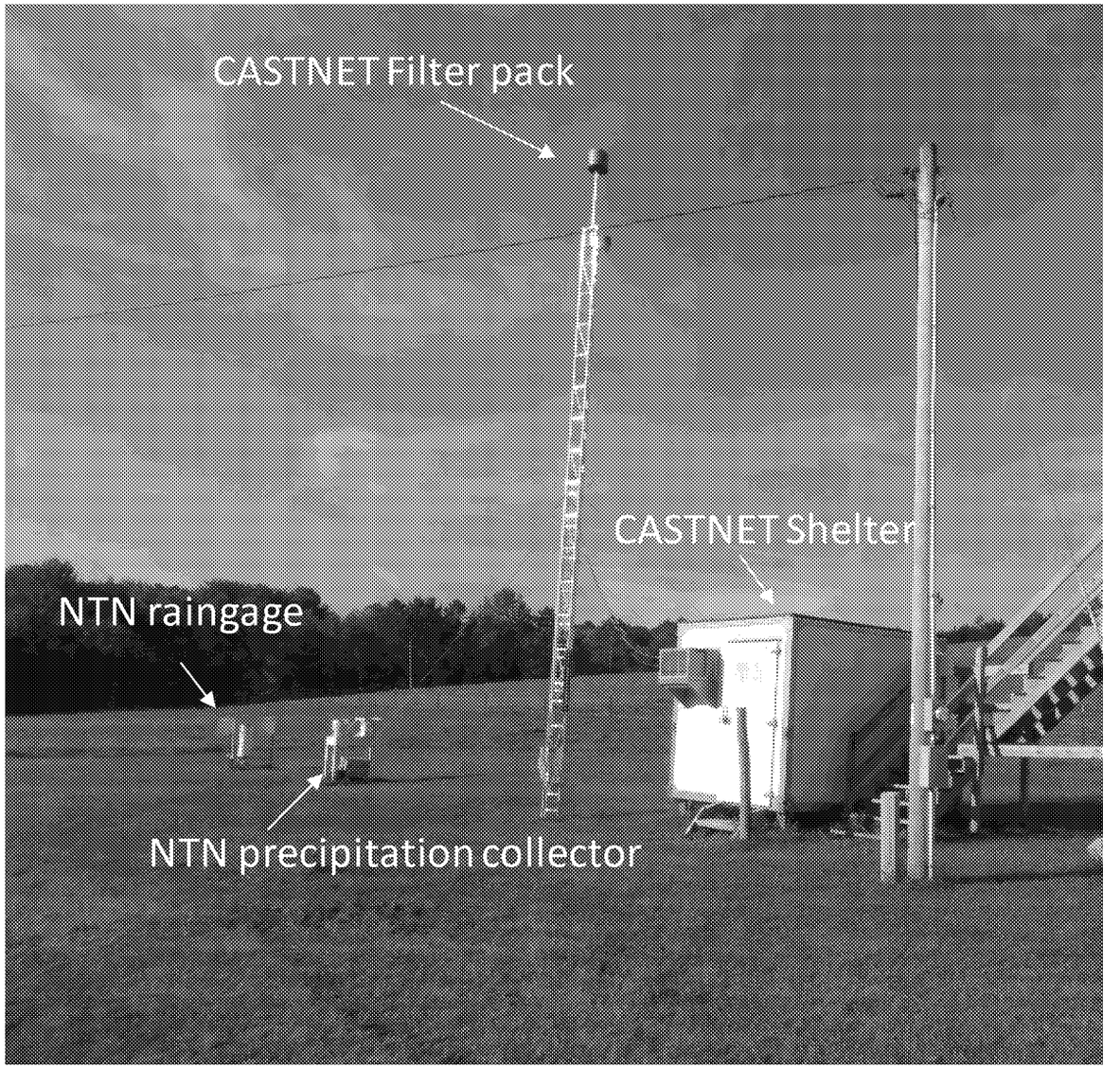
Clean Air Status and Trends Network (CASTNET)

- Established in 1987 - 38 sites operating 30+ years providing valuable data for long-term trends
- 100 monitoring sites in 42 states
- Managed by EPA/OAR/OAP/CAMD
- Sites located in rural and often ecologically important locations, including 31 National Parks
- Data to assess long-term, regionally representative trends in sulfur, ozone, and nitrogen pollutants
  - Concentrations of gases (nitric acid and sulfur dioxide) and particles in the air measured weekly
  - Continuous ozone concentrations measured hourly
- Many network partners (e.g., Tribes, NYSDEC, NPS, BLM, Environment and Climate Change Canada)



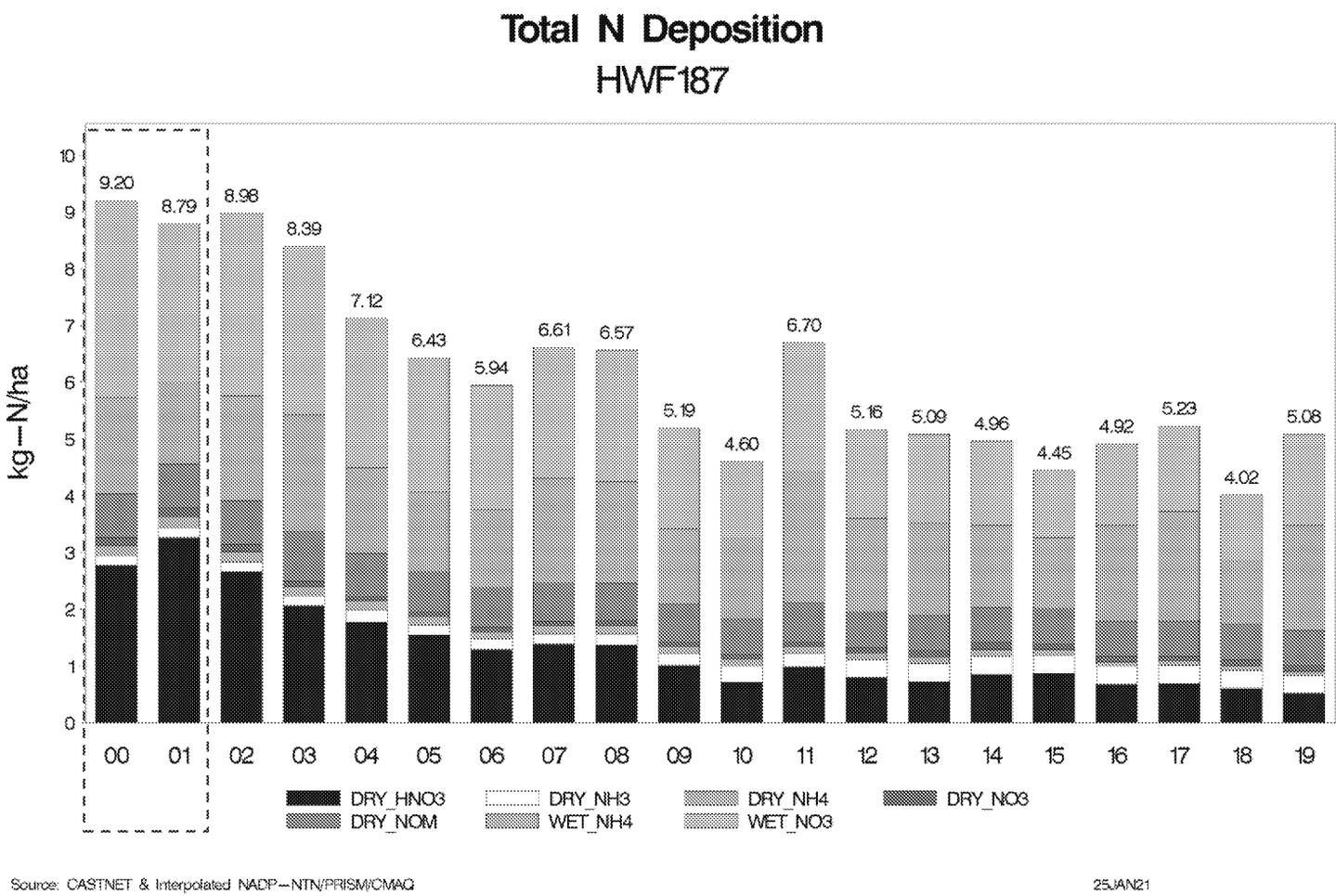
Long-Term Deposition Monitoring Measurements

	NADP National Trends Network (NTN)	NADP Ammonia Monitoring Network (AMoN)	CASTNET
Measurements	pH, SO_4^{2-}, NO_3^-, NH_4^+, Cl^-, base cations, specific conductance (weekly, in precipitation)	NH_3 (bi-weekly, air)	SO_2, HNO_3, SO_4, NH_4, NO_3, Cl^-, base cations (weekly, air) O_3 (hourly, air) Temperature (hourly)
Operations	Sponsors + UW Madison/ Wisconsin State Lab of Hygiene (WSLH)	Sponsors + UW Madison/WSLH	EPA + Contractor
Laboratory	WSLH	WSLH	Contract (Wood)
Established	1978	2007	1987
Number of sites	250	100+	100

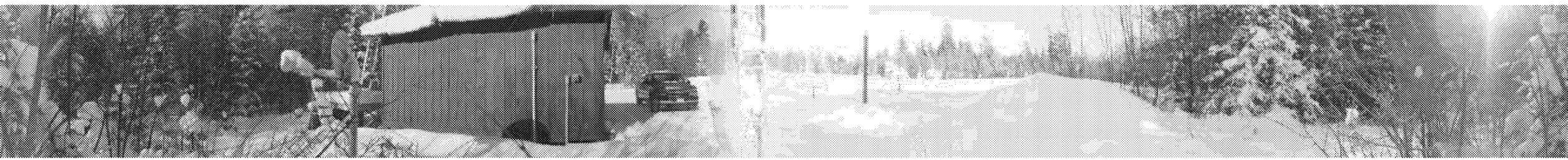


Rural monitoring networks

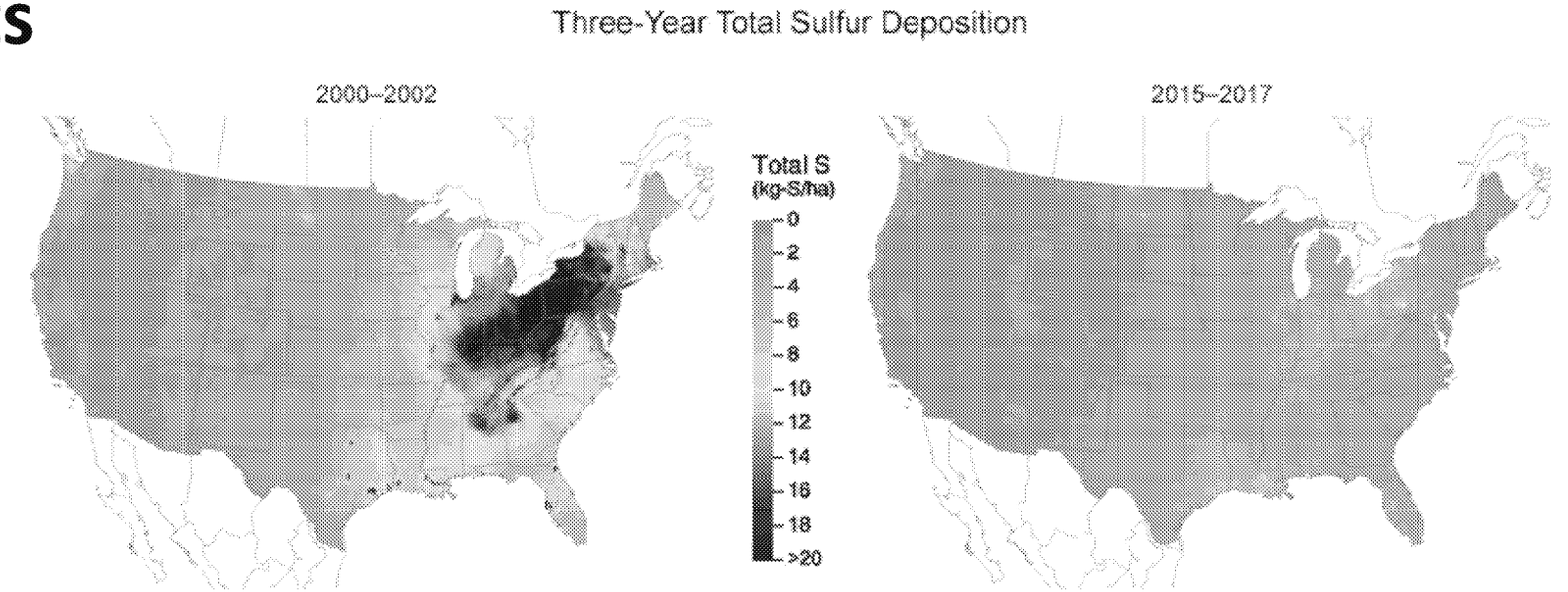
- Long-term records to detect trends
- Consistent measurements that are comparable from year to year
- Comprehensive QA
- Regionally representative

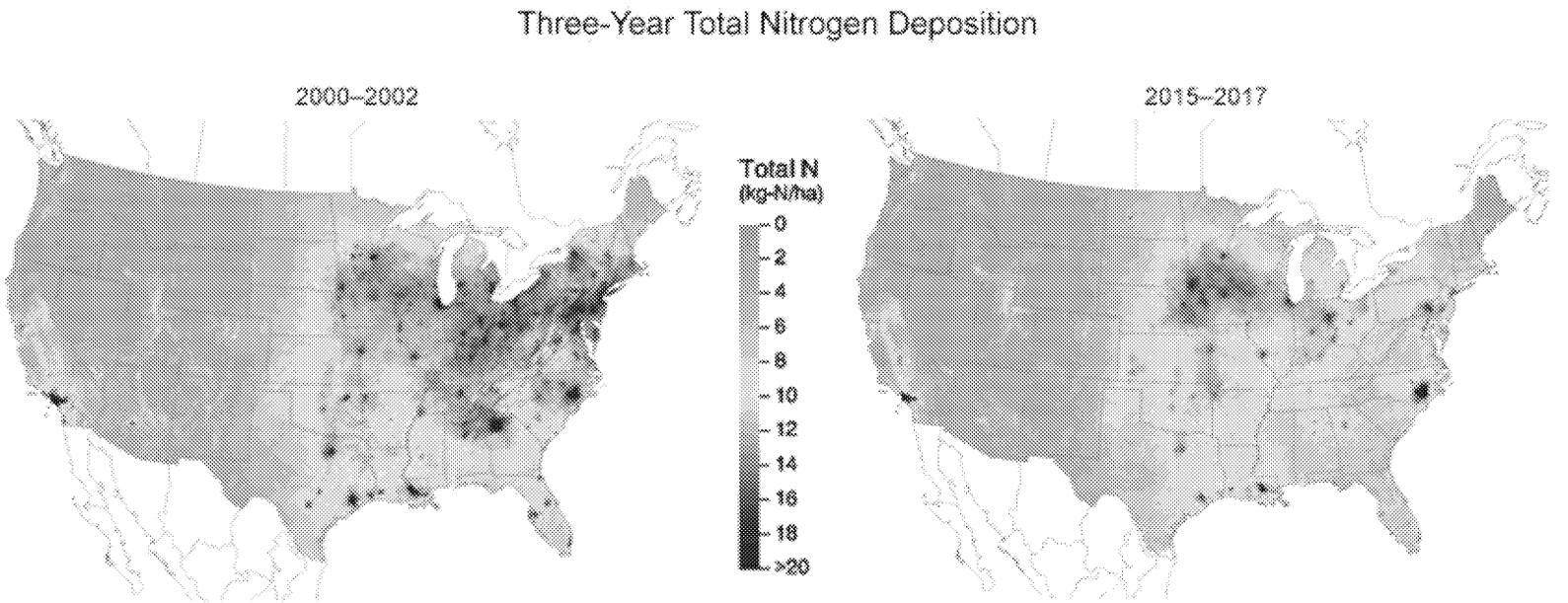


*2000-2001 based on model estimates



Program Results





Source: CASTNET/CMAQ/NADP
USEPA, 2019

Message

From: Profeta, Timothy [Profeta.Timothy@epa.gov]
Sent: 1/23/2022 10:26:42 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Katims, Casey [Katims.Casey@epa.gov]; Bowles, Jack [Bowles.Jack@epa.gov]; Barbery, Andrea [Barbery.Andrea@epa.gov]
CC: Culligan, Kevin [Culligan.Kevin@epa.gov]
Subject: RE: Proposed talking points for the USCA meeting on Tuesday

Agree – and Jack, would love to see any specific language from the past that you think might resonate.

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Sunday, January 23, 2022 3:49 PM
To: Katims, Casey <Katims.Casey@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; Bowles, Jack <Bowles.Jack@epa.gov>; Barbery, Andrea <Barbery.Andrea@epa.gov>
Cc: Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed talking points for the USCA meeting on Tuesday

Thanks Casey, these are helpful points to keep in mind. Best,

Tomás

From: Katims, Casey <Katims.Casey@epa.gov>
Sent: Saturday, January 22, 2022 4:02 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Bowles, Jack <Bowles.Jack@epa.gov>; Barbery, Andrea <Barbery.Andrea@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: RE: Proposed talking points for the USCA meeting on Tuesday

Tim,

Ex. 5 Deliberative Process (DP)

Hope this helps! Thanks again for pulling this all together — this will be a good meeting.

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Friday, January 21, 2022 5:17 PM
To: Katims, Casey <Katims.Casey@epa.gov>; Bowles, Jack <Bowles.Jack@epa.gov>; Barbery, Andrea <Barbery.Andrea@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Culligan, Kevin <Culligan.Kevin@epa.gov>
Subject: Proposed talking points for the USCA meeting on Tuesday

For your comment. I have given to OGC for comments in parallel.

Cheers,

Tim

**

Ex. 5 Deliberative Process (DP)

Tim Profeta
Special Counsel for the Power Sector
Office of Air Quailty, Planning and Standards
U.S. Environmental Protection Agency
Profeta.Timothy@epa.gov

Office: 919/541-5667
Mobile: 919/309-5395

Message

From: Profeta, Timothy [Profeta.Timothy@epa.gov]
Sent: 1/24/2022 4:59:13 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Subject: FW: draft talking points for Tuesday
Attachments: Profeta Talking Points 01-21-22.docx

Friendly amendments from OGC

From: Hoffman, Howard <hoffman.howard@epa.gov>
Sent: Monday, January 24, 2022 11:56 AM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>
Cc: Srinivasan, Gautam <Srinivasan.Gautam@epa.gov>; Hogan, Stephanie <Hogan.Stephanie@epa.gov>; Marks, Matthew <Marks.Matthew@epa.gov>
Subject: RE: draft talking points for Tuesday

Tim – thx for sending these along – they look fine, some suggestions….

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Friday, January 21, 2022 5:16 PM
To: Srinivasan, Gautam <Srinivasan.Gautam@epa.gov>; Hogan, Stephanie <Hogan.Stephanie@epa.gov>; Marks, Matthew <Marks.Matthew@epa.gov>; Hoffman, Howard <hoffman.howard@epa.gov>
Cc: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: draft talking points for Tuesday

Hello all –

Thanks again for the call this morning. Below are the talking points that Tomas and I propose to follow when we meet with the Climate Alliance on Tuesday. Please let me know your counsel.

Have a great weekend!

Tim

**

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Tim Profeta
Special Counsel for the Power Sector
Office of Air Quailty, Planning and Standards
U.S. Environmental Protection Agency
Profeta.Timothy@epa.gov

Office: 919/541-5667
Mobile: 919/309-5395

Message

From: Hooper, Daniel [hooper.daniel@epa.gov]
Sent: 1/25/2022 9:58:00 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
CC: Campbell, Ann [Campbell.Ann@epa.gov]; Kim, Eunjung [Kim.Eun@epa.gov]
Subject: READING: Materials for Wednesday, January 26
Attachments: CAA 111 GHG EGU Policy Briefing OAR 01.26.22.pptx; Oil and Gas. Presentation for RAs. 1.26.22.pptx

Carbonell, Tomas Calendar
Carbonell.Tomas@epa.gov
On Wednesday, January 26, 2022
Time zone: (UTC-05:00) Eastern Time (US & Canada)
(Adjusted for Daylight Saving Time)

January 2022

Su	Mo	Tu	We	Th	Fr	Sa
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2	3	4	5	6	7	8
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23	24	25	26	27	28	29
30	31					

Busy
Out of Office
Tentative
Working Elsewhere
Free
Outside of Working Hours

January 2022

Wed, Jan 26

	Before 8:00 AM	**Free**
	8:00 AM – 9:00 AM	**Free**
	9:00 AM – 9:25 AM	Management Roundtable
	9:25 AM – 9:30 AM	**Free**
	9:30 AM – 9:55 AM	Air Issues Meeting
	9:55 AM – 10:00 AM	**Free**
	10:00 AM – 10:40 AM	Power Sector Biweekly (1 ppt)
	10:40 AM – 12:00 PM	**Free**
	12:00 PM – 1:00 PM	Lunch/Management Time
	1:00 PM – 2:30 PM	**Free**
	2:30 PM – 2:55 PM	One-on-One with Chris Grundler
	2:55 PM – 3:00 PM	**Free**

■	3:00 PM – 3:30 PM	Presenter Invite - Regional Administrators Meeting	(1 ppt)
■	3:00 PM – 4:00 PM	GMI-SPEC on oil and gas methane	
□	**4:00 PM – 4:30 PM**	**Free**	
□	**4:30 PM – 5:00 PM**	**Free**	
▨	5:00 PM – 5:25 PM	MATs Rollout Discussion	
□	**5:25 PM – 5:30 PM**	**Free**	
▨	5:30 PM – 6:30 PM	HAPPY HOUR: A Year of Accomplishments at EPA!	
□	**After 6:30 PM**	**Free**	

Daniel Hooper
Assistant Chief of Staff
Office of Air and Radiation, US EPA
hooper.daniel@epa.gov
202.343.9167 office

Pronouns: He/Him/His

Message

From: Goffman, Joseph [Goffman.Joseph@epa.gov]
Sent: 1/26/2022 11:00:55 PM
To: Culligan, Kevin [Culligan.Kevin@epa.gov]
CC: Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Campbell, Ann [Campbell.Ann@epa.gov]; Hooper, Daniel [hooper.daniel@epa.gov]
Subject: Re: Best for you to call Jason re: timing on MATS clearance

Got it. Thanks

Sent from my iPhone

On Jan 26, 2022, at 5:58 PM, Culligan, Kevin <Culligan.Kevin@epa.gov> wrote:

Ex. 5 Deliberative Process (DP)

Message

From: Kim, Eunjung [Kim.Eun@epa.gov]
Sent: 1/28/2022 7:51:31 PM
To: Profeta, Timothy [Profeta.Timothy@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Subject: RE: Power Sector Listening Sessions

Definitely, no rush on the list of folks. Probably wont need it till next Monday at the earliest.

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Friday, January 28, 2022 2:50 PM
To: Kim, Eunjung <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

This is great – thank you.

Regarding attendees, I was going to finalize our recommendation with Peter Tsirigotis and Kevin Culligan this afternoon, but here is what I am leaning towards:

In addition to Joe (when he wants), Tomas and myself, we invite:

- 2 representatives from OAQPS, to be determined by Peter (it will vary from meeting to meeting – i.e., Tina Ndoh should come to EJ, while Nick Hutson may come to EEI…).
- 2 representatives from OAP to be determined by Chris
- 1 person from OAR Comms (likely either Jackie or Melanie LaCount)
- I am also suggesting that we invite the Richards from OW and OLEM but take a "no" if they don't prefer.

Can I finalize that with Peter and Kevin and suggest it back in a few hours?

From: Kim, Eunjung <Kim.Eun@epa.gov>
Sent: Friday, January 28, 2022 2:46 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Thanks this is super helpful. I can definitely ask to rename these meetings and suggest 4 separate industry group calls. The division of the NGOs look good, I believe Rosemary will also take a pass at the suggested groups and can ask her to figure out where NRDC fits best.

The AFL-CIO call is in the works of getting scheduled. Also happy to pitch additional unions to add to the list.

And for the list of attendees for all these roundtables, is this correct?
Kevin Culligan
Nick Hutson (all power rules)

Nick Swanson (111d GHG)
Christian Fellner (111b GHG)
Melanie King (MATS)
Beth Palma, Brian Timin (Regional Haze, PM NAAQS)
Rona Birnbaum, Jeb Stenhouse (Transport)
Jacki Ashley (Comms)

Did you have any additional thoughts on including Richard Huggins and Richard Benware?
Thanks!

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Friday, January 28, 2022 1:03 PM
To: Kim, Eunjung <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

This looks tremendous, Eunjung. Thanks to you and Max.

Tomas and I were discussing this morning, and we want to move forward with speed. There are a few amendments upon which I think we agreed – let me propose them here and tell us if you think they create any concerns?

Ex. 5 Deliberative Process (DP)

I hope that isn't too much to request – let me know if you want to discuss?

And have a great weekend!

Tim

From: Kim, Eunjung <Kim.Eun@epa.gov>
Sent: Thursday, January 27, 2022 12:46 PM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Hey Tomas and Tim,
Just met with Max and wanted to say thanks again for your email Tim! Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP)

Please let me know if you have any questions or if there's anything I can do to help.

Thanks!

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Thursday, January 27, 2022 10:57 AM
To: Kim, Eunjung <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

No worries, and glad it helps! Look forward to hearing what you find out.

From: Kim, Eunjung <Kim.Eun@epa.gov>
Sent: Thursday, January 27, 2022 10:56 AM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Thanks, Tim! And I apologize, I didn't mean to rush this information from you. My intention was just to figure out what OPEEE was planning to do and figure out the logistics of the invites. I was going to check back in with you all with this information before giving them the green light on next steps.
But that said, this is super helpful! I will relay all your key points and still check back in with you both before we get the ball really moving.

Thanks again!

Eunjung Kim
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(202) 815-7252

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Thursday, January 27, 2022 10:41 AM
To: Kim, Eunjung <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Knowing you and Max are talking in an hour, let me offer a little more thoughts here.

Ex. 5 Deliberative Process (DP)

Hope this helps – saying it rough but trying to get something to you in time for your conversation.

Cheers,

Tim

From: Kim, Eunjung <Kim.Eun@epa.gov>
Sent: Thursday, January 27, 2022 10:30 AM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Ex. 5 Deliberative Process (DP)

Eunjung Kim
Special Assistant
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Environmental Protection Agency
(202) 815-7252

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Thursday, January 27, 2022 10:26 AM

To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>
Subject: RE: Power Sector Listening Sessions

Hello Eunjung –

I will come forward with a more comprehensive proposal for prioritization asap – just drawn onto some other fire drill right now.

One thing that jumped from the WSJ article was the reactions of the industry – support from EEI, and the quote below from the coops – my instinct is to use these quotes to request a listening session with them asap. Do you agree?

Cheers,

Tim

**

An onslaught of new rules could raise the cost of power to business and consumers if it isn't implemented carefully, and the cost of compliance could also force older plants powered by coal, oil and natural gas to close, said Louis Finkel, senior vice president of government relations for the National Rural Electric Cooperative Association.

"If the ambition is to create death by a thousand cuts, to make it more difficult to operate, yes—that's wildly problematic," Mr. Finkel said.

Mr. Finkel said the idea of a coordinated approach isn't by itself a big concern but he would be eager to hear more details from Mr. Regan about how exactly the EPA might implement the strategy.

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Wednesday, January 26, 2022 11:19 AM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Kim, Eunjung <Kim.Eun@epa.gov>
Subject: RE: Power Sector Listening Sessions

Thank you both! Eunjung, please do make sure Tim is fully looped in on the plans for outreach to these stakeholders and status of scheduling. I had not been seeing OPEEE's outreach as a separate or parallel effort to the engagement strategy Tim has been planning – I think we are basically carrying out the "Phase 2" outreach that is in the latest version of the engagement strategy memo, in an effort to adjust to the new plans for timing of an Administrator announcement. Tim, are there particular stakeholders (like environmental NGOs) that you think we should be meeting with as a group?

Also, thanks for pulling together the list of technical experts – I agree we need to be careful about over-scheduling these folks. I suggest checking in with Kevin to see if he has a sense as to what the right balance might be. My instinct is that having Kevin or Nick on most of these calls will help ensure that stakeholder input is channeled efficiently to the regulatory teams, but I think Kevin will know best how to manage the team. Best,

Tomás

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Wednesday, January 26, 2022 10:57 AM

To: Kim, Eunjung <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Great – thanks!

From: Kim, Eunjung <Kim.Eun@epa.gov>
Sent: Wednesday, January 26, 2022 10:57 AM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

We haven't assigned the holds with the groups yet, Max and I will work on tracking and scheduling. As they get scheduled, each calendar hold will be updated with the respective groups. And yes we are using Rosemary's document as the blueprint for the necessary listening sessions we have to schedule.

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Wednesday, January 26, 2022 10:53 AM
To: Kim, Eunjung <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Thanks Eunjung! Do you know if a specific group is associated with each meeting on the calendar, or have we just held times that we can offer to the groups? And I figure these groups will track the list we put together in the outreach document that Rosemary produced – let me know if I am incorrect?

From: Kim, Eunjung <Kim.Eun@epa.gov>
Sent: Wednesday, January 26, 2022 10:43 AM
To: Profeta, Timothy <Profeta.Timothy@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Hey Tim,
My understanding is that the listening session will be mostly for these organizations to give their perspectives and ask questions – but Tomas please feel free to correct me if I'm wrong.
Rosemary is envisioning that each session only include 1 group, rather than combining similar organizations together.
The intended audience are various industry groups, labor organizations, NGOs, green groups, EJ groups, and public health organizations.
Please let me know if you have any further questions. Thanks!

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

From: Profeta, Timothy <Profeta.Timothy@epa.gov>
Sent: Wednesday, January 26, 2022 10:24 AM

To: Kim, Eunjung <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Eunjung –

One further question here – do you have any greater background on what these listening sessions are intended to do? As I think with the OAR staff about our own outreach efforts, I am interested in knowing what the OPEEE-organized outreach looks like so we ensure we are complementary and not redundant.

Thanks,

Tim

From: Profeta, Timothy
Sent: Tuesday, January 25, 2022 5:17 PM
To: Kim, Eunjung <Kim.Eun@epa.gov>; Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Subject: RE: Power Sector Listening Sessions

Tomas –

Would you like me to assemble a list of technical folks across all of the relevant rules? Or just the GHG rules?

I am also not sure how much we want to pull them away from their work to listen, or how much to have us represent EPA and then report into their processes.

Here's my most inclusive effort:

Kevin Culligan
Nick Hutson (all power rules)
Nick Swanson (111d GHG)
Christian Fellner (111b GHG)
Melanie King (MATS)
Beth Palma, Brian Timin (Regional Haze, PM NAAQS)
Rona Birnbaum, Jeb Stenhouse (Transport)

Also should we include CCR and ELG, which would be Richard Huggins and Richard Benware, respectively?

Let me know if you want to discuss.

Tim

From: Kim, Eunjung <Kim.Eun@epa.gov>
Sent: Tuesday, January 25, 2022 4:32 PM
To: Carbonell, Tomas <Carbonell.Tomas@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>
Subject: Power Sector Listening Sessions

Hey Tomas and Tim,
Max has sent out holds on your calendars for upcoming listening sessions with stakeholders on our power sector plan. They are open to have technical experts join these listening sessions. Could you send me a list of folks we should add to these holds?

Thanks!

Eunjung Kim
Special Assistant
Office of Air and Radiation
Environmental Protection Agency
(202) 815-7252

Message

From: Weaver, Susannah [Weaver.Susannah@epa.gov]
Sent: 1/31/2022 3:06:39 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Subject: RE: MATS

Yes! Big congratulations to you as well!

From: Carbonell, Tomas <Carbonell.Tomas@epa.gov>
Sent: Monday, January 31, 2022 10:04 AM
To: Weaver, Susannah <Weaver.Susannah@epa.gov>
Subject: MATS

Very glad to see the proposal go out today! Congratulations and thanks again for your hard work on this!

Message

From: Millett, John [Millett.John@epa.gov]
Sent: 2/1/2022 2:34:28 PM
To: Carbonell, Tomas [Carbonell.Tomas@epa.gov]
Subject: FW: Signed today: MATS A&N proposal -- web links live

---

From: Ashley, Jackie <Ashley.Jackie@epa.gov>
Sent: Tuesday, February 1, 2022 8:20 AM
To: Biton, Leiran <biton.leiran@epa.gov>; Haman, Patricia <Haman.Patricia@epa.gov>; Thundiyil, Karen <Thundiyil.Karen@epa.gov>; Koerber, Mike <Koerber.Mike@epa.gov>; Moeller, Njeri <Moeller.Njeri@epa.gov>
Cc: Culligan, Kevin <Culligan.Kevin@epa.gov>; Hutson, Nick <Hutson.Nick@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; King, Melanie <King.Melanie@epa.gov>; Dolwick, Pat <Dolwick.Pat@epa.gov>; Terry, Sara <Terry.Sara@epa.gov>; Macpherson, Alex <Macpherson.Alex@epa.gov>; LaCount, Melanie <LaCount.Melanie@epa.gov>; Gmyr, Joanna <Gmyr.Joanna@epa.gov>; McNerney, Matthew <McNerney.Matthew@epa.gov>; Cozzie, David <Cozzie.David@epa.gov>; Bremer, Kristen <Bremer.Kristen@epa.gov>; Weatherhead, Darryl <Weatherhead.Darryl@epa.gov>; OAQPS OD PACS <OAQPS_OD_PACS@epa.gov>; LaCount, Melanie <LaCount.Melanie@epa.gov>; Millett, John <Millett.John@epa.gov>; DeLuca, Isabel <DeLuca.Isabel@epa.gov>; Ting, Kaytrue <Ting.Kaytrue@epa.gov>
Subject: RE: Signed today: MATS A&N proposal

Good morning –
The MATS pages are updated. The links are below.

Main page
Mercury and Air Toxics Standards | US EPA
https://www.epa.gov/stationary-sources-air-pollution/mercury-and-air-toxics-standards

Proposed rule page
Proposed Revocation of the 2020 Reconsideration and Affirmation of the Appropriate and Necessary Supplemental Finding | US EPA
https://www.epa.gov/stationary-sources-air-pollution/proposed-revocation-2020-reconsideration-and-affirmation

---
Jackie Ashley (she/her/hers)
US EPA - Office of Air Quality Planning and Standards
Policy Analysis and Communications Staff
919.541.7664 - ashley.jackie@epa.gov

From: Ashley, Jackie
Sent: Monday, January 31, 2022 4:15 PM
To: Biton, Leiran <biton.leiran@epa.gov>; Haman, Patricia <haman.patricia@epa.gov>; Thundiyil, Karen <Thundiyil.Karen@epa.gov>; Koerber, Mike <koerber.mike@epa.gov>; Moeller, Njeri <Moeller.Njeri@epa.gov>
Cc: Culligan, Kevin <culligan.kevin@epa.gov>; Hutson, Nick <Hutson.Nick@epa.gov>; Profeta, Timothy <Profeta.Timothy@epa.gov>; King, Melanie <King.Melanie@epa.gov>; Dolwick, Pat <Dolwick.Pat@epa.gov>; Terry, Sara <Terry.Sara@epa.gov>; Macpherson, Alex <Macpherson.Alex@epa.gov>; LaCount, Melanie <lacount.melanie@epa.gov>; Gmyr, Joanna <Gmyr.Joanna@epa.gov>; McNerney, Matthew <McNerney.Matthew@epa.gov>; Cozzie, David <Cozzie.David@epa.gov>; Bremer, Kristen <bremer.kristen@epa.gov>; Weatherhead, Darryl <Weatherhead.Darryl@epa.gov>; OAQPS OD PACS <OAQPS_OD_PACS@epa.gov>; LaCount, Melanie <lacount.melanie@epa.gov>; Millett, John <millett.john@epa.gov>; Isabel DeLuca <DeLuca.Isabel@epa.gov>;

Ting, Kaytrue <Ting.Kaytrue@epa.gov>
Subject: Signed today: MATS A&N proposal

Good afternoon –
Today, the Administrator signed the proposal to reaffirm the scientific, economic, and legal underpinnings of the 2012 Mercury and Air Toxics Standards (MATS) for power plants. The press release (below) went out this afternoon.

Unfortunately, OAR Is not able to make updates to the web at this time, so have not yet been able to update the website and post documents. In the interim, attached please PDFs of

- the fact sheet
- pre-publication version of the preamble

OAQPS does not know when the web issues will be resolved. We will send around a link to the new MATS web page when it has been updated.

Thank you in advance for sharing with your key contacts as appropriate.

-Jackie

Jackie Ashley (she/her/hers)
US EPA - Office of Air Quality Planning and Standards
Policy Analysis and Communications Staff
919.541.7664 - ashley.jackie@epa.gov

EPA Reaffirms Scientific, Economic, and Legal Underpinnings of Limits on Toxic Emissions

Action Would Ensure Continued Protection for Children and Vulnerable Communities

Contact: EPA Press Office, press@epa.gov

WASHINGTON (Jan. 31, 2022) – Today, EPA is proposing to reaffirm the scientific, economic, and legal underpinnings of the 2012 Mercury and Air Toxics Standards (MATS) for power plants, which require significant reductions of mercury, acid gases, and other harmful pollutants. Controlling these emissions improves public health for all Americans by reducing fatal heart attacks, reducing cancer risks, avoiding neurodevelopmental delays in children, and helping to restore certain ecosystem functions that people and businesses value. These public health improvements are especially important for children and particularly vulnerable segments of the population such as Indigenous communities, low-income communities, and people of color who live near power plants or are affected by hazardous air pollution. The proposal, which responds to President Biden's January 20, 2021, Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis," would reverse a rule issued by the previous administration in May 2020, which undermined the legal basis for these vital health protections.

"Sound science makes it clear that we need to limit mercury and toxins in the air to protect children and vulnerable communities from dangerous pollution," said **EPA Administrator Michael S. Regan**. "EPA is committed to aggressively reducing pollution from the power sector so that all people, regardless of zip code or amount of money in their pocket, can breathe clean air and live healthy and productive lives."

The proposal would leave the current emissions standards unchanged but would ensure the continuation of public health protections provided by these requirements, while seeking information from the public on opportunities for additional pollution reductions. Taking account of the burden that hazardous air pollutants including mercury impose on public health as well as the costs of controlling these emissions, EPA proposes to find that it is appropriate and necessary to regulate emissions of air toxics from power plants under the Clean Air Act.

The MATS, combined with advancements in the power sector, have driven sharp reductions in harmful pollutants. EPA has estimated that by 2017, mercury emissions from power plants were reduced by 86 percent, acid gas emissions were reduced by 96 percent, and non-mercury metal emissions were reduced by 81 percent compared to pre-MATS levels in 2010.

Prior to the MATS, power plants were the largest domestic source of mercury and other toxic pollutants such as hydrogen chloride and selenium. They were also among the largest domestic contributors of arsenic, chromium, cobalt, nickel, hydrogen cyanide, beryllium, and cadmium.

The initial appropriate and necessary finding was made in 2000 and affirmed in 2012 and 2016. In May 2020, the previous administration reversed EPA's 2016 finding, undermining the legal basis for the Mercury and Air Toxics Standards. President Biden's Executive Order 13990 directed EPA to review that finding and consider an action to rescind it. In today's action, EPA proposes to find that the 2020 action was based on a fundamentally flawed interpretation of the Clean Air Act that improperly ignored or undervalued vital health benefits from reducing hazardous air pollution from power plants. Based on a thorough review of these benefits, the reasonable costs of controls, and other relevant factors, EPA is proposing to reaffirm that it is appropriate and necessary to regulate emissions of hazardous air pollutants from coal- and oil-fired power plants.

The agency is also continuing to consider the MATS Risk and Technology Review, as directed by Executive Order 13990, to determine whether more stringent protections for hazardous air pollution from power plants are feasible and warranted. To support that review, EPA is soliciting information on the performance and cost of new or improved technologies or methods of operation to control hazardous air pollution emissions, as well as risk-related information, as a part of this proposal.

EPA will accept comment on the proposal for 60 days after publication in the *Federal Register*. The agency also plans to hold a virtual public hearing. Details about the hearing will be announced online in the coming weeks.

Please contact press@epa.gov for a copy of the proposal.

Appointment

From: Rakosnik, Delaney [rakosnik.delaney@epa.gov]
Sent: 1/5/2022 4:32:58 PM
To: Profeta, Timothy [Profeta.Timothy@epa.gov]; Carbonell, Tomas [Carbonell.Tomas@epa.gov]; Culligan, Kevin [Culligan.Kevin@epa.gov]; Birnbaum, Rona [Birnbaum.Rona@epa.gov]

Subject: HOLD || Meeting with American Public Power Assoc re: Clean Air Act & NESHAP
Attachments: APPA_12022021_ External meeting requests pdf.pdf
Location: TBD

Start: 1/14/2022 4:00:00 PM
End: 1/14/2022 4:30:00 PM
Show Time As: Tentative

Required Attendees: Profeta, Timothy; Carbonell, Tomas; Culligan, Kevin; Birnbaum, Rona

APPA_12022021_
External meeting...

Appointment

From: Haman, Patricia [Haman.Patricia@epa.gov]
Sent: 1/11/2022 8:20:18 PM
To: Haman, Patricia [Haman.Patricia@epa.gov]; Schmeltz, David [Schmeltz.David@epa.gov]; Puchalski, Melissa [Puchalski.Melissa@epa.gov]; Riley, Scott M. [riley.scottm@epa.gov]
CC: Kim, Eunjung [Kim.Eun@epa.gov]; Olson, Heather [Olson.Heather@epa.gov]; Graff, Michelle [graff.michelle@epa.gov]; Lau, Patrick [Lau.Patrick@epa.gov]; Birnbaum, Rona [Birnbaum.Rona@epa.gov]; Laverdiere, Maria [Laverdiere.Maria@epa.gov]

Subject: Cofirmed: 101 Briefing for Rep. Stefanik's staff on the Acid Rain Program
Attachments: EPA_CASTNET_LTM_STEFANIK.pdf
Location: Microsoft Teams Meeting

Start: 1/19/2022 5:30:00 PM
End: 1/19/2022 6:00:00 PM
Show Time As: Busy

Required Attendees: Schmeltz, David; Puchalski, Melissa; Riley, Scott M.
Optional Attendees: Kim, Eunjung; Olson, Heather; Graff, Michelle; Lau, Patrick; Birnbaum, Rona; Laverdiere, Maria

Hi, Adding in the slides Dave sent over so everyone has them handy. Pat

---

Microsoft Teams meeting

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