From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:48:48 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:27 PM
To: Collections.SubW
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Friday, November 04, 2016 10:27 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Thanks Dan. We will get back to you as soon as possible.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Schultheisz, Daniel [mailto:Schultheisz.Daniel@epa.gov]
Sent: Friday, November 4, 2016 9:24 AM
To: Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily

<seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Aaron:

Attached is EPA's proposed response to the additional comment from the interagency review of the Subpart W final rule. We provide two options to clarify the point noted by the commenter, with our preferred option identified. Please let me know if you need anything else. Thanks.

FYI, I will be on travel next Monday and Tuesday, but should be able to respond to emails. Thanks.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Thursday, October 27, 2016 3:57 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Attached please find the summary of additional interagency comments under EO 12866 and 13563 for the EPA draft final rule entitled, "Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings" (2060-AP26) in response to the most recent response provided by EPA.

Please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:48:33 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:28 PM
To: Collections.SubW
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Friday, November 04, 2016 3:22 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Dan,

Thank you again for the response to comments. The interagency reviewers agree with the use of the EPA preferred approach.

At this time, please provide a redline-strikeout version reflecting all of the changes during the interagency review and a clean version. I have also opened up ROCIS for amendment such that the revised versions of the documents can be uploaded. Please have OP email me when the new version has been uploaded to ROCIS.
Thank you again and please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget

202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Schultheisz, Daniel [mailto:Schultheisz.Daniel@epa.gov]
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Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Aaron:

Attached is EPA's proposed response to the additional comment from the interagency review of the Subpart W final rule. We provide two options to clarify the point noted by the commenter, with our preferred option identified. Please let me know if you need anything else. Thanks.

FYI, I will be on travel next Monday and Tuesday, but should be able to respond to emails. Thanks.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
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Subject: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Attached please find the summary of additional interagency comments under EO 12866 and 13563 for the EPA draft final rule entitled, "Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings" (2060-AP26) in response to the most recent response provided by EPA.

Please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:48:22 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:28 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Peake, Tom
Sent: Friday, November 04, 2016 4:50 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: terrific news on Subpart W!

Great news on Subpart W!

Dan has heard from OMB that the rule has cleared the interagency review process!
There is still clean-up and finalizing everything and getting the docket in order and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.

Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.

Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: terrific news on Subpart W!
Date:	Monday, January 09, 2017 11:48:14 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:28 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Peake, Tom
Sent: Friday, November 04, 2016 4:54 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: RE: terrific news on Subpart W!

And special thanks to Phil, too!

From: Peake, Tom
Sent: Friday, November 04, 2016 4:50 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
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Tom Peake
US EPA Radiation Protection Division

Director, Center for Waste Management and Regulations
phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:48:00 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:28 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Egidi, Philip
Sent: Friday, November 04, 2016 5:00 PM
To: Peake, Tom <Peake.Tom@epa.gov>; OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Aw shucks.
I really didn't have to contribute that much since Dan was in charge - it was written as well as could be!
I am impressed with his clarity and communication skills on this effort.
It will be great to see the final rule published...

PVE

From: Peake, Tom
Sent: Friday, November 4, 2016 4:54:16 PM
To: OAR-ORIA-RPD; Flynn, Mike; Edwards, Jonathan; Cherepy, Andrea
Cc: Reid Rosnick ; Rodman, Sonja; Seidman, Emily; Stahle, Susan
Subject: RE: terrific news on Subpart W!

And special thanks to Phil, too!

From: Peake, Tom

Sent: Friday, November 04, 2016 4:50 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: terrific news on Subpart W!

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Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: terrific news on Subpart W!
Date:	Monday, January 09, 2017 11:47:48 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:28 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Rodman, Sonja
Sent: Friday, November 04, 2016 5:00 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: FW: terrific news on Subpart W!

FYI, this is a little premature. It hasn't actually cleared yet. They won't clear it until they get a redline showing the changes.

Sonja L. Rodman, Assistant General Counsel for Air Toxics, Consumer Protection and Indoor Air / Office of General Counsel / U.S. Environmental Protection Agency / (202) 564-4079 / 202-768-2120 (cell)

From: Peake, Tom
Sent: Friday, November 04, 2016 4:54 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: RE: terrific news on Subpart W!

And special thanks to Phil, too!

From: Peake, Tom
Sent: Friday, November 04, 2016 4:50 PM

To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: terrific news on Subpart W!

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Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.

Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: terrific news on Subpart W!
Date:	Monday, January 09, 2017 11:47:38 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:28 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Veal, Lee
Sent: Friday, November 04, 2016 6:29 PM
To: Peake, Tom <Peake.Tom@epa.gov>
Cc: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Congratulations all!

Lee Ann B Veal
Director, CREM
Office 202-343-9448
Cell 202-617-4322

On Nov 4, 2016, at 4:54 PM, Peake, Tom <Peake.Tom@epa.gov> wrote:

> And special thanks to Phil, too!
>
> ---
>
> **From:** Peake, Tom
> **Sent:** Friday, November 04, 2016 4:50 PM
> **To:** OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
> **Cc:** Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
> **Subject:** terrific news on Subpart W!
>
> Great news on Subpart W!

Dan has heard from OMB that the rule has cleared the interagency review process! There is still clean-up and finalizing everything and getting the docket in order and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.

Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.

Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:47:29 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:28 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Reid Rosnick [mailto:rosnickr@gmail.com]
Sent: Friday, November 04, 2016 6:44 PM
To: Peake, Tom <Peake.Tom@epa.gov>
Cc: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Great news! Thanks, Tom.

On Friday, November 4, 2016, Peake, Tom <Peake.Tom@epa.gov> wrote:

> Great news on Subpart W!
>
> Dan has heard from OMB that the rule has cleared the interagency review process! There is still clean-up and finalizing everything and getting the docket in order and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.
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> Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.
>
> Tom Peake
> US EPA Radiation Protection Division
> Director, Center for Waste Management and Regulations
> phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:47:15 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:29 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Flynn, Mike
Sent: Saturday, November 05, 2016 10:55 AM
To: Reid Rosnick <rosnickr@gmail.com>
Cc: Peake, Tom <Peake.Tom@epa.gov>; OAR-ORIA-RPD <OARORIARPD@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Great to hear - congratulations everyone!

Mike

Mike Flynn
Associate Deputy Administrator
Office of the Administrator
U.S. Environmental Protection Agency
202-564-4711

On Nov 4, 2016, at 6:43 PM, Reid Rosnick <rosnickr@gmail.com> wrote:

> Great news! Thanks, Tom.
>
> On Friday, November 4, 2016, Peake, Tom <Peake.Tom@epa.gov> wrote:
>
> > Great news on Subpart W!
> >
> > Dan has heard from OMB that the rule has cleared the interagency review process!
> > There is still clean-up and finalizing everything and getting the docket in order

and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.

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Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: RTC Sections
Date: Monday, January 09, 2017 11:46:52 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:29 PM
To: Collections.SubW
Subject: FW: RTC Sections

From: Seidman, Emily
Sent: Monday, November 07, 2016 9:20 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: RTC Sections

Thanks, Dan. I'll begin my review and be in touch with you. Safe travels today and tomorrow.

From: Schultheisz, Daniel
Sent: Monday, November 07, 2016 8:37 AM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: RTC Sections

Emily:

Here are five RTC sections updated to reflect the contents of the preamble. There should not be any significant changes needed, but I would like you to look them over. I anticipate the final version will not include the comment excerpts, but they are retained here for completeness. Thanks.

Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:46:35 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:29 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Rodman, Sonja
Sent: Monday, November 07, 2016 9:36 AM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: RE: terrific news on Subpart W!

No, I must have missed that e-mail. Thanks. It will be good to get this one signed!

Sonja L. Rodman, Assistant General Counsel for Air Toxics, Consumer Protection and Indoor Air / Office of General Counsel / U.S. Environmental Protection Agency / (202) 564-4079 / 202-768-2120 (cell)

From: Seidman, Emily
Sent: Monday, November 07, 2016 8:51 AM
To: Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: terrific news on Subpart W!

Dan provided Aaron Szabo with a RLSO version of the FRN & rule text in his Friday transmission (attached). Is there something else Dan has to send?

From: Rodman, Sonja
Sent: Friday, November 04, 2016 5:00 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: FW: terrific news on Subpart W!

FYI, this is a little premature. It hasn't actually cleared yet. They won't clear it until they get a redline

showing the changes.

Sonja L. Rodman, Assistant General Counsel for Air Toxics, Consumer Protection and Indoor Air / Office of General Counsel / U.S. Environmental Protection Agency / (202) 564-4079 / 202-768-2120 (cell)

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Sent: Friday, November 04, 2016 4:54 PM
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Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: RE: terrific news on Subpart W!

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Sent: Friday, November 04, 2016 4:50 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: terrific news on Subpart W!

Great news on Subpart W!

Dan has heard from OMB that the rule has cleared the interagency review process!
There is still clean-up and finalizing everything and getting the docket in order and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.

Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.

Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: RTC Sections
Date: Monday, January 09, 2017 11:46:25 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:29 PM
To: Collections.SubW
Subject: FW: RTC Sections

From: Schultheisz, Daniel
Sent: Monday, November 07, 2016 9:20 AM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: Automatic reply: RTC Sections

I am out of the office until November 9. I will return your email upon my return to the office.

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W Update
Date: Monday, January 09, 2017 11:46:14 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:29 PM
To: Collections.SubW
Subject: FW: Subpart W Update

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 8:44 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald <Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: Subpart W Update

To the Subpart W Workgroup:

OMB officially cleared Subpart W this week. We are now working to get the package prepared to submit for signature. Thanks for all your assistance.

Dan

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Legal Responses for Review
Date:	Monday, January 09, 2017 11:45:36 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:30 PM
To: Collections.SubW
Subject: FW: Legal Responses for Review

From: Seidman, Emily
Sent: Thursday, November 10, 2016 4:45 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Legal Responses for Review

These look good. No comments from me. Thanks.

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 2:33 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: Legal Responses for Review

Only the last issue is not included in the preamble.

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W ICR
Date: Monday, January 09, 2017 11:45:28 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:31 PM
To: Collections.SubW
Subject: FW: Subpart W ICR

-----Original Appointment-----
From: Rodman, Sonja
Sent: Monday, November 14, 2016 3:33 PM
To: Seidman, Emily
Subject: Accepted: Subpart W ICR
When: Tuesday, November 15, 2016 11:30 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Emily and Sonja will call Dan (343-9349)

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W ICR
Date: Monday, January 09, 2017 11:45:18 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:31 PM
To: Collections.SubW
Subject: FW: Subpart W ICR

-----Original Appointment-----
From: Schultheisz, Daniel
Sent: Monday, November 14, 2016 4:11 PM
To: Seidman, Emily
Subject: Accepted: Subpart W ICR
When: Tuesday, November 15, 2016 11:30 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Emily and Sonja will call Dan (343-9349)

Call my cell instead: (202) 236-8264

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: got your message
Date: Monday, January 09, 2017 11:44:38 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:31 PM
To: Collections.SubW
Subject: FW: got your message

From: Seidman, Emily
Sent: Thursday, November 17, 2016 8:34 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: got your message

Thanks for the update. Keep me posted on progress and anything I can review to help with the package.

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Inside EPA article on CRA
Date:	Monday, January 09, 2017 11:44:25 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:31 PM
To: Collections.SubW
Subject: FW: Inside EPA article on CRA

From: Schultheisz, Daniel
Sent: Thursday, November 17, 2016 4:02 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: FW: Inside EPA article on CRA

FYI

From: Schultheisz, Daniel
Sent: Wednesday, November 16, 2016 8:14 AM
To: Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Doster, Brian <Doster.Brian@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: RE: Inside EPA article on CRA

Here's a brief Congressional Research Service paper on the CRA. Based on the premise that any final rule submitted to Congress for which both houses do not have a full 60 legislative day review (i.e., both houses must be in session for 60 consecutive days), the new administration would have an additional period for review. This pushes the date back to May 30, 2016, presumably because there were so many recesses in the election year.

http://www.fas.org/sgp/crs/misc/IN10437.pdf

From: Rosencrantz, Ingrid
Sent: Wednesday, November 16, 2016 7:16 AM
To: Perrin, Alan <Perrin.Alan@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Doster, Brian <Doster.Brian@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Inside EPA article on CRA

http://insideepa.com/news-briefs/white-house-threatens-veto-bill-expanding-cra-review

Ingrid Rosencrantz
Senior Physical Scientist
Radiation Protection Division
Office of Radiation and Indoor Air
Office of Air and Radiation
202-579-5157

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: RTC Section 12 (General)
Date: Monday, January 09, 2017 11:44:15 AM

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:31 PM
To: Collections.SubW
Subject: FW: RTC Section 12 (General)

From: Seidman, Emily
Sent: Monday, November 21, 2016 4:38 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: RTC Section 12 (General)

Thanks for sending this over. I'll try to get this back to you tomorrow. I'll be in the office tomorrow. On Wednesday, I'll be working remotely and can be reached at 646-354-9254.

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

From: Schultheisz, Daniel
Sent: Monday, November 21, 2016 4:36 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: RTC Section 12 (General)

This one was a real grind. Only the out of scope left. Thanks.

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Please look at this
Date: Monday, January 09, 2017 11:44:01 AM
Attachments: Comment.pdf

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:32 PM
To: Collections.SubW
Subject: FW: Please look at this

From: Schultheisz, Daniel
Sent: Friday, November 25, 2016 3:58 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: Please look at this

Emily:

Take a look at this and let me know what you think. Thanks.

Dan

Uranium Watch

76 South Main Street, # 7 | P.O. Box 344
Moab, Utah 84532
435-260-8384

January 15, 2015

via electronic mail

Air and Radiation Docket
Environmental Protection Agency
Mailcode: 2822T
1200 Pennsylvania Ave., NW
Washington, D.C. 20460
a-and-r-docket@epa.gov

Re: Docket ID No. EPA–HQ– OAR–2008–0218. Supplement No. 3 to Comments on Proposed Rule: Revisions to National Emission Standards for Radon Emissions From Operating Mill Tailings (40 C.F.R. Part 61 Subpart W). 79 Fed. Reg. 25388, May 2, 2014.

Dear Sir or Madam:

Below please find Supplement 3 to the October 29, 2014, comments on Environmental Protection Agency (EPA) Proposed Revisions to National Emission Standards for Radon Emissions From Operating Mill Tailings, 49 C.F.R. Part 61 Subpart W, Docket ID No. EPA–HQ– OAR–2008–0218; 79 Fed. Reg. 25388, May 2, 2014. These comments are submitted by Uranium Watch and on behalf of Living Rivers and Information Network on Responsible Mining.

These comments, though submitted after the October 29, 2014, close of the Subpart W Revision comment period, are based on additional information regarding the relationship between the Clean Air Act and 40 C.F.R. Part 61, Subpart W. and consideration of an important legal issue that the EPA failed to address in the EPA Proposed Revisions to National Emission Standards for Radon Emissions From Operating Mill Tailings (Proposed Rules). Considering the long time for the EPA to develop the Proposed Rules and the numerous May 2, 2014, *Federal Register* Notice inadequacies, the expectation of over a year to develop the Final Rule, Uranium Watch requests that the EPA give full consideration to the following comments.

THE CLEAN AIR ACT AND 40 C.F.R. PART 61 SUBPART W

1. Commenters provided comments in the applicability of Section 112(h) of the Clean Air Act (CAA), as amended in 1990, in the October 29, 2014, Comments on Proposed Rule: Revisions to National Emission Standards for Radon Emissions From Operating Mill Tailing. Section II.1. of the comments asserted that under the provisions of Section 112(h) of the CAA, the EPA cannot establish a design, equipment, work practice, or operational standard, or combination thereof (whether through the application of maximum available technologies or generally available technologies) **in lieu of** an emission standard unless the Administrator makes certain findings. If the EPA proposes to establish a design, equipment, work practice, or operational standard, or combination thereof, the Administrator must find that it is not feasible to prescribe or enforce an emission standard, meaning that the the application of a measurement methodology is not technologically and economically practicable. The Proposed Rules made no mention of such a provision and did not make such findings.

2. The Clean Air Act of 1977. Public Law 95-95 - August 7, 1977. 91 STAT. 703. Emission Standards for Hazardous Air Pollutants (Design or equipment standards, 42 U.S.C. 7412.). The Clean Air Act (CAA)of 1977 has language similar to the provisions in Section 112(h) of the CAA as amended in 1990. Section 110 of the CAA of 1977 states:

> Section 112 of the Clean Air Act is amended by adding the following new subsection at the end thereof:
>
> (e)(1) **For purposes of this section, if in the judgment of the Administrator, it is not feasible to prescribe or enforce an emission standard for control of a hazardous air pollutant or pollutants, he may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof, which in his judgment is adequate to protect the public health from such pollutant or pollutants with an ample margin of safety.** 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 an emission standard' means any situation in which the Administrator determines that** (A) a hazardous 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 in not practicable due to technological or economic limitations.**
>
> (3) If after notice and opportunity for public hearing, and 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.
>
> (4) **Any standard promulgated under paragraph (1) shall be promulgated in terms of an emission standard whenever it becomes feasible to promulgate and enforce such a standard in such terms.** [Emphasis added.]

These provisions of the CAA of 1977 were applicable to the promulgation, or lack of promulgation, of National Emission Standards for Radon Emissions From Operating Mill Tailings in the 1980s. What is clear is that the EPA invoked Section 112(e) when making a determination that the promulgation of an emission standard was not "feasible." However, in 1989, when the EPA promulgated a radon-222 emission standard for "existing" impoundments and did not promulgate an radon-222 emission standard for similar "new" impoundments, there was no mention of a finding that it was "not feasible to prescribe or enforce an emission standard" for "new" impoundments (i.e., constructed after December 1989).

3. There are statements made by the EPA in previous *Federal Register* Notices that support the assertion above. Below are those statements:

3.1. Part 192: Environmental Standards for Uranium and Thorium Mill Tailings at Licensed Commercial Processing Sites, 40 C.F.R. Part 192, 48 Fed. Reg. 45926; October 14, 1983.[1] Part 192 in 1983 contains statements the show that the EPA was aware of the provisions in the CAA with respect the promulgation of Standard for Radon-222 Emissions From Licensed Uranium Mills.

The October 1983 Part 192 *Federal Register* Notice contains a discussion of the Relationship to the Clean Air Act Emission Standard Requirements. This section, page 45938, col. 3, at 3., to page 35939, states:

> The Clean Air Act also requires that EPA provide public health protection from air emissions from tailings piles. Further, EPA is publishing an ANPR to consider additional control of radon emissions during the operational phase of mills. This discussion relates to the disposal phase.
>
> The Clean Air Act requires that the Administrator establish a standard at the level which in his judgment provides an ample margin of safety to protect the public health from hazardous air pollutants. The Agency published proposed rules for radionuclides as National Emission Standards for Hazardous Air Pollutants [NESHAPS] on April 6, 1983 (48 FR 15076). The proposed rule addressed all of the sources of emissions of

[1] https://blog.epa.gov/milltailingblog/wp-content/uploads/2009/12/48fr45926.pdf

> radionuclides that EPA had identified. The proposed rule either provided standards for various source categories or proposed not to regulate them and provided reasons for that decision.
>
> In the proposed NESHAPS for radionuclides EPA did not propose additional standards for uranium mill tailings, because the Agency believed the EPA standards to be established under UMTRCA would provide the same degree of protection as required by Section 112 of the Clean Air Act.
> ***
> **The Clean Air Act specifies that the Administrator promulgate emissions standards to protect the public health. The Administrator is also authorized to promulgate design, equipment, work practice, or operational standards, or a combination, if it is not feasible to prescribe or enforce emission standards. The Administrator can conclude that "it is not feasible" if a hazardous pollutant cannot be emitted through a conveyance or the use of the conveyance would be contrary to laws, or if measurement methodologies are not practicable due to technological or economic limitations. As noted above, we will consider the need for such standards for the operational phase of mills.** [Emphasis added.] [Page 35939, col. 2 to col. 3.]

3.2. Environmental Protection Agency, 40 C.F.R. Part 61. National Emission Standards for Hazardous Air Pollutants (NESHAPS): Regulations of Radionuclides; Withdrawal of Proposed Standards. Standard for Radon-222 Emissions From Licensed Uranium Mills; Proposed Rule and Announcement of Public Hearing; 51 Fed. Reg. 6382, February 21, 1986. This Proposed Rule states, in part:

> V. Summary of Proposed Standard.
> Based on currently available information, EPA has determined that is is not feasible to prescribe an emission standard for radon-222 emissions from uranium mills. Therefore, the Agency is proposing a work practice standard to limit radon-222 emissions from license uranium mills.

Therefore, the EPA recognized that, if they did not prescribe an emission standard for radon-222 emissions from uranium mills, it was necessary to determine that it was not feasible to promulgate such a standard, as required under Section 1123(e) of the CAA.

3.3. Environmental Protection Agency, 40 C.F.R. Part 61. National Emission Standards for Hazardous Air Pollutants (NESHAPS): Regulations of Radionuclides; Withdrawal of Proposed Standards. Standard for Radon-222 Emissions From Licensed Uranium Mills; Final Rule; 51 Fed. Reg. 34056 September 24, 1986. This Final Rule states, in part:

> IV. Summary of Proposed Standards. As noted earlier, EPA published a proposed rulemaking regarding control of radon-222

> emissions from tailings piles at licensed sites on February 21 1986 (51 FR 6382). **That notice announced that EPA was considering various work practice standards for limiting such emissions based on its preliminary conclusions that it is not feasible to set an emissions standard,** and that the nature of the risk involved warrants a regulatory response. [Emphasis added.] [Page 34058, col. 2.]
>
> ***
>
> **The NRC questioned why EPA did not issue an emission standard, such as already exists in NRC and State regulations, instead of proposing a work practice standard. The Agency judges that it is not feasible to prescribe an emission standard since most of the radon emitted by a uranium mill comes from the surface of mill tailings piles.** A typical pile may be from a few to hundreds of acres in area, and emissions from its surface cannot be controlled through conveyance designed and constructed to emit or capture radon. It is also not practical to accurately and consistently measure emissions because of the large size of the tailings pile and the continued modifications of the pile that take place during operations. For these and others reasons, a work practice standard is being promulgated. [Emphasis added.] [Page 34059, col. 2.]
>
> ***
>
> VI. Summary and Rationale of Final Rule. A. Summary
>
> **Based on currently available information, EPA has determined that is not feasible to prescribe an emission standard for radon emissions from uranium mills.** [Emphasis added.] [Page 34060, col. 3.]

Therefore, with the 1986 Final Rule, the EPA did not issue an emission standard and made a determination that is was not "feasible" to do so. Clearly, this determination was responsive to the 1977 CAA Section 112(e) requirements.

3.4. Environmental Protection Agency, 40 C.F.R. Part 61. National Emission Standards for Hazardous Air Pollutants: Regulations of Radionuclides; Proposed Rule and Announcement of Public Hearing; 54 Fed. Reg. 9612, March 7, 1989.

This Proposed Rule proposed National Emission Standards for Radon Emissions From Operating Mill Tailings at Subpart W. The EPA proposed 4 approaches to work practice and design standards for operating mills. However, these approaches were not accompanied by a finding that it was not feasible to prescribe an emission standard for radon emissions from uranium mills. Somehow, the EPA forgot about the requirements in Section 112(e) of the CAA.

3.5. Environmental Protection Agency, 40 C.F.R. Part 61. National Emission Standards for Hazardous Air Pollutants: Regulations of Radionuclides; Proposed Rule and Announcement of Public Hearing; 54 Fed. Reg. 9612, March 7, 1989.

This Proposed Rule proposed National Emission Standards for Radon Emissions From Operating Mill Tailings at Subpart W. The EPA proposed 4 approaches to work practice and design standards for operating mills. However, these approaches were not

accompanied by a finding that it was not feasible to prescribe an emission standard for radon emissions from uranium mills. Somehow the EPA forgot about the requirement in Section 112(e) of the CAA.

3.6. Environmental Protection Agency, 40 C.F.R. Part 61. National Emission Standards for Hazardous Air Pollutants: Regulations of Radionuclides; Final Rule and Notice of Reconsideration; 54 Fed. Reg. 51654, December 15, 1989.

This Final Rule established National Emission Standards for Radon Emissions From Operating Mill Tailings at Subpart W, along with standards for other Radionuclide emission sources. The final rule established an emission standard for "existing" tailings impoundments (constructed prior to December 1989). And, the EPA established work practice and design standards for "new" tailings impoundments (constructed after December 1989). The EPA did not make a finding that it was not feasible to prescribe an emission standard for radon emissions from "new" impoundments. Somehow the EPA forgot about the requirement in Section 112(e) of the CAA for such a finding. And, the reality was that the EPA could not make such a finding after establishing an emission standard for "existing" impoundments.

4. In sum:

4.1. The EPA made it clear in the October 1983 Part 192 Rulemaking and the 1986 Proposed and Final Rules that Section 112(e) of the 1977 CAA required that any EPA decision not to promulgate a radon-222 emission standard for uranium mills needed to be accompanied by a determination that such an emission standard was not feasible. (However erroneous that determination may have been.)

4.2. With the 1989 Subpart W Rulemaking, the EPA failed to, and, in fact, could not, make the determination required by Section 112(e) of the CAA of 1977 that is was not feasible to promulgate an emission standard when they promulgated a design and work practice standard for "new" tailings impoundments.

4.3. With the 2014 Subpart W Rulemaking, when the EPA proposed design and work practice standards in lieu of emission standards for all tailings impoundments, in-situ leach operations, and heap leach operations, the EPA failed to make the determination required by Section 112(h) of the CAA of 1990 that is was not feasible to promulgate an emission standard.

4.4. Therefore, it appears that the 1989 design and work practice standards for "new" impoundments were promulgated contrary to the requirements of Section 112(e) 1977 CAA. It also appears that the 2014 Subpart W Proposed Rules are contrary to the requirements of the Section 112(h) CAA of 1990, because ther EPA proposed design and work practice standards without making a determination that emission standards were not feasible.

Thank you for your consideration of these comments.

Respectfully submitted,

Sarah Fields
Program Director

And on behalf of:

Jennifer Thurston
Director
Information Network for Responsible Mining
P.O. Box 27
Norwood, Colorado 81423

John Weisheit
Conservation Director
Living Rivers
P.O. Box 466
Moab, Utah 84532

cc: Rusty Lundberg, Utah DRC
Bryce Bird, Utah DAQ
Angilique Diaz, EPA Region 8
Reid Rosnick, EPA
Caryn Mullerieile,EPA
Andera Cherepy, EPA
Tom Peake, EPA
Daniel Schultheisz, EPA
Susan Stahle, EPA
Jonathan Edwards, EPA
Mike Flynn, EPA
Elliott Zenick, EPA
Wendy Blake, EPA
Davis Zhen, EPA
Lena Ferris, EPA
Tim Brenner, EPA
Charlie Garlow, EPA
Stuart Walker, EPA
Steve Hoffman, EPA
Marilyn Ginsburg, EPA
Bob Dye, EPA
Gina McCarthy, EPA
Janet McCabe, EPA
Avi Garbow, EPA

Cynthis Giles, EPA
Michael Goo, EPA
Mathy Stanislaus

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: H. Rep. No. 1480
Date: Monday, January 09, 2017 11:43:42 AM
Attachments: H. Rep. No. 1480.pdf

From: Seidman, Emily
Sent: Monday, December 5, 2016 5:32 PM
To: Collections.SubW
Subject: FW: H. Rep. No. 1480

From: Seidman, Emily
Sent: Monday, November 28, 2016 11:54 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: H. Rep. No. 1480

Dan,

H. Rep. 1480 is attached and the quote on page 56 of the preamble is on page 21 of the attached report. You can use this in the docket and delete the phrase "reprinted in, 1978 U.S. Code Cong. & Admin. News 7433, 7444" from the preamble language.

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

95TH CONGRESS } HOUSE OF REPRESENTATIVES { REPT. 95-1480
2d Session } { Part I

AUTHORIZING THE SECRETARY OF ENERGY TO ENTER INTO COOPERATIVE AGREEMENTS WITH CERTAIN STATES RESPECTING RESIDUAL RADIOACTIVE MATERIAL AT EXISTING SITES, PROVIDING FOR THE REGULATION OF URANIUM MILL TAILINGS UNDER THE ATOMIC ENERGY ACT OF 1954, AND FOR OTHER PURPOSES

AUGUST 11, 1978.—Ordered to be printed

Mr. UDALL, from the Committee on Interior and Insular Affairs, submitted the following

REPORT

[To accompany H.R. 13650 which on July 28, 1978 was referred jointly to the Committees on Interior and Insular Affairs and Interstate and Foreign Commerce]

The Committee on Interior and Insular Affairs to whom was referred the bill (H.R. 13650) to authorize the Secretary of Energy to enter into cooperative agreements with certain States respecting residual radioactive material at existing sites, to provide for the regulation of uranium mill tailings under the Atomic Energy Act of 1954, and for other purposes, having considered the same, reports favorably thereon with an amendment and recommends that the bill as amended do pass.

The amendment is as follows:

Page 1, beginning on line 3, strike out all after the enacting clause and insert in lieu thereof the following:

That this Act may be cited as the "Uranium Mill Tailings Control Act of 1978".

SECTION 1. Short title and table of contents.

TITLE I—RESIDUAL RADIOACTIVE MATERIAL AT CERTAIN EXISTING SITES

29-006—78——1

TITLE II—URANIUM MILL TAILINGS LICENSING AND REGULATION

TITLE I—RESIDUAL RADIOACTIVE MATERIAL AT CERTAIN EXISTING SITES

DEFINITIONS

SEC. 101. For purposes of this title—

(1) The term "processing site" means any site which is designated by the Secretary under section 102 as a processing site for purposes of this title.

(2) The term "residual radioactive material" means—

(A) radioactive material in the form of tailings or waste resulting from the processing of ores for the extraction from such ores of uranium, other valuable constituents, or both;

(B) other radioactive materials at the processing site which are related to such processing, including any residual stock of unprocessed ores or low-grade materials; and

(C) any ground or structure which (i) is in the vicinity of the site where such ores were processed, and (ii) is contaminated with radioactive material derived from such site.

(3) The term "Secretary" means the Secretary of Energy unless otherwise expressly provided.

(4) The term "Commission" means the Nuclear Regulatory Commission.

(5) The term "Administrator" means the Administrator of the Evnironmental Protection Agency.

DESIGNATION OF PROCESSING SITES

SEC. 102. (a) As soon as practicable after the date of the enactment of this Act, the Secretary shall designate as processing sites for purposes of this title 22 sites at the following locations at which uranium was produced before the date of the enactment of this Act:

Salt Lake City, Utah,
Green River, Utah,
Mexican Hat, Utah,
Durango, Colorado,
Grand Junction, Colorado,
Rifle, Colorado (two sites),
Gunnison, Colorado,
Naturita, Colorado,
Maybell, Colorado,
Slick Rock, Colorado (two sites),
Shiprock, New Mexico,
Ambrosia Lake, New Mexico,
Riverton, Wyoming,
Converse County, Wyoming,
Lakeview, Oregon,
Falls City, Texas,
Tuba City, Arizona,
Monument Valley, Arizona,
Lowman, Idaho,
Canonsburg, Pennsylvania.

(b)(1) The Commission, in consultation with the attorney general of the State of New Mexico, shall conduct a study to determine the extent of the authority of the State of New Mexico to require the owners of the following sites to undertake appropriate remedial action to limit the exposure of the public to radiation associated with residual radioactive materials at such sites: the Homestake-New Mexico Partners site near Milan, New Mexico, and the Anaconda carbonate process tailings site near Bluewater, New Mexico. Not later than one year after the date of the enactment of this Act, the Commission shall issue a report containing the results of the study.

(2) As soon as practicable after reviewing the report and recommendations of the Commission under paragraph (1), the Secretary shall designate either or both of the sites studied under paragraph (1) as a processing site for purposes of this title if he determines that the State does not have adequate authority to require that appropriate remedial action be undertaken with respect to any such site.

(c) Within five years after the date of the enactment of this Act, the Secretary may designate as a processing site for purposes of this title any site which is not referred to in subsection (a) or (b) and at which uranium was produced under contract for sale to the United States if he determines that such designation is necessary and desirable to protect public health, safety, and the environment. No such site may be designated under this subsection if—

(1) such site was owned by the United States on January 1, 1978, or

(2) a license, issued under the Atomic Energy Act of 1954, or by a State under State authority as permitted under section 274 of such Act, for any activity (other than an activity described in section 103(c)(7) or section 104(c) (4)) which results in the production at such site of any uranium product derived from ores, is in effect on the date of the enactment of this Act, or is issued after such date.

(d) The Secretary shall publish notice in the Federal Register of any designation made under this section and shall specify in such notice the boundaries of each processing site so designated.

COOPERATIVE ARRANGEMENTS WITH STATES

SEC. 103. (a) (1) The Secretary is authorized to enter into cooperative arrangements with each of the States in which a processing site is located to assess radiation levels, and to carry out appropriate remedial action to limit the exposure of the public to radiation associated with residual radioactive materials.

(2) No cooperative arrangement shall be entered into under this section with respect to any processing site located on the Indian lands described in section 104(a)(2).

(b) (1) The United States shall pay 90 per centum of the costs of carrying out any cooperative arrangement with any State under this section. The remaining costs of such arrangement shall be paid by the State from non-Federal funds.

(2) For purposes of determining the State and Federal shares of the costs of carrying out any cooperative arrangement under this section, any costs incurred by the State in acquiring any processing site, disposal site, or residual radioactive materials shall not be taken into account.

(3) Notwithstanding paragraph (1), if the State share of the costs of carrying out all cooperative arrangements entered into by any State exceeds 0.25 per centum of the available general revenue of the State (as determined by the Secretary) during the last fiscal year of the State ending before the date of the enactment of this Act, the United States shall pay (in addition to any amount paid by the United States under paragraph (1)) the amount by which the State's share of the costs exceeds such percentage. For purposes of determining available general revenues of any State, no Federal funds made available to the State by the United States shall be taken into account.

(c) Each cooperative arrangement entered into with a State under this section shall contain such terms and conditions as are appropriate and consistent with the provisions of this title. Each such arrangement shall provide for the following:

(1) Upon the concurrence of such State and the Commission, and after consultation with the Administrator, the Secretary shall—

(A) select any appropriate remedial action, and

(B) designate identify an appropriate location (at the processing site or at another location) for the disposal of residual radioactive materials. If the Secretary identifies a location outside of such State as an appropriate location for the disposal of such materials, the Secretary may designate that location as a disposal site under subparagraph (B) only with the concurrence of the State within which such proposed disposal site is located.

(2) Unless the Secretary otherwise determines, before remedial action is undertaken with respect to any processing site, the State shall acquire—

(A) the processing site (including both the surface estate and the subsurface estate at the site),

(B) any residual radioactive materials on such site, and

(C) any disposal site selected for the residual radioactive materials.

A State may comply with the requirement of the preceding sentence with respect to acquisition of the processing site by the execution of a purchase option for such site which shall be exercised at any time within two years after the completion of remedial work at the processing site. No State shall be required to acquire any ground or structure contaminated with radioactive material derived from the processing site if such ground or structure is located outside the processing site or disposal site.

(3) When the Commission determines that remedial work at the processing site is completed in accordance with the requirements imposed pursuant to this title, the State shall transfer to the United States ownership and custody of—

(A) the residual radioactive materials, and

(B) any disposal site acquired by the State under paragraph (2).

The United States shall not transfer title to property acquired under this subsection to any other person. No payment shall be made in connection with such transfer from funds appropriated under subsection (b) other than payments for administrative and legal costs incurred in carrying out such transfer. Custody of any property transferred to the United States under this paragraph shall be assumed by the Secretary, and the Secretary shall maintain such property in such manner as will protect the public health and safety and the environment.

(4)(A) When the Commission determines that remedial work at the processing site is completed in accordance with the requirements imposed pursuant to this title, the State may sell to any other person any processing site owned by the State other than a processing site used for the disposal of residual radioactive materials. Whenever a State sells a processing site acquired as provided in paragraph (2), before offering the site for sale to any other person, the State shall offer to sell such site at its fair market value to the person from whom the State acquired the site.

(B) Before any State transfers title to any processing site offered for sale under subparagraph (A), the State shall execute and record, pursuant to applicable State law, a document giving notice that—

(i) such site had been contaminated with residual radioactive materials; and

(ii) measures have been taken under this Act to limit any hazard associated with such materials to acceptable levels.

(5) If the State sells any processing site acquired under paragraph (2) within two years after acquiring the site or within two years after remedial action is completed at the site, whichever occurs last, the State shall pay to the United States an amount determined by multiplying the Federal contribution percentage by an amount equal to the excess of the net proceeds of the sale over the cost incurred by the State in acquiring the site. If the State does not sell the processing site within such period, the State shall pay to the Secretary at the end of such period an amount determined by multiplying the Federal contribution percentage by an amount equal to the excess of the fair market value of the site at the end of such period over the cost incurred by the State in acquiring such site. For purposes of this paragraph, the term "Federal contribution percentage" means, with respect to any site, the percentage of the costs of the cooperative arrangement with respect to such which is paid by the United States.

(6) Any remedial action undertaken under a cooperative arrangement shall be performed by the Secretary or by a contractor authorized by the Secretary, unless otherwise determined by the Secretary.

(7) The State may, with the approval of the Secretary, enter into contracts with any person under which such person may recover minerals from residual radioactive materials at any processing site upon payment to the State of—

(A) all or part of the cost of remedial action to be undertaken at such site after the removal of the minerals,

(B) an amount of the profits generated from such recovery activity as the Secretary considers appropriate, or

(C) a combination of the amounts described in subparagraphs (A) and (B).

Any person carrying out mineral recovery activities under this paragraph shall be required to obtain any license required under the Atomic Energy Act of 1954 or under State authorlty as permitted under section 274 of such Act, except that the State shall not be required to obtain any such license solely by reason of entering into a contract under this paragraph.

(8) If the State enters into ontract with any person to recover minerals from residual radioactive materials as provided under paragraph (7), the State shall pay to the United States an amount determined by multiplying the Federal contribution percentage (as determined under paragraph (5)) by an amount equal to the payment to the State as determined under paragraph (7).

COOPERATIVE ARRANGEMENTS WITH INDIAN TRIBES

SEC. 104. (a)(1) The Secretary is authorized to enter into cooperative arrangements with the Secretary of the Interior and with each Indian tribe residing on lands described in paragraph (2) to assess radiation levels and to carry out appropriate remedial action to limit the exposure of the public to radiation emanating from residual radioactive materials.

(2) The lands referred to in paragraph (1) are any lands—

(A) held in trust by the United States for any Indian or for any Indian tribe, or

(B) owned by any Indian or Indian tribe subject to a restriction against alienation imposed by the United States.

(3) For purposes of this section, the term "Indian tribe" means any Indian tribe, band, group, pueblo, or other organized community of Indians recognized as eligible for services provided by the Secretary fo the Interior to Indians.

(b) The Secretary shall provide 100 per centum of the costs of carrying out any cooperative arrangement with the Secretary of the Interior and any Indian tribe under this section.

(c) Each cooperative arrangement entered into with the Secretary of the Interior and with an Indian tribe under this section shall contain such terms and conditions as are appropriate and consistent with the provisions of this title. Each such arrangement shall provide for the following:

(1) Upon the concurrence of the Secretary of the Interior and the Commission, and after consultation with the Indian tribe and the Administrator, the Secretary shall—

(A) select any appropriate remedial action, and

(B) designate an appropriate location (at the processing site or at another location) for the disposal of residual radioactive materials.

(2) The Secretary of the Interior shall have the responsibility for the continued custody of any residual radioactive materials from any processing site restored under the cooperative arrangement unless the President determines that another arrangement is appropriate.

(3) Unless otherwise determined by the Secretary, any remedial action undertaken under any cooperative arrangement shall be performed by the Secretary or by a contractor authorized by the Secretary.

(4) With the approval of the Indian tribe and the Secretary, the Secretary of the Interior may enter into contracts with any person, under which such person may recover minerals from residual radioactive materials at any processing site upon payment to the United States of—

(A) all or part of the cost of the remedial action to be undertaken at such site after the removal of the minerals,

(B) an amount of the profits generated from such recovery activity as the Secretary of the Interior considers appropriate, or

(C) a combination of the amounts described in subparagraphs (A) and (B).

Any person carrying out mineral recovery activities under this paragraph shall be required to obtain any license required under the Atomic Energy Act of 1954 or under State authority as permitted under section 274 of such Act, except that the Secretary of the Interior shall not be required to obtain any such license solely by reason of entering into a contract under this paragraph.

REIMBURSEMENT FOR PRIOR EXPENDITURES

SEC. 105. Any cooperative arrangement entered into under this title may provide for the reimbursement of any person for expenditures incurred by such person in carrying out remedial action on property outside the boundaries of any processing site, before the date of the enactment of this Act, to protect public health, safety and the environment from radiation associated with residual radioactive materials at such site.

TAILINGS RESEARCH PROGRAM

SEC. 106. The Secretary shall conduct a research program, and make available information, concerning ways in which residual radioactive materials at processing sites may be neutralized in order to reduce the level of hazardous radioactive and nonradioactive substances contained in such materials to acceptable levels, as determined by the Administrator in accordance with standards and criteria promulgated under section 108.

RULES AND REGULATIONS

SEC. 107. The Secretary may prescribe such rules and regulations as he deems necessary and appropriate to carry out the provisions of this title, including rules and regulations respecting reports, accounting, and rights of inspection.

AUTHORITY OF ENVIRONMENTAL PROTECTION AGENCY

SEC. 108. (a) Within one hundred and eighty days after the date of the enactment of this Act, the Administrator shall, by rule, promulgate generally applicable standards and criteria for the protection of the general environment outside the boundaries of—

(1) processing sites, and

(2) sites used for the disposal of residual radioactive materials.

Such criteria shall apply to radiological and nonradiological environmental hazards associated with the processing, and with the possession and transfer, of residual radioactive material, and shall be consistent to the maximum extent practicable with the requirements of the Solid Waste Disposal Act.

(b) Before the promulgation of any rule pursuant to subsection (a), the Administrator shall—

(1) consult with the Commission; and

(2) provide adequate notice of any rulemaking proceeding and provide opportunity for public hearing.

(c) Any interested person may obtain judicial review of any rule promulgated under subsection (a) of this section in the United States court of appeals for the Federal judicial circuit in which such person resides or transacts business only upon petition for review by such person filed within ninety days from the date of such promulgation, or after such date only if such petition is based solely on grounds which arose after such ninetieth day.

(d) No remedial action shall be commenced under this title before the date ninety days following the promulgation of standards and criteria under subsection (a).

(e) Nothing in this section shall be construed to limit or enlarge the functions of the Administrator of the Environmental Protection Agency under the Federal Water Pollution Control Act or under the Clean Air Act.

AUTHORITY OF COMMISSION

SEC. 109. (a) The Commission shall insure that any cooperative arrangement entered into under this title is carried out in such manner as—

(1) conforms to the requirements established by the Secretary and concurred in by the Commission under sections 103(c)(1) and 104(c)(1), and

(2) conforms with the applicable standards and criteria promulgated by the Administrator under section 108.

(b) In carrying out its authority under this section the Commission is authorized—

(1) by rule, regulation, or order, to require persons, officers, or instrumentalities exempted—

(A) under section 208(b) or 210 of this Act, or

(B) under section 81 of the Atomic Energy Act of 1951.

from the requirement of obtaining a license for the ownership or possession of byproduct material as defined in section 11e. (2) to conduct monitoring, perform remedial work, and to comply with such other measures as it considers necessary or desirable to protect the public health and safety and the environment; and

(2) to make such studies and inspections and conduct such monitoring as may be necessary.

(c) Any violation by any person other than the United States of any rule or order of the Commission under this section shall be subject to a civil penalty in the same manner and in the same amount as violations subject to a civil penalty under section 234 of the Atomic Energy Act of 1954. Nothing in this section shall be construed to affect any other authority of the Commission under such Act.

AUTHORIZATION

SEC. 110. Effective October 1, 1979, there is authorized to be appropriated $180,000,000 to carry out, the purposes of this title which shall remain available until expended.

ADVANCE AUTHORITY

SEC. 111. Notwithstanding any other provision of this Act, authority to enter into cooperative arrangements and to enter into contracts or make payments under this Act shall be effective only to the extent or in such amounts as are provided in advance in appropriation Acts.

TITLE II—URANIUM MILL TAILINGS LICENSING AND REGULATION

DEFINITION

SEC. 201. Section 11 e. of the Atomic Energy Act of 1954 is amended to read as follows:

"e. The term 'byproduct materials' means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content."

CUSTODY OF DISPOSAL SITE

SEC. 202. (a) Chapter 8 of the Atomic Energy Act of 1954 is amended by adding the following new section at the end thereof:

SEC. 83. OWNERSHIP AND CUSTODY OF CERTAIN BYPRODUCT MATERIAL AND DISPOSAL SITES.—

"a. Any license under section 62 or section 81 for any activity which results in the production of any byproduct material as defined in section 11 e. (2) shall contain such terms and conditions as may be necessary to assure that, prior to termination of such license—

"(1) the license will comply with such requirements as the Commission may establish respecting such termination, and

"(2) ownership of—

"(A) any byproduct material defined in section 11 e. (2) which resulted from such licensed activity, and

"(B) any land (other than land owned by the United States), including both the surface and subsurface estates, which is used for the disposal of such byproduct material.

shall be transferred to the United States.

Such material and land shall be transferred to the United States without cost to the United States (other than administrative and legal costs incurred in carrying out such transfer). The United States shall not transfer title to property acquired under this subsection to any other person.

"b. (1) As soon as practicable after the date of the enactment of this section, the President shall designate the Secretary of Energy or any other appropriate officer or instrumentality of the United States (other than the Commission) to have custody of byproduct material and land transferred to the United States under subsection a. (2). No officer or instrumentality may be designated under the preceding sentence unless such officer or instrumentality has adequate authority to provide for the safe treatment, management, storage, and disposal of such byproduct material and to provide for the sound management of such plan, consistent with the requirements of subsection d.

"(2) The officer or instrumentality designated under this subsection may accept donations of any byproduct material and land described in subsection a. (2) which is not required to be transferred to such officer or instrumentality (by reason of the effective date of this section or for any other reason). Such

material and land may be accepted under this paragraph upon a determination by such officer or instrumentality that such acceptance is necessary or desirable in order to protect the public health, safety, and the environment.

"c. Upon termination of any license to which this section applies, the Commission shall determine whether or not the licensee has complied with all applicable standards and requirements under such license.

"d. Following the Commission's determination of compliance under subsection c., the officer or instrumentality designated by the President under subsection b. shall assume custody of the byproduct material and land referred to in subsection a. Such officer or instrumentality shall maintain such material and land in such manner as will protect the public health and safety and the environment. Such custody may be transferred to another officer or instrumentality of the United States only upon approval of the President upon his determination that such officer or instrumentality meets the requirements of subsection b.".

(b) The table of contents for chapter 8 of the Atomic Energy Act of 1954 is amended by inserting the following new item after the item relating to section 82:

"Sec. 83. Ownership and custody of certain by product material and disposal sites."

AUTHORITY TO ESTABLISH CERTAIN REQUIREMENTS

SEC. 203. Section 161 of the Atomic Energy Act of 1954 is amended by adding the following new subsection at the end thereof:

"x. Establish by rule, regulation, or order (in accordance with the provisions of the Administrative Procedure Act as required under section 181) such standards and instructions as the Commission may deem necessary or desirable to insure, before termination of any license for byproduct material as defined in section 11e.(2) and before the transfer under section 83 of land used for the disposal of such material, that the licensee will make available such bonding or other financial arrangements as may be required to assure the reclamation of sites structures and equipment used in conjunction with such byproduct material and that—

"(1) in the case of any such license issued or renewed after the date of the enactment of this subsection, to the maximum extent practicable, no long-term maintenance and monitoring of such sites, structures, and equipment will be required; and

"(2) in the case of each license for such material (including any license referred to in paragraph (1) and any license in effect on the date of the enactment of this subsection), if the Commission determines that any such long-term maintenance and monitoring is necessary, the licensee will make available such bonding or other financial arrangements as may be required to assure such long-term maintenance and monitoring.".

COOPERATION WITH STATES

SEC. 204. (a) Section 274 b. of the Atomic Energy Act of 1954 is amended by adding "as defined in section 11 e. (1)" after the words "byproduct materials" in paragraph (1); by renumbering paragraphs (2) and (3) as paragraphs (3) and (4); and by inserting the following new paragraph immediately after paragraph (1):

"(2) by product materials as defined in section 11 e. (2);".

(b) Section 274 d. (2) of such Act is amended by inserting the following before the word "compatible": "in accordance with the requirements of subsection o. and in all other respects".

(c) Section 274 n. of such Act is amended by adding the following new sentence at the end thereof: "As used in this section, the term agreement includes any amendment to any agreement.".

(d) Section 274 j. of such Act is amended by adding "(1)" after "may", and by adding before the period at the end thereof "and (2), terminate or suspend that part of its agreement with the State relating to State licensing and regulation of any activity which results in the production of byproduct material as defined by section 11 e. (2), and reassert the licensing and regulatory authority vested in it under this Act over such activities, if the Commission finds that such termination or suspension is required to assure compliance with subsection o.".

(e) (1) Section 274 of such Act is amended by adding the following new subsection at the end thereof:

"o. In the licensing and regulation of any activity which results in the production of byproduct material as defined in section 11 e. (2) under an agreement entered into pursuant to subsection b., a State shall require compliance with the requirements of section 83 a. (2) (respecting ownership by the United States of byproduct material and land), and the State shall adopt and enforce—

"(1) substantive standards for the protection of the public health, safety, and the environment from hazards associated with such material which are equivalent to the extent practicable, or more stringent than, standards adopted and enforced by the Commission for the same purpose, and

"(2) procedures which—

"(A) in the case of licenses, provide for advance public notice, an opportunity for a public hearing with rights to present direct and rebuttal evidence and conduct cross-examination, and a written decision which is based only on evidence in the record and which is subject to judicial review,

"(B) in the case of rulemaking, provide opportunity for public participation in the form of written comments or a public hearing and which provide for judicial review of the rulemaking decision,

"(C) require the preparation of a written independent environmental analysis or review which is available to the public before the commencement of any such proceedings, and

"(D) prohibit, in the case of any construction activity which is proposed with respect to such material, any major activity from being undertaken before completion and public availability of the analysis or review referred to in subparagraph (C).

No State shall be required under paragraph (2) to conduct proceedings concerning any license or regulation which would duplicate proceedings conducted in such State by the Commission.

If any State, under an agreement for the licensing and regulation of byproduct material as defined in section 11 e. (2), imposes upon the license any requirement for the payment of funds which are collected by the State for the reclamation or long-term maintenance and monitoring of such byproduct material, such State shall transfer to the United States, upon termination of the license in connection with which such payment was made, any amounts collected by the State for such purposes. Any such agreement in effect on the date of the enactment of this subsection shall be amended as promptly as practicable following such date to comply with the requirements of the preceeding sentence with respect to amounts collected before, on, and after such date of enactment.

(f) Section 274 c. of such Act is amended by inserting the following new sentence after paragraph (4) thereof: "The Commission shall also retain authority under any such agreement to make a determination that all applicable standards and requirements have been met prior to termination of a license for byproduct material as defined in section 11 e. (2).".

(g) As soon as practicable after the date 3 years after the date of the enactment of this Act, the Nuclear Regulatory Commission shall review each agreement under section 274 of the Atomic Energy Act of 1954 to determine whether or not such agreement complies with the requirements contained in amendments made by this section, If the Commission determines that any such agreement does not comply with such requirements, it shall exercise the authority of section 274 j. (2) of the Atomic Energy Act of 1954 (as amended by subsection (d) of this section).

AUTHORITIES OF COMMISSION RESPECTING CERTAIN BYPRODUCT MATERIAL

SEC. 205. (a) Chapter 8 of the Atomic Energy Act of 1954 is amended by adding the following new section at the end thereof:

"SEC. 84. AUTHORITIES OF COMMISSION RESPECTING CERTAIN BYPRODUCT MATERIAL.—

"a. The Commission shall insure that the management of any byproduct material as defined in section 11 3. (2) is carried out in such manner as—

"(1) the Commission deems appropriate to protect the public health and safety and the environment, and

"(2) conforms with applicable standards and criteria promulgated by the Administrator of the Environmental Protection Agency under section 275.

"b. In carrying out its authority under this section, the Commission is authorized to:

"(1) by rule, regulation, or order require persons, officers, or instrumentalities exempted from licensing—

"(A) under section 208(b) or 210 of the Uranium Mill Tailings Control Act of 1978, or

"(B) under section 81 of this Act

to conduct monitoring, perform remedial work, and to comply with such other measures as it may deem necessary or desirable to protect the public health and safety and the environment, and

"(2) make such studies and inspections and to conduct such monitoring as may be necessary.

Any violation by any person other than the United States of any rule or order of the Commission established under this section shall be subject to a civil penalty in the same manner and in the same amount as violations subject to a civil penalty under section 234. Nothing in this section affects any authority of the Commission under any other provision of this Act.".

(b) The table of contents for such chapter 8 is amended by inserting the following new item after the item relating to section 83:

"Sec. 84. Authorities of Commission respecting certain byproduct material.".

AUTHORITY OF ENVIRONMENTAL PROTECTION AGENCY RESPECTING CERTAIN BY-PRODUCT MATERIAL

SEC. 206. (a) Chapter 19 of the Atomic Energy Act of 1954 is amended by inserting after section 274 the following new section:

"SEC. 275. AUTHORITY OF THE ENVIRONMENTAL PROTECTION AGENCY.—

"a. The Administrator of the Environmental Protection Agency (hereinafter in this section referred to as the 'Administrator') shall, by rule, promulgate, and from time to time revise, generally applicable standards and criteria for the protection of the general environment outside the boundaries of—

"(1) sites at which ores are processed primarily for their source material content, and

"(2) sites used for the disposal of byproduct material as defined in section 11 e. (2).

Such criteria shall apply to radiological and nonradiological environmental hazards associated with the processing, and with the possession and transfer, of byproduct material as defined in section 11e. (2), and shall be consistent to the maximum extent practicable with the requirements of the Solid Waste Disposal Act.

"b. Before the promulgation of any rule pursuant to subsection a., the Administrator shall—

"(1) consult with the Commission, and

"(2) provide adequate notice of any rulemaking proceeding and provide opportunity for public hearing.

"c. Any interested person may obtain judicial review of any rule promulgated under subsection a. of this section in the United States court of appeals for the Federal judicial circuit in which such person resides or transacts business only upon petition for review by such person filed within ninety days from the date of such promulgation, or after such date only if such petition is based solely on grounds which arose after such ninetieth day.

"d. Nothing in this section shall be construed to limit or enlarge the functions of the Administrator of the Environmental Protection Agency under the Federal Water Pollution Control Act or under the Clean Air Act.".

(b) The table of contents for chapter 19 of the Atomic Energy Act is amended by inserting the following new item after the item relating to section 274:

"Sec. 275. Authority of the Environmental Protection Agency.".

AUTHORIZATION OF APPROPRIATION FOR GRANTS

SEC. 207. Effective Ocrober 1, 1979, there is hereby authorized to be appropriated to the Nuclear Regulatory Commission the sum of $500,000 to be used for making grants to States which have entered into agreements with the Commission under section 274 of the Atomic Energy Act of 1954 to aid in the development of State regulatory programs under such section which implement the provisions of this Act.

EFFECTIVE DATE

SEC. 208. (a) Except as otherwise provided in this section, the amendments made by this title shall take effect on the date of the enactment of this Act and any such amendments applicable to licenses issued under the Atomic Energy Act of 1954 or under State authority (as permitted under section 274 of such Act) shall apply without regard to whether such licenses are issued before, on, or after the date of the enactment of this Act.

(b) Before the date 3 years after the date of the enactment of this Act no license under section 81 of the Atomic Energy Act of 1954 or under State authority (as permitted under section 274 of such Act) shall be required for the transfer, receipt, production, manufacture, acquisition, ownership, possession, import or export of byproduct material as defined in section 11e. (2) of the Atomic Energy Act of 1954 (as added by section 201 of this Act).

(c) In the case of any license issued before the date of the enactment of this Act by a State under State authority (as permitted under section 274 of the Atomic Energy Act of 1954), the requirements of section 274 o. of the Atomic Energy Act of 1954 (as added by section 204 of this Act) shall apply only to the extent practicable during—

(1) the three year period beginning on the date of the enactment of this Act, or

(2) the period (ending not later than the date five years after the date of the enactment of this Act) before the renewal of such license,

which ever period is longer.

(d) Nothing in any amendment made by this title shall preclude any State from exercising any authority (including the authority permitted under section 274) respecting byproduct material as defined in section 11e. (2) of the Atomic Energy Act of 1954 during the 3 year period beginning on the date of the enactment of this Act.

(e) In the case of any license issued before the date of the enactment of this Act under the Atomic Energy Act of 1954 (or under State authority as permitted under section 274 of such Act), the requirements of section 83 a. (2) of the Atomic Energy Act of 1954 (as added by section 202 of this Act) shall apply only to the extent practicable.

Background and Need

Uranium mill tailings are the sandy waste produced by the uranium ore milling process. Because only 1 to 5 pounds of useable uranium is extracted from each 2,000 pounds of ore, tremendous quantities of waste are produced as a result of milling operations. These tailings contain many naturally-occurring hazardous substances, both radioactive and nonradioactive. The greatest threat to public health and safety is presented by the long radioactive decay process of radium into radon-222, an inert gas which may cause cancer or genetic mutations. This decay process, and the dangers which accompany it, will continue for a billion years. As a result of being for all practical purposes, a perpetual hazard, uranium mill tailings present the major threat of the nuclear fuel cycle.

In its early years, the uranium milling industry was under the dominant control of the Federal Government. At that time, uranium was being produced under Federal contracts for the Government's Manhattan Engineering District and Atomic Energy Commission program. Under these contracts, uranium tailings piled up so that now nearly 90 million tons of such waste are attributable to Federally-induced production. Of this amount, about 27 million tons of tailings have been left at sites where no commercial milling has taken place and which are not the responsibility of any active milling company.

From the early 1940's through the early 1970's there was little official recognition of the hazards presented by these tailings. Federal regulation of the industry was minimal. As a consequence, mill tailings were left at sites, mostly in the Southwest, in an unstabilized and unprotected condition. Some of these tailings were used for construction purposes in the foundations and walls of private and public buildings. There, through the concentrated emission of radon gas, the hazard of the tailings and public exposure increased substantially.

In 1971 the Subcommittee on Raw Materials of the Joint Committee on Atomic Energy began to investigate the dangers presented by the use of uranium mill tailings for construction purposes. Testimony at

those hearings lead to the passage of legislation in 1972 authorizing the Federal Government to enter into a cooperative program with the State of Colorado to provide a program of remedial action to remove the tailings from sites and structures in Grand Junction, Colo., where they constituted a threat to public health. Under that program, 75 percent of the costs of the remedial action, were paid by the Federal Government and the State of Colorado paid the remainder.

Concurrently, public and Federal attention began to focus on regulation of the active commercial uranium milling industry. With the advent of the National Environmental Policy Act, more scrutiny was applied to licensing standards and requirements for the control and disposal of uranium mill tailings. The Atomic Energy Commission, and its successor, the Nuclear Regulatory Commission, have retained authority for licensing uranium mills under the Atomic Energy Act since 1954. States may license uranium milling under their own authorities through agreement with the Commission. Five of the twenty-five "Agreement States" now have such licensing programs.

The States and the Commission have continued, since the early 1970's, to upgrade their standards for uranium mill licensing, in response to a growing awareness of the threat to public health presented by these materials. In May 1975, the Nuclear Resources Defense Council petitioned the Commisslon to prepare a generic environmental impact statement to evaluate the regulatory programs for uranium milling at both the Federal and State levels, and to adopt improved regulations for milling operations. Subsequently, the Commission began the evaluation. The draft generic environmental impact statement on uranium milling regulation, and proposed new milling regulations, are expected to be completed by NRC this year. But the steps which have been taken to control future uranium milling operations do not remedy existing public health hazards resulting from the unstabilized piles of wastes produced in prior decades.

In 1974 Congress requested the Energy Research and Development Administration to survey and assess the problem presented by the tailings located at 22 sites throughout the Southwest. On the basis of the resulting studies, the administration proposed legislation this year to authorize a remedial program similar to that implemented at Grand Junction, Colo., to clean up existing inactive sites. The cost of the program to the Federal Government is expected to be $180 million. To prevent any future occurrence of a situation of this kind the Nuclear Regulatory Commission was asked by the chairman of the Committee on Interior and Insular Affairs, Representative Morris K. Udall, to submit draft legislation providing it with necessary authority to comprehensively regulate the uranium mill operations and activities. This draft legislation was introduced and considered by the committee in developing its recommendations.

Without the authorities included in H.R. 13650, the conditions addressed by the remedial program would be left without remedy, and the authority of the Commission to establish uniform rational standards for waste disposal from uranium mills would not be clear.

Purpose and Summary

The Uranium Mill Tailings Control Act, as proposed, is intended to protect the public health and safety and the environment from hazards associated with wastes from the uranium ore milling process. If enacted, the legislation will require every reasonable effort to be made by the States, the Federal Government, and private industry to provide for the disposal, stabilization and control in a safe and environmentally sound manner of such tailings to prevent or minimize the diffusion of radon or the entry of other hazards into the environment.

Title I of H.R. 13650, in cooperation with interested States, Indian tribes, and persons who own or control inactive mill tailings sites, provides a program of assessment and remedial action at such sites. Such actions may include, where appropriate, the reprocessing of tailings to extract residual uranium and other valuable minerals.

Title II clarifies and reinforces the authority of the Nuclear Regulatory Commission to regulate the production and disposal of uranium mill tailings at active sites, and provides for the application of minimum Federal standards to such activities in States which regulate them under authority permitted by the Atomic Energy Act.

H.R. 13650 also provides that all final disposal areas for uranium mill tailings be treated in accordance with Federal policy regarding other nuclear wastes, in that such disposal sites would be transferred to the Federal Government for permanent custody and protection.

Inclusion of Sites

As reported by the committee, H.R. 13650 authorizes Federal participation in the reduction of hazards from the 22 inactive uranium mill tailings sites. These sites, which are found at 20 different locations, have been studied by the Department of Energy in an effort to assess the need for remedial action. All of them consist of tailings resulting from operations under Federal contracts. None are now under active license by the Nuclear Regulatory Commission. While it is believed that these sites are the only ones which possess all such characteristics, the bill permits the inclusion of any other sites meeting those characteristics. Two other sites which contain tailings resulting entirely from Federal contracts, but which are now owned by companies operating under active uranium milling licenses are to be studied to determine whether the State of New Mexico, which licenses the mills, has the authority to require the companies to reduce or eliminate any hazardous conditions which may exist as a result of the condition of the sites.

The committee questioned the expenditure of Federal funds to clean up uranium mill tailings in cases where the commercial uranium milling industry can be required through regulatory authorities to assume those costs. It would seem therefore, that the Secretary of Energy need not designate any sites to be included in the authorized program which are currently under active license, or which contain tailings from commercial production, unless it can be shown that the tailings hazards could in no way be remedied without such designation.

Division of Costs

H.R. 13650 requires States and the Federal Government to share the costs of remedial action for inactive tailings sites. The costs to be shared include expenses for removing or reducing hazards both at the processing site and at locations and structures contaminated with tailings from the site. Environmental impact statements to be prepared for determining remedies for each site will be paid for by the Department of Energy. Costs of long-term maintenance and monitoring of final disposal sites will also be borne by the Department. States are required to assume all costs of purchasing the inactive processing sites and any necessary new disposal sites (in cases where tailings will be removed from the original processing sites).

A ceiling is placed on any State's share of remedial costs. The ceiling equals one-fourth of 1 percent of the State's general revenues, not including Federal funds, in the State's last fiscal year ending before enactment of the act. The committee bases figures for States' general revenues on those used by the Department of Commerce for its determinations.

The committee believes that no State's participation in the remedial program should be precluded by the State's inability to obligate funds to meet its share of program costs. The committee considered in its deliberations the effect of existing State laws prohibiting deficit spending or limiting the extent to which States may be indebted by their legislatures.

The funding formula arrived at by the committee both insures that each State may participate in the program, and distributes the burden of payments according to States' ability to pay. It also takes into account the tremendous financial burden placed on Utah and Colorado where the number and size of inactive processing sites are substantial.

The committee formula would allow each State to provide its share of program costs through a one-time appropriation from its legislative body. This protects the Federal Government from having to supplement the Federal share due to the failure of some future legislature to appropriate funds committed by a previous legislature.

The following chart shows estimated share of program costs based on the committee formula for each affected State. Shares are shown under the ceiling only when a State's share of program costs would meet or exceed the ceiling.

State	Total remedial action cost	10-percent State share	Ceiling of 0.25 percentum of available general revenue[1]
Arizona	$4,069,000	[2]	
Colorado	64,450,000	$6,445,000	2.7
Idaho	590,000	59,000	
New Mexico	14,730,000	223,000	
Oregon	290,000	29,000	
Pennsylvania	NA	NA	14.0
Texas	2,450,000	245,000	
Utah	44,716,000	4,032,600	2.1
Wyoming	1,282,000	128,200	

[1] For purposes of determining available general revenues of any State, no Federal funds made available to the State by the United States shall be taken into account.
[2] All sites on Indian lands.

Note: All figures are based on high-option estimates of the Department of Energy as found in individual engineering assessments for inactive uranium mill tailings sites.

All costs for remedial activities undertaken on Indian lands are the responsibility of the Federal Government.

Determination and Priority of Remedy

It is the primary responsibility of the Department of Energy to determine the appropriate remedy for each inactive uranium mill tailings site included under the legislation. The Department is required to consult with Administrator of the Environmental Protection Agency in making such determinations. The Department must have the concurrence of the State where the site is located, and the Nuclear Regulatory Commission, in its determination of remedies before any remedial action is undertaken. In cases where sites are located on Indian lands, however, the State does not have a concurrence role. There, the Department must consult with the appropriate tribe and the Administrator and gain the concurrence of the Secretary of the Interior and the Commission.

The public is to have a strong role in the selection of any remedy through procedures provided by the National Environmental Policy Act. It is expected that the Secretary will give full consideration to the wishes of the public as expressed through those processes.

The committee also expects the Secretary to proceed with implementation of remedies in accord with necessity for reducing the most threatening hazards first. In setting priorities for implementation of remedial programs, the Secretary should give special consideration to sites at Salt Lake City, Utah, and Riverton and Converse, Wyo.

Caveat Emptor

In some cases where the Department will remedy inactive tailings hazards, tailings will be removed from the original processing sites and disposed of at more suitable locations. In such cases, the State where the site is located may sell the original, cleaned-up processing site on the public market. H.R. 13650 requires that when a State sells any processing site, it must execute and record a document giving all future prospective buyers notice that the site was once used for the disposal of radioactive materials. The record is also required to note that the site was cleaned up under the remedial program so that hazards were eliminated or reduced to acceptable levels.

It is the intent of the committee that such notice be implemented through the simplest mechanism possible pursuant to State law, as long as it provides a fair opportunity for notice to prospective buyers. The committee does not intend that such notice imply that the land as a result of having been used as a disposal site would constitute a hazard to public health.

Authority of the Nuclear Regulatory Commission

The Commission, in keeping with its responsibilities and authorities under the Atomic Energy Act and the National Environmental Policy Act, is the lead agency in regulation, oversight and management of uranium mill tailings-related activities. It is one of the major purposes of H.R. 13650 to clarify and reinforce these Commission responsibilities, with respect to uranium mill tailigns at both active and inactive sites.

In establishing requirements or promulgating regulations for licensing or for oversight of the Department's remedial activities, the Commission must set all standards and requirments relating to management concepts, specific technology, engineering methods, and procedures to be employed to achieve desired levels of control for limiting public exposure, and for protecting the general environment. The Commission's standards and requirments should be of such nature as to specify, for example, exclusion area restrictions on site boundaries, surveillance requirments, detailed engineering requirements, including lining for tailings ponds, depth, and types of tailings covers, population limitations, or institutional arrangements such as financial surety requirements or site security measures. The Commission should issue all necessary permits or licenses for uranium mill tailings sites.

The NRC is also responsible for implementing general standards and criteria promulgated by the Administrator of the Environmental Protection Agency. NRC must assure that the technology, engineering methods, operational controls, surveillance requirements and institutional arrangements employed at the sites provide the necessary barriers and levels of control to limit public exposure, and protect the environment from radiological and toxic nonradiological substances associated with uranium mill tailings materials, as specified by the EPA standards and criteria.

With respect to nonradiological matters, the NRC, through its environmental review under the NEPA mandate, would impose controls consistent with those imposed by EPA on similar materials contained in other solid wastes subject to EPA authority.

The committee received testimony regarding authorities of the EPA under the Solid Waste Disposal Act which could be beneficially applied to the management of uranium mill tailings. While it is in no way the intent of the committee to imply that the EPA or the Solid Waste Disposal Act should govern the regulatory activities of the Commission, it is the committee's desire that the Commission examine the management concepts being developed for the EPA solid waste disposal program, and assess them for possible incorporation into NRC regulations where such concepts could improve regulation of tailings.

It also the desire of the committee that the NRC and the States, in mplementing new standards and regulations for mill tailings control, consider possible differences in applicability of such requirements to existing tailings disposal sites versus new sites. Specifications for tailings site selection and impoundment design, in particular, once implemented by a licensee, may be reversible only at great cost. In all cases such considerations must, of course, be weighed against the committee's requirement in section 161(x) of the Atomic Energy Act, as amended by section 203 of H.R. 13650, that the Commission regulate to the maximum extent practicable in such a way that disposal sites for tailings will be stabilized sufficiently by the licensee to preclude any necessity for long-term maintenance and monitoring.

Authority of the Environmental Protection Agency

It is the responsibility of the Environmental Production Agency to establish generally applicable standards and criteria for the protection of the general environment, considering radiological and nonradiological aspects of tailings. The EPA standards and criteria should be developed to limit the exposure (or potential exposure) of the public

and to protect the general environment from either radiological or nonradiological substances to acceptable levels through such means as allowable concentrations in air or water, quantities of the substances released over a period of time, or by specifying maximum allowable doses or levels to individuals in the general population. The EPA standards and criteria should not interject any detailed or site-specific requirements for management, technology or engineering methods on licensees or on the Department of Energy. Nor should EPA incorporate any requirements for permits or licenses for activities concerning uranium mill tailings which would duplicate NRC regulatory authority over the tailings sites.

Environmental Reviews

Title II requires that States which license uranium milling or mill tailings disposal activities prepare a written, independent environmental analysis or review as part of its licensing process. The committee considers the independent preparation and public distribution of such an analysis essential to competent licensing of uranium milling activities. The committee also recognizes that the resources of a State are not equivalent to those of a Federal agency. Direct application of all the procedures and requirements embodied in the National Environmental Policy Act, and implemented by the Commission in its licensing process, may not be appropriate to require of the States. Some latitude should be given to allow States to prepare environmental reviews appropriate to their needs and means. The Commission must not, however, allow States to license uranium milling activities with less than thorough and comprehensive environmental assessments due to a lack of financial means in the State to meet Federal environmental impact review standards.

Federal Custody of Tailings States

It is the intent of H.R. 13650 that all final disposal sites for uranium mill tailings be placed ultimately under Federal custody. The President is given the responsibility for designating an appropriate agency to act as custodian for the sites. It is expected that the designated agency should be the Department of Energy, or an agency with similar responsibilities in the area of nuclear waste managements.

The committee believes that uranium mill tailings should be treated by the custodian in accordance with the substantial hazard they will present until long after our existing institutions can be expected to last in their present forms. Any decision by a custodian whether to allow any use by the public of tailings disposal sites must take into consideration the fragile nature of disposal techniques when they are measured against the test of a billion years of erosive influence.

The Nuclear Regulatory Commission should consider its responsibilities for oversight of the custodian in a similar light.

License Termination and Long-Term Maintenance

Uranium mill tailings disposal sites should in all cases be controlled and regulated by States and the Commission, to the maximum extent allowed by the state of the art, to insure that the public and the

environment will be protected from the hazards of the tailings for as long as they may remain a hazard. It is the intent of the committee that the costs of such protection shall be internalized wherever possible by the commercial uranium milling industry.

H.R. 13650 requires that before the transfer of custody of any disposal sites to the Federal Government, the Commission shall have made arrangements to insure that such piles are stabilized to provide long-term protection. Prior to determination of licenses for commercial tailings, the Commission shall have collected from licensees funds adequate to cover costs of long-term maintenance and monitoring, if any such measures will be necessary.

Section-by-Section Analysis

TITLE I—RESIDUAL RADIOACTIVE MATERIAL AT CERTAIN EXISTING SITES

Title I authorizes the Secretary of Energy to enter into agreements with States to remedy radioactive hazards associated with uranium mill tailings created under contract to the Federal Government.

Section 101 sets out definitions of terms used to describe sites and materials covered by the legislation, and those designating agencies and officials participating in the program.

Section 102 specifies and defines sites where abandoned uranium mill tailings piles are located which would be covered under the Act. These include sites in three categories: (1) 22 sites which have been surveyed by the Department of Energy and which have been determined by the Secretary to be in need of remedial action and qualified for Federal financial assistance; (2) two sites which meet the criteria for assistance except that they are under active license by the State of New Mexico (the Commission is required to make a study to determine whether States have the authority to compel the owners of the piles to clean them up; if the study concludes such authority does not exist, the Secretary is required to include the sites under the Act); and (3) any other uranium tailings sites which the Secretary may determine within 5 years to have been created under Federal contract and not to be under active NRC license.

Section 103 authorizes the Secretary of Energy to enter into cooperative arrangements with States to clean up mill tailings piles, and describes conditions which would apply to the agreements. The conditions include:

Section 103(b). A split of program costs such that the Federal Government pays 90 percent, and each States pays 10 percent, of the costs of remedial action within each State. A ceiling is placed on any State's share of costs. The ceiling equals 0.25 percent of the State's general revenue in the State's fiscal year ending the year before the enactment of the act. The difference between the State's ceiling and total costs would be paid by the Federal Government. Program costs do not include any costs of environmental impact statements, land acquisition or long-term care of disposal sites.

Section 103(c)(1). Selection of the appropriate remedial action for each site by the Secretary of Energy, with the concurrence of the State and the Nuclear Regulatory Commission, and in consultation with the Environmental Protection Agency.

Section 103(c)(2). State acquisition of all designated sites and any required new final disposal sites for tailings.

Section 103(c)(3). Transfer of title, without cost, to the U.S. Government of any final disposal sites for tailings, to be maintained in perpetuity by a designated custodian.

Section 103(c)(4)–(5). States may sell any cleanup sites not used as final disposal sites. Profits resulting from increased value of property after remedial action is completed would be split between State and Federal Governments in proportion to total program costs.

Section 103(c)(6). Actions taken to remedy hazardous mill tailings sites must be performed by the Secretary of Energy or by a contractor authorized by the Secretary, unless otherwise determined by the Secretary.

Section 103(c)(7)–(8). States my contract with private companies for recovery of any valuable minerals in tailings piles. The Government's share of any profits from such recovery are to be split between State and Federal Government in proportion to total program costs.

Section 104 authorizes the Secretary to enter into arrangements with Indian tribes to clean up mill tailings piles on tribal property. The conditions applied to agreements with Indian tribes are the same as those for States, except that:

(1) The Federal Government pays 100 percent of program costs.

(2) Appropriate remedial action is determined by the Secretary in consultation with the Indian tribe and with the concurrence of the Secretary of the Interior.

(3) Mineral recovery operations would be conducted under contract with the Secretary of the Interior, and 100 percent of any Government profits would be paid to the Federal Government.

Section 105 authorizes the Secretary to include in total program costs funds for the reimbursement of individuals who have undertaken remedial action at their own cost on sites or structures which would have been remedied under the act. The sites or structures must be at locations other than the original processing site, and the actions must have been undertaken prior to enactment of the act.

Section 106 requires the Secretary to conduct research to determine whether the hazards of mill tailings piles could be remedied by extracting the dangerous materials in the piles.

Section 107 authorizes the Secretary to promulgate rules and regulations necessary to carry out the act.

Section 108 requires the Administrator of the Environmental Protection Agency to promulgate within 180 days general standards and criteria for protection of the environment against hazards of the uranium mill tailings. Such standards would be applicable to the activities of the Department of Energy in remedying the mill tailings hazards under the act.

Section 109 authorizes the Commission to promulgate, implement and enforce regulations governing permanent Federal custody of uranium mill tailings disposal sites and governing the activities of the Department of Energy under title I of the act. In addition, the section insures that no regulatory gap will exist during the 3-year grace period when licenses are not required for the type of byproduct material newly defined in title II.

Section 110 authorizes $180 million effective October 1, 1979, for the Department of Energy to carry out the purposes of title I of the act. The funds are to remain available until expended.

Section 111 brings the authorization into compliance with the Budget Act.

TITLE II—URANIUM MILL TAILINGS LICENSING AND REGULATION

Title II reinforces the authority of the Nuclear Regulatory Commission to regulate the uranium mill process and mill tailings disposal. The "Agreement States" program, under which certain States license uranium milling activities, is modified to require that State licensing standards be equivalent to the extent practicable to those of the Commission, and to require public participation and environmental review as part of the State licensing procedures. Title II also reinforces the NRC's authority to make financial arrangements with uranium milling companies to insure proper stabilization and care of uranium mill tailings.

Section 201 amends the definition of "byproduct material" in the Atomic Energy Act to include uranium mill tailings. Previously, tailings have been controlled through the licensing process for uranium mills. This amendment would subject tailings to specific licensing authority. (Section 209 requires that the milling and mill tailings licensing process be consolidated.)

Section 202 requires that all final disposal sites for uranium mill tailings be transferred, upon termination of licenses, to the Federal Government for permanent Federal custody. The President is required to designate an appropriate agency to act as custodian for the tailings. The designated custodian is authorized to accept donations of sites which have been used for licensed tailings disposal but which may not be required to be transferred by the Commission. This provision insures that no owner of disposal sites would be compelled to remain under perpetual Commission license as a result of possessing byproduct material. Title to all tailings sites is required to be transferred to the United States without cost.

Section 203 authorizes the Commission to require secure financial arrangements from licensees for mill tailings stabilization and, if necessary, for long-term care costs. Such financial arrangements may be in the form of bonds, sureties, fees or other collateral to insure that flexibility may be exercised in requirements to prevent unnecessary hardship for firms of differing size or financial background.

Subparagraph (1) requires the Commission to regulate uranium milling and mill tailings disposal in such a way that when licenses are terminated reclamation and stabilization has been implemented by the licensee in such way as to insure, to the maximum extent allowable by the state of technical art, that the disposal sites will not require any long-term maintenance and monitoring to protect the public and the environment.

Subparagraph (2) requires that, in any case where long-term maintenance and monitoring is determined to be necessary by the Commission, the appropriate licensee will pay such costs. The Commission is required to have obtained any such funds from the licensee prior to termination of the license.

Section 204 amends the Atomic Energy Act to provide for adherence by Agreement States to minimum Federal standards for uranium mill tailings control. Subsections (a) through (d) allow States to discontinue licensing of uranium milling and mill tailings control, while retaining authority to license other materials licensable under the Agreement States program. Under current law, States which did not want to regulate uranium milling would have to terminate their complete agreements with the Commission.

Subsection (e) requires that, following 3 years after enactment of the act, State licensing standards for uranium mill tailings and uranium milling must to the extent practicable be equivalent to, or exceed, those of the Commission. In addition, licenses issued by States must require that upon termination of such licenses mill tailings disposal sites will be transferred without cost to permanent Federal custody. State licensing procedures are required to include provisions for public participation and environmental review.

The subsection also provides for States to transfer fees they may collect for long-term care of uranium mill tailings disposal sites to the Federal Government when the sites become inactive. All uranium mill tailings disposal sites will be transferred for permanent custody under the act to the Federal Government, which will implement any necessary long-term care requirements.

States may impose and collect long-term care fees under their own authorities, when States license uranium milling and mill tailings disposal activities. Several States already collect long-term care fees from licensees. This subsection provides that collected maintenance fees will be transferred to the Federal Government along with the sites which will require the maintenance.

Subsection (f) reserves the right of the Commission to determine that mill tailings piles created under Agreement State licensing have met applicable requirements before they are turned over to Federal custody.

Subsection (g) requires the Commission to review the regulatory programs of each Agreement States, as soon as practicable 3 years after the date of enactment of the act, to determine whether the standards applied by the State are at least equivalent to those of the Commission. If the Commission determines that the State's program does not comply, it may suspend or terminate that part of its agreement with the State under which the State is permitted to license and regulate uranium milling and mill tailings activities. Regulatory authority would then revert to the Commission.

Section 205 authorizes the Commission to promulgate, implement and enforce regulations governing permanent Federal custody of uranium mill tailings disposal sites and governing the activities of the Department of Energy under title I of the act. In addition, the section insures that no regulatory gap will exist during the 3-year grace period when licenses are not required for the type of byproduct material, newly defined in title II.

Section 206 requires the Environmental Protection Agency to set general standards and criteria for the protection of the environment outside the boundaries of mill tailings disposal sites. The standards and criteria would be applicable to both radiological and nonradiological hazards in the piles. Authorities of the EPA under other laws would not be abridged by the new requirements.

Section 207 authorizes $500,000 for grants to Agreement States to assist them in revision of current regulatory programs to implement provisions of the act.

Section 208 provides effective dates for the provisions of the act such that:

(1) No licenses would be required under the new definition of byproduct material until 3 years following enactment.

(2) Upgraded requirements under Agreement States licensing programs would be applied retroactively only to the extent practicable for a grade period following enactment of the act. For each licensee, such period would be for 3 years following enactment, or until the time at which the licensee's license would first be required to be renewed, whichever is the longer period for a specific licensee. In no case may such grace period be longer than 5 years following enactment of the act.

(3) Requirements for transfer of title to final disposal sites under either NRC or State licensing are applicable only to the extent practicable to licenses issued before the date of enactment of the act.

(4) Authority to require secure financial arrangements would take effect immediately.

The authority of Agreement States to continue licensing uranium milling and tailings disposal activities under their own authorities during the period preceding requirement of licenses for byproduct material as newly defined is made clear.

Section 209 requires the Commission to consolidate, to the extent practicable, licenses and licensing procedures for the uranium milling process and for uranium mill tailings control.

Section 210 prohibits the Commission from requiring licenses for any activities undertaken under title I of the act, except that any mineral recovery operations on abandoned mill tailings piles would be subject to licensing.

Legislative History, Hearings and Committee Action and Recommendation

H.R. 13650 is an amalgam of four bills introduced during the 2d session of the 95th Congress. To facilitate consideration of the recommendations of the Subcommittee on Energy and the Environment, it was introduced as a clean bill.

The four initial proposals represented two basic purposes: three [1] proposed a remedy for hazards at inactive sites which resulted from the production of radioactive materials for the Atomic Energy Commission under Federal contract and the fourth [2] provided for improved regulation of uranium mill tailings at active uranium milling sites.

Hearings were held by the Subcommittee on Energy and the Environment on the problem at inactive sites on June 26 and 27, 1978. Testimony was presented on H.R. 13382 July 10 and 17.

Witnesses at these hearings agreed on the necessity for reducing or eliminating hazards presented by uranium mill tailings. Substantial disagreement arose regarding the appropriate share States and the Federal Government should pay of the costs of any remedial program

[1] H.R. 12535, introduced by Mr. Udall (for the administration), H.R. 12938, introduced by Mr. Marriott, and H.R. 13049, introduced by Mr. Johnson of Colorado.
[2] H.R. 13382 by Mr. Udall.

for tailings at inactive sites, with a significant number of witnesses and members arguing that the remedial program costs should be completely assumed by the Federal Government.

On August 3, 5, and 9 of 1978, the committee reviewed the recommendations of the Subcommittee on Energy and the Environment with respect to H.R. 13650, and on August 9 by unanimous voice vote recommended that the bill be enacted, with an amendment.

Oversight Statement

Since the legislation, if enacted, would affect laws governing the disposal of nuclear waste and the regulation of the domestic nuclear industry, the Committee on Interior and Insular Affairs, pursuant to rule X, clauses 2(b)(1) and 3(e), would have oversight responsibility over any action of the Secretary of Energy or the Nuclear Regulatory Commission to comply with the mandate of the legislation. No recommendations were submitted to the committee pursuant to rule X, clause (2)(b)(2).

Cost Estimate and Budget Act Compliance

In accordance with rule XIII, clause 7(a) of the House of Representatives, the committee has made an estimate of the budget authority which would be required to carry out H.R. 9203 for the fiscal year beginning on October 1, 1979.

Effective October 1, 1978, the bill authorizes $180 million to be appropriated for the Department of Energy to carry out the remedial program under title I. This amount is in addition to $3 million authorized by H.R. 11392 for the Department to carry out activities under title I during fiscal year 1979, which authorization is subject to enactment of this act.

Another $500,000 is authorized for fiscal year 1980 for the Nuclear Regulatory Commission to make grants to States to aid them in implementing the requirements of title II.

No cost estimate from the Congressional Budget Office was timely submitted to the committee for inclusion in this report.

Inflationary Impact

In accordance with rule XI, clause 2(l)(4) of the Rules of the House of Representatives, the committee has determined that this legislation will have no significant impact on prices or costs affecting the national economy.

Departmental Reports

The committee received reports from two administration agencies expressing concerns with certain aspects of H.R. 13650. On July 13, a communication from the Environmental Protection agency suggested amendments to what became title II of H.R. 13650. (The EPA letter expressed support for legislation in title I of the bill.) On August 3, 1978, the Department of Energy sent a letter expressing objections to three actions of the Subcommittee on Energy and the Environment with respect to title I of the bill. Both communications are printed below:

U.S. ENVIRONMENTAL PROTECTION AGENCY,
Washington, D.C., July 13, 1978.

Hon. MORRIS UDALL,
Chairman, subcommittee on Energy and the Environment,
Committee on Interior and Insular Affairs,
House of Representatives,
Washington, D.C.

DEAR MR. CHAIRMAN: It has come to my attention that your subcommittee is planning to proceed on July 17 with marking up two bills dealing with the problem of uranium mill tailings. One of the bills, H.R. 12535, is the administration bill for remedial action for inactive uranium mill tailings sites. We have testified on this bill before Congressman Dingell's Subcommittee on Energy and Power, and we support it. The other bill is H.R. 13382, the Uranium Mill Tailings Licensing Act of 1978, which was introduced by you on June 29, 1978, and we have not had an opportunity to comment or testify on this bill before your Subcommittee prior to markup. Based on our review of the bill, we do have some substantive problems which could easily be solved by amending the bill as described below.

H.R. 13382 has several purposes:

1. to authorize the Commission to exercise direct licensing and regulation of the naturally occurring daughter products of uranium and thorium found in uranium mill tailings;
2. to reinforce the Commission's authority to require secure financial arrangements to insure the proper decommissioning, decontamination, reclamation, and long-term care if necessary, of radioactively contaminated sites, structures, and equipment;
3. to facilitate State ownership and authorize Federal ownership of mill tailings disposal areas; and
4. to authorize State regulation of uranium mill tailings under section 274 of the act and to require Agreement States to regulate uranium mill tailings within their jurisdiction to at least the same substantive standards required by the Commission for its licensees.

Our concerns deal mainly with the first point, which would be accomplished by including uranium mill tailings under the definition of "byproduct materials" under the Atomic Energy Act of 1954, as amended, thereby removing uranium mill tailings from the scope of the Resource Conservation and Recovery Act of 1976 (RCRA).

EPA is concerned about consistency between regulatory approaches to the uranium mill tailings problem. The NRC legislation is applicable only to uranium mill tailings, but other wastes, notably those from the phosphate industry, pose similar hazards due to quantity, configuration and radionuclide content and will be regulated under RCRA. Like uranium tailings, these wastes are generated in large quantities; they contain radium, the principal radionuclide of concern; they are dispersed throughout a nonradioactive medium in relatively low concentrations; and they create a health hazard to members of the public chronically exposed to such material. It would be duplicative and inconsistent to have different regulations for similar

wastes rendered hazardous by identical radioactive constituents. Complications may arise especially in connection with the regulation of disposal by the phosphate industry. For example, some phosphate mining wastes are being reprocessed to extract uranuim.

EPA is also concerned about the nonradioactive hazardous characteristics of the waste. Under section 6001 of RCRA, all departments, agencies and instrumentalities of the Federal Government are subject to substantive and procedural RCRA requirements. If the uranium mill tailings also have toxic characteristics, their management should be compatible with RCRA provisions.

To address these concerns, several amendments should be made to the bill. First, it should specify that for the purposes of 40 CFR 190, the Uranium Fuel Cycle standards, and for all other purposes, the bill is not intended to affect EPA's generally applicable authority under the Atomic Energy Act, as amended, and Reorganization plan No. 3 of 1970, or any EPA authority under the Clean Air Act.

The bill should also require EPA to set environmental standards and criteria for management of uranium mill tailings and specify that the licensing by NRC under the amended Atomic Energy Act implement these standards and criteria. The bill should further provide that the license conditions required by NRC contain substantive requirements comparable to those of RCPA. The following language could incorporate these suggestions into the bill:

> "The Environmental Protection Agency shall, after notice of proposed rulemaking and opportunity for oral presentation of views, data and arguments, prescribe standards and criteria to assure that public health and the environment are adequately protected in connection with the management of uranium mill tailings. The standards and criteria shall be applicable to hazardous radioactive and nonradioactive characteristics of the uranium mill tailings.
>
> "In developing criteria and standards under this Act, EPA will avoid duplication of efforts and ensure consistency to the maximum extent practicable with the requirements of RCRA of 1976, the Clean Air Act of 1970, as amended, and any other Federal law relating to protection of the environment.
>
> "NRC shall implement these standards and criteria in its licensing activities under the Atomic Energy Act of 1954, as amended. NRC shall also adopt and enforce requirements governing uranium mill tailings providing for the use by licensees of additional measures comparable to those required for hazardous materials under subtitle C of RCRA."

The approach this language takes to setting standards and criteria has the additional benefit of basic consistency with the approach taken in the administration's bill, H.R. 12535, dealing with remedial action at inactive sites.

I hope these comments will be helpful to the Subcommittee in its continued work on the uranium mill tailings problem.

Sincerely yours,

DOUGLAS M. COSTLE.

DEPARTMENT OF ENERGY,
Washington, D.C., August 3, 1978.

Hon. MORRIS K. UDALL,
Chairman, Committee on Interior and Insular Affairs,
Washington, D.C.

DEAR MR. CHAIRMAN: On July 20 and 27, 1978, the Subcommittee on Energy and Environment conducted a markup of the Residual Radioactive Materials Act of 1978 (the administration bill). During the markup the subcommittee agreed to the following changes in the administration bill with respect to which the Department of Energy (DOE) wishes to express its concern:

1. A 90-percent Federal/10-percent State share of the costs of the remedial action with an absolute ceiling on any State's cumulative share equal to one-quarter of 1 percent of the State's general revenue in the year of enactment;
2. A concurrence role, as opposed to a consultation role, for the States in the determination of the remedial action; and
3. Deletion of the subsections of the administration bill relating to the release of the United States from liability in connection with the performance of the remedial action.

COST SHARING FORMULA

For reasons made clear in the subcommittee record, DOE is opposed to the funding formula agreed to by the subcommittee. Of particular concern is the ceiling imposed on a State's contribution to the remedial action program. In practice, imposition of such a ceiling could create serious problems once the remedial action program is underway.

One of DOE's primary objectives with respect to this program is the accomplishment of the cleanup of the 22 specified sites within the estimated budget of between $80 million and $125 million. In order to achieve this goal it is imperative that the States have more than a minimal, preliminary financial involvement in the remedial program. Should changes in the program become necessary after its commencement, the States should have an ongoing concern with the relative costs associated with these changes. Additionally, the Secretary has been provided discretionary authority to designate within 5 years of enactment of the legislation additional sites for the purpose of remedial action. It is reasonable to expect that a significant amount of pressure will be exerted upon the Secretary by States and private parties to designate additional sites within this 5-year period. At a minimum additional sites, if designated, should be exempted from application of the ceiling in order to minimize such perssure.

STATE ROLE

Under the administration bill, the appropriate remedial action would be determined by the Secretary after consultation with the State; the State would then designate the disposal site or long-term stabilization of the tailings. In proposing this type of State role, it was DOE's intention to afford the States full participation at every level of the decisionmaking process. Therefore, the philosophy underlying the subcommittee's decision to provide concurrence authority to the

States is not dissimilar to DOE's objectives. We are concerned, however, as to how States could obtain authority to grant this concurrence under State law. Such authority, if required to be secured through new State legislation, could cause significant delays in the remedial action program and create unnecessary problems within the States. The language in the administration bill achieves the same objectives without creating such potential legislative hurdles.

RELEASE OF LIABILITY

The question of limiting the liability of the United States in connection with the performance of the remedial action is a sensitive and complex one, and warrants a more thorough study than is contained in the one paragraph summary in the issue paper presented to the subcommittee on July 20, 1978.

The language proposed by the administration effects only a limited release of liability dating from enactment of the legislation through the completion of the remedial action. Such a release would not affect the U.S. liability, if any, either prior to or after completion of the remedial action. Since the basis upon which the remedial action program is being undertaken is one of compassionate rather than legal responsibility, DOE considers the inclusion of a limited release of liability to be reasonable and proper.

While we recognize and understand the motivations which have prompted the subcommittee's actions with respect to the administration bill, the modifications adopted are contrary to DOE's objectives as expressed above. With respect to the three major issues of funding, State role, and liability, DOE is concerned that the subcommittee's changes could result in delays in implementation of and cost overruns for the remedial actions.

We appreciate the time and effort that the subcommittee has spent in marking up this legislation. My staff and I will be happy to provide any assistance the full committee may require during its markup.

Sincerely,

JOHN F. O'LEARY,
Deputy Secretary.

CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

In compliance with clause 3 of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

ATOMIC ENERGY ACT OF 1954

* * * * * * *

CHAPTER S. BYPRODUCT MATERIAL

Sec. 81. Domestic Distribution.
Sec. 82. Foreign Distribution of Byproduct Material.
Sec. 83. Ownership and custody of certain byproduct material and disposal sites.
Sec. 84. Authorities of Commission respecting certain byproduct material.

* * * * * * *

CHAPTER 19. MISCELLANEOUS

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CHAPTER 2. DEFINITIONS

SEC. 11. DEFINITIONS.—The intent of Congress in the definitions as given in this section should be construed from the words or phrases used in the definitions. As used in this Act:

a. The term "agency of the United States" means the executive branch of the United States, or any Government agency, or the legislative branch of the United States, or any agency, committee, commission, office, or other establishment in the legislative branch, or the judicial branch of the United States, or any office, agency, committee, commission, or other establishment in the judicial branch.

b. The term "agreement for cooperation" means any agreement with another nation or regional defense organization authorized or permitted by sections 54, 57, 64, 82, 91c., 103, 104, or 144, and made pursuant to section 123.

c. The term "atomic energy" means all forms of energy released in the course of nuclear fission or nuclear transformation.

d. The term "atomic weapon" means any device utilizing atomic energy, exclusive of the means for transporting or propelling the device (where such means is a separable and divisible part of the device), the principal purpose of which is for use as, or for development of, a weapon, a weapon prototype, or a weapon test device.

e. The term "byproduct material" means (*1*) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material[.] , *and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.*

CHAPTER 8. BYPRODUCT MATERIAL

* * * * * * *

SEC. 83. OWNERSHIP AND CUSTODY OF CERTAIN BYPRODUCT MATERIAL AND DISPOSAL SITES.—

a. Any license undre section 62 or section 81 for any activity which results in the production of any byproduct material as defined in section 11 e. (2) shall contain such terms and conditions as may be necessary to assure that, prior to termination of such license—

(1) the license will comply with such requirements as the Commission may establish repsecting such termination, and

(2) ownership of—

(A) any byproduct material defined in section 11 e. (2) which resulted from such licensed activity, and

(B) any land (other than land owned by the United States), including both the surface and subsurface estates, which is used for the disposal of such byproduct material.

shall be transferred to the United States.

Such material and land shall be transferred to the United States without cost to the United States (other than administrative and legal costs incurred in carrying out such transfer). The United States shall not transfer title to property acquired under this subsection to any other person.

b. (1) As soon as practicable after the date of the enactment of this section, the President shall designate the Secretary of Energy or any other appropriate officer or instrumentality of the United States (other than the Commission) to have custody of byproduct material and land transferred to the United States under subsection a. (2). No officer or instrumentality may be designated under the preceding sentence unless such officer or instrumentality has adequate authority to provide for the safe treatment, management, storage, and disposal of such byproduct material and to provide for the sound management of such plan, consistent with the requirements of subsection d.

(2) The officer or instrumentality designated under this subsection may accept donations of any byproduct material and land described in subsection a. (2) which is not required to be transferred to such officer or instrumentality (by reason of the effective date of this section or for any other reason). Such material and land may be accepted under this paragraph upon a determination by such officer or instrumentality that such acceptance is necessary or desirable in order to protect the public health, safety, and the environment.

c. Upon termination of any license to which this section applies, the Commission shall determine whether or not the licensee has complied with all applicable standards and requirements under such license.

d. Following the Commission's determination of compliance under subsection c., the officer or instrumentality designated by the President under subsection b. shall assume custody of the byproduct material and land referred to in subsection a. Such officer or instrumentality shall maintain such material and land in such manner as will protect the public health and safety and the environment. Such custody may be transferred to another officer or instrumentality of the United States only upon approval of the President upon his determination that such officer or instrumentality meets the requirements of subsection b.

Sec. 84. AUTHORITIES OF COMMISSION RESPECTING CERTAIN BYPRODUCT MATERIAL.—

a. The Commission shall insure that the management of any byproduct material as defined in section 11 e. (2) is carried out in such manner as—

(1) the Commission deems appropriate to protect the public health and safety and the environment, and

(2) conforms with applicable standards and criteria promulgated by the Administrator of the Environmental Protection Agency under section 275.

b. In carrying out its authority under this section, the Commission is authorized to:

(1) by rule, regulation, or order require persons, officers, or instrumentalities exempted from licensing—

(A) under section 208(b) or 210 of the Uranium Mill Tailings Control Act of 1978, or

(B) under section 81 of this Act to conduct monitoring, perform remedial work, and to comply with such other measures as it may deem necessary or desirable to protect the public health and safety and the environment, and

(2) make such studies and inspections and to conduct such monitoring as may be necessary.

Any violation by any person other than the United States of any rule or order of the Commission established under this section shall be subject to a civil penalty in the same manner and in the same amount as violations subject to a civil penalty under section 234. Nothing in this section affects any authority of the Commission under any other provision of this Act.

CHAPTER 14. GENERAL AUTHORITY

SEC. 161. GENERAL PROVISIONS.—In the performance of its functions the Commission is authorized to—

a. * * *

* * * * * * *

x. Establish by rule, regulation, or order (in accordance with the provisions of the Administrative Procedure Act as required under section 181) such standards and instructions as the Commission may deem necessary or desirable to insure, before termination of any license for byproduct material as defined in section 11 e. (2) and before the transfer under section 83 of land used for the disposal of such material, that the licensee will make available such bonding or other financial arrangements as may be required to assure the reclamation of sites, structures and equipment used in conjunction with such byproduct material and that—

(1) in the case of any such license issued or renewed after the date of the enactment of this subsection, to the maximum extent practicable, no long-term maintenance and monitoring of such sites, structures, and equipment will be required; and

(2) in the case of each license for such material (including any license referred to in paragraph (1) and any license in effect on the date of the enactment of this subsection), if the Commission determines that any such long-term maintenance and monitoring is necessary, the licensee will make available such bonding or other financial arrangements as may be required to assure such long-term maintenance and monitoring.

* * * * * * *

CHAPTER 19 MISCELLANEOUS

* * * * * * *

SEC. 274. COOPERATION WITH STATES.—

a. It is the purpose of this section—

(1) to recognize the interests of the States in the peaceful uses of atomic energy, and to clarify the respective responsibilities under this Act of the States and the Commission with respect to the regulation of byproduct, source, and special nuclear materials;

(2) to recognize the need, and establish programs for, cooperation between the States and the Commission with respect to control of radiation hazards associated with use of such materials;

(3) to promote an orderly regulatory pattern between the Commission and State governments with respect to nuclear development and use and regulation of byproduct, source, and special nuclear materials;

(4) to establish procedures and criteria for discontinuance of certain of the Commissions's regulatory responsibilities with respect to byproduct, source, and special nuclear materials, and the assumption thereof by the States;

(5) to provide for coordination of the development of radiation standards for the guidance of Federal agencies and cooperation with the States; and

(6) to recognize that, as the States improve their capabilities to regulate effectively such materials, additional legislation may be disirable.

b. Except as provided in subsection c., the Commission is authorized to enter into agreements with the Governor of any State providing for discontinuance of the regulatory authority of the Commission under chapters 6, 7, and 8, and section 161 of this Act, with respect to any one or more of the following materials within the State—

(1) byproduct materials *as defined in section 11e.(1)*;

(2) byproduct materials as defined in section 11e.(2);

[(2)] *(3)* source materials;

[(3)] *(4)* special nuclear materials in quantities not sufficient to form a critical mass.

During the duration of such an agreement it is recognized that the State shall have authority to regulate the materials covered by the agreement for the protection of the public health and safety from radiation hazards.

c. No agreement entered into pursuant to subsection b. shall provide for discontinuance of any authority and the Commission shall retain authority and responsibility with respect to regulation of—

(1) the construction and operation of any production or utilization facility;

(2) the export from or import into the United States of byproduct, source, or special nuclear material, or of any production or utilization facility;

(3) the disposal into the ocean or sea of byproduct, source, or special nuclear waste materials as defined in regulations or orders of the Commission;

(4) the disposal of such other byproduct, source, or special nuclear material as the Commission determines by regulation or order should, because of the hazards or potential hazards thereof, not be so disposed of without a license from the Commission.

The Commission shall also retain authority under any such agreement to make a determination that all applicable standards and requirements have been met prior to termination of a license for byproduct material as defined in section 11 e. (2). Notwithstanding any agreement between the Commission and any State pursuant to subsection b., the Commission is authorized by rule, regulation, or order to require that the manufacturer, processor, or producer or any equipment, device, commodity, or other product containing source, byproduct, or special

nuclear material shall not transfer possession or control of such product except pursuant to a license issued by the Commission.

d. The Commission shall enter into an agreement under subsection b. of this section with any State if—

(1) The Governor of that State certifies that the State has a program for the control of radiation hazards adequate to protect the public health and safety with respect to the materials within the State covered by the proposed agreement, and that the State desires to assume regulatory responsibility for such materials; and

(2) the Commission finds that the State program is *in accordance with the requirements of subsection o. and in all other respects* compatible with the Commission's program for the regulation of such materials, and that the State program is adequate to protect the public health and safety with respect to the materials covered by the proposed agreement.

* * * * * * *

j. The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the State with which an agreement under subsection b, has become effective, or upon request of the Governor of such State, may *(1)* terminate or suspend its agreement with the State and reassert the licensing and regulatory authority vested in it under this Act, if the Commission finds that such termination or suspension is required to protect the public health and safety *and (2), terminate or suspend that part of its agreement with the State relating to State licensing and regulation of any activity which results in the production of byproduct material as defined by section 11e.(2), and reassert the licensing and regulatory authority vested in it under this Act over such activities, if the Commission finds that such termination or suspension is required to assure compliance with subsection o.*

* * * * * * *

n. As used in this section, the term "State" means any State, Territory, or possession of the United States, the Canal Zone, Puerto Rico, and the District of Columbia. *As used in this section, the term agreement includes any amendment to any agreement.*

o. In the licensing and regulation of any activity which results in the production of byproduct material as defined in section 11e. (2) under an agreement entered into pursuant to subsection b., a State shall require compliance with the requirements of section 83 a. (2) (respecting ownership by the United States of byproduct material and land), and the State shall adopt and enforce—

(1) substantive standards for the protection of the public health, safety, and the environment from hazards associated with such material which are equivalent, to the extent practicable, or more stringent than, standards adopted and enforced by the Commission for the same purpose, and

(2) procedures which—

(A) in the case of licenses, provide for advance public notice, an opportunity for a public hearing with rights to present direct and rebuttal evidence and conduct cross-examination, and a written decision which is based only on evidence in the record and which is subject to judicial review,

(B) *in the case of rulemaking, provide opportunity for public participation in the form of written comments or a public hearing and which provide for judicial review of the rulemaking decision,*

(C) *require the preparation of a written independent-environmental analysis or review which is available to the public before the commencement of any such proceedings, and*

(D) prohibit, in the case of any construction activity which is proposed with respect to such material, any major activity from being undertaken before completion and public availability of the analysis or review referred to in subparagraph (C).

No State shall be required under paragraph (2) to conduct proceedings concerning any license or regulation which would duplicate proceedings conducted in such State by the Commission.

p. If any State, under an agreement for the licensing and regulation of byproduct material as defined in section 11 e. (2), imposes upon the licensee any requirement for the payment of funds which are collected by the State for the reclamation or longterm maintenance and monitoring of such byproduct material, such State shall transfer to the United States, upon termination of the license in connection with which such payment was made, any amounts collected by the State for such purposes. Any such agreement in effect on the date of the enactment of this subsection shall be amended as promptly as practicable following such date to comply with the requirements of the proceeding sentence with respect to amounts collected before, on, and after such date of enactment.

SEC. 275. AUTHORITY OF THE ENVIRONMENTAL PROTECTION AGENCY.—

a. The Administrator of the Environmental Protection Agency (hereinafter in this section referred to as to the "Administrator") shall, by rule, promulgate, and from time to time revise, generally applicable standards and criteria for the protection of the general environment outside the boundaries of—

(1) sites at which ores are processed primarily for their source material content, and

(2) sites used for the disposal of byproduct material as defined in section 11 e. (12).

Such criteria shall apply to radiological and nonradiological environmental hazards associated with the processing, and with the possession and transfer, of by product material as defined in section 11 e. (2), and shall be consistent to the maximum extent practicable with the requirements of the Solid Waste Disposal Act.

b. Before the promulgation of any rule pursuant to subsection a., the Administrator shall—

(1) consult with the Commission; and

(2) provide adequate notice of any rulemaking proceeding and provide opportunity for public hearing.

c. Any interested person may obtain judicial review of any rule promulgated under subsection a. of this section in the United States court of appeals for the Federal judicial cicruit in which such person resides or transacts business only upon petition for review by such person filed

within ninety days from the date of such promulgation, or after such date only if such petition is based solely on grounds which arose after such ninetieth day.

d. Nothing in this section shall be construed to limit or enlarge the functions of the Administrator of the Environmental Protection Agency under the Federal Water Pollution Control Act or under the Clean Air Act.

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95TH CONGRESS } HOUSE OF REPRESENTATIVES { REPT. 95-1480
2d Session } { Part 2

URANIUM MILL TAILINGS RADIATION CONTROL ACT OF 1978

SEPTEMBER 30, 1978.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. STAGGERS, from the Committee on Interstate and Foreign Commerce, submitted the following

REPORT

together with

SUPPLEMENTAL VIEWS

[To accompany H.R. 13650 which, on July 28, 1978, was referred jointly to the Committee on Interior and Insular Affairs and the Committee on Interstate and Foreign Commerce]

The Committee on Interstate and Foreign Commerce, to whom was referred the bill (H.R. 13650) to authorize the Secretary of Energy to enter into cooperative agreements with certain States respecting residual radioactive material at existing sites, to provide for the regulation of uranium mill tailings under the Atomic Energy Act of 1954, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

The amendment is as follows:

SHORT TITLE AND TABLE OF CONTENTS

SECTION 1. This Act may be cited as the "Uranium Mill Tailings Radiation Control Act of 1978".

TABLE OF CONTENTS

TITLE I—REMEDIAL ACTION PROGRAM

TITLE II—URANIUM MILL TAILINGS LICENSING AND REGULATION

TITLE III—STUDY AND DESIGNATION OF TWO MILL TAILINGS SITES IN NEW MEXICO

FINDINGS AND PURPOSES

SEC. 2. (a) The Congress finds that—

(1) uranium mill tailings located at active and inactive mill operations may pose a potential and significant radiation health hazard to the public, and that the protection of the public health, safety, and welfare and the regulation of interstate commerce require that every reasonable effort be made to provide for the stabilization, disposal, and control in a safe and environmentally sound manner of such tailings in order to prevent or minimize radon diffusion into the environment and to prevent or minimize other environmental hazards from such tailings.

(2) uranium mill tailings at certain inactive sites resulted in whole or in part from the production of uranium for sale under contract to the United States during a period when the potential radiation health hazard to the public was apparently not adequately recognized, altough environmental hazards to water and air from such tailings were recognized by several Federal agencies and the States as early as 1960;

(3) all milling operations at such sites have terminated prior to 1973;

(4) in 1972 Congress authorized some remedial action for property and structures in Grand Junction, Colorado, found to be contaminated by such tailings; and

(5) it is in the public interest to provide financial assistance to the States and Indian tribes to undertake remedial actions concerning such inactive sites in order to eliminate or minimize such hazard.

(b) The purposes of this Act are to provide—

(1) in cooperation with the interest States, Indian tribes, and the persons who own or control inactive mill tailings sites, a program of assessment and remedial action at such sites, including, where appropriate, the reprocessing of tailings to extract residual uranium and other mineral values where practicable, in order to stabilize and control such tailings in a safe and environmentally sound manner and to minimize or eliminate radiation health hazards to the public, and

(2) a program to regulate mill tailings during uranium or thorium ore processing at active mill operations and after termination of such operations in order to stabilize and control such tailings in a safe and environmentally sound manner and to minimize or eliminate radiation health hazards to the public.

TITLE I—REMEDIAL ACTION PROGRAM

DEFINITIONS

SEC. 101. For purpose of this title—

(1) The term "Secretary" means the Secretary of Energy.

(2) The term "Commission" means the Nuclear Regulatory Commission.

(3) The term "Administrator" means the Administrator of the Environmental Protection Agency.

(4) The term "Indian tribe" means any tribe, band, clan, group, pueblo, or community of Indians recognized as eligible for services provided by the Secretary of the Interior to Indians.

(5) The term "person" means any individual, association, partnership, corporation, firm, joint venture, trust, government entity, and any other entity, except that such term does not include any Indian or Indian tribe.

(6) The term "processing site" means—

(A) any site, including the mill, containing residual radioactive materials at which all or substantially all of the uranium was produced for sale to any Federal agency prior to January 1, 1971 under a contract with any Federal agency, unless—

(i) such site was owned or controlled as of January 1, 1978, or is thereafter owned or controlled, by any Federal agency, or

(ii) a license (issued by the Commission or its predecessor agency under the Atomic

Energy Act of 1954 or by a State as permitted under section 274 of such Act) for the production at such site of any uranium or thorium product derived from ores is in effect on January 1, 1978, or is issued or renewed after such date; and

(B) any other real property or improvement thereon which—

(i) is in the vicinty of such site, and

(ii) is determined by the Secretary, in consultation with the Commission, to be contaminated with residual radioactive materials derived from such site.

Any ownership or control of an area by a Federal agency which is acquired pursuant to a cooperative agreement under this title shall not be treated as ownership or control by such agency for purposes of subparagraph (A)(i). A license for the production of any uranium product from residual radioactive materials shall not be treated as a license for production from ores within the meaning of subparagraph (A)(ii) if such production is in accordance with section 108(b).

(7) The term "residual radioactive material" means—

(A) waste (which the Secretary determines to be radioactive) in the form of tailings resulting from the processing of ores for the extraction of uranium and other valuable constituents of the ores; and

(B) other waste (which the Secretary determines to be radioactive) at a processing site which relate to such processing, including any residual stock of unprocessed ores or low-grade materials.

(8) The term "tailings" means the remaining portion of a metal-bearing ore after some or all of such metal, such as uranium, has been extracted.

(9) The term "Federal agency" includes any executive agency as defined in section 105 of title 5 of the United States Code.

(10) The term "United States" means the 48 contiguous States and Alaska, Hawaii, Puerto Rico, the District of Columbia, and the territories and possessions of the United States.

DESIGNATION OF PROCESSING SITES

SEC. 102. (a)(1) Within one year after enactment of this Act, the Secretary shall designate all processing sites within the United States which he determines require remedial action to carry out the purposes of this Act. In making each such designation, the Secretary shall consult with the Administrator, the Commission, and the affected States, and in the case of Indian lands, the appropriate Indian tribe and the Secretary of the Interior.

(2) As part of his designation under this subsection, the Secretary, in consultation with the Commission, shall determine the boundaries of each such site.

(3) No site or structure with respect to which remedial action is authorized under Public Law 92–314 in Grand Junction, Colorado, may be designated by the Secretary as a processing site under this section.

(b) Within one year from the date of the enactment of this Act, the Secretary shall assess the potential health hazard to the public from the residual radioactive materials at designated processing sites. Based upon such assessment, the Secretary shall, within such one year period, establish priorities for carrying out remedial action at each such site. In establishing such priorities, the Secretary shall rely primarily on the advice of the Administrator.

(c) Within thirty days after making designations of processing sites and establishing the priorities for such sites under this section, the Secretary shall notify the Governor of each affected State, and, where appropriate, the Indian tribes and the Secretary of the Interior.

(d) The designations made, and priorities established, by the Secretary under this section shall be final and not be subject to judicial review.

(e)(1) The designation of processing sites within one year after enactment under this section shall include, to the maximum extent practicable, the areas referred to in section 101(6)(B).

(2) Notwithstanding the one year limitation contained in this section, the Secretary may, after such one year period, include any area described in section 101(6)(B) as part of a processing site designated under this section if he determines such inclusion to be appropriate to carry out the purposes of this title.

STATE COOPERATIVE AGREEMENTS

SEC. 103. (a) After notifying a State of the designation referred to in section 102 of this title, the Secretary, subject to section 113, is authorized to enter into cooperative agreements with such State to perform remedial actions at each designated processing site in such State (other than a site located on Indian lands referred to in section 105). The Secretary shall, to the greatest extent practicable, enter into such agreements and carry out such remedial actions in accordance with the priorities established by him under section 102.

(b) Each cooperative agreement under this section shall contain such terms and conditions as the Secretary deems appropriate and consistent with the purposes of this Act.

(c)(1) Except where the State is required to acquire the processing site as provided in subsection (a) of section 104, each cooperative agreement with a State under section 103 shall provide that the State shall obtain, in a form prescribed by the Secretary, written consent from any person holding any record interest in the designated processing site for the Secretary or any person designated by him to perform remedial action at such site.

(2) Such written consent shall include a waiver by each such person on behalf of himself, his heirs, successors, and assigns—

(A) releasing the United States of any liability or claim thereof by such person, his heirs, successors, and assigns concerning such remedial action, and

(B) holding the United States harmless against any claim by such person on behalf of himself, his heirs, successors, or assigns arising out of the performance of any such remedial action.

(d) Each cooperative agreement under this section shall require the State to assure that the Secretary, the Commission, and the Administrator and their authorized representatives have a permanent right of entry at any time to inspect the processing site and the site provided pursuant to section 104(b)(1) in furtherance of the provisions of this title and to carry out such agreement and enforce this Act and any rules prescribed under this Act. Such right of entry under this section or section 106 into an area described in section 101(6)(B) shall terminate on completion of the remedial action, as determined by the Secretary.

(e) Each agreement under this section shall take effect only upon the concurrence of the Commission with the terms and conditions thereof.

(f) The Secretary may, in any cooperative agreement entered into under this section or section 105, provide for reimbursement of the actual costs, as determined by the Secretary, of any remedial action performed with respect to so much of a designated processing site as is described in section 101(6)(B). Such reimbursement shall be made only to a property owner of record at the time such remedial action was undertaken and only with respect to costs incurred by such property owner. No such reimbursement may be made unless—

(1) such remedial action was completed prior to enactment of this Act, and unless the application for such reimbursement was filed by such owner within one year after an agreement under this section or section 105 is approved by the Secretary and the Commission, and

(2) the Secretary is satisfied that such action adequately achieves the purposes of this Act with respect to the site concerned and is consistent with the standards established by the Administrator pursuant to section 275(a)(1) of the Atomic Energy Act of 1954.

ACQUISITION AND DISPOSITION OF LANDS AND MATERIALS

SEC. 104. (a) Each cooperative agreement under section 103 shall require the State, where determined appropriate by the Secretary with the concurrence of the Commission, to acquire any designated processing site, including where appropriate any interest therein.

(b)(1) If the Secretary with the concurrence of the Commission determines that removal of residual radioactive material from a processing site is appropriate, the coopera-

tive agreement shall provide that the State shall acquire land (including, where appropriate, any interest therein) to be used as a site for the permanent disposition and stabilization of such residual radioactive materials in a safe and environmentally sound manner.

(2) Acquisition by the State shall not be required under this subsection if a site located on land controlled by the Secretary or made available by the Secretary of the Interior pursuant to section 106(a)(2) is designated by the Secretary with the concurrence of the Commission, for such disposition and stabilization.

(c) No State shall be required under subsection (a) or (b) to acquire any real property or improvement outside the boundaries of—

(1) that portion of the processing site which is described in section 101(6)(A), and

(2) the site used for disposition of the residual radioactive materials.

(d) In the case of each processing site designated under this title other than a site designated on Indian land, the State shall take such action as may be necessary, and pursuant to regulations of the Secretary under this subsection, to assure that any person who purchases such a processing site after the removal of radioactive materials from such site shall be notified in an appropriate manner prior to such purchase, of the nature and extent of residual radioactive materials removed from the site, including notice of the date when such action took place, and the condition of such site after such action. If the State is the owner of such site, the State shall so notify any prospective purchaser before entering into a contract, option, or other arrangement to sell or otherwise dispose of such site. The Secretary shall issue appropriate rules and regulations to require notice in the local land records of the residual radioactive materials which were located at any processing site and notice of the nature and extent of residual radioactive materials removed from the site, including notice of the date when such action took place.

(e)(1) The terms and conditions of any cooperative agreement with a State under section 103 shall provide that in the case of any lands or interests therein acquired by the State pursuant to subsection (a), the State with the concurrence of the Secretary and the Commission, may—

(A) sell such lands and interests,

(B) permanently retain such land and interests in lands (or donate such lands and interests therein to another governmental entity within such State) for permanent use by such State or entity solely for park, recreational, or other public purposes, or

(C) transfer such lands and interests to the United States as provided in subsection (f).

No lands may be sold under subparagraph (A) without the consent of the Secretary and the Commission. No site may be sold under subparagraph (A) or retained under subparagraph (B) is such site is used for the disposition of residual radioactive materials.

(2) Before offering for sale any lands and interests therein which comprise a processing site, the State shall offer to sell such lands and interests at their fair market value to the person from whom the State acquired them.

(f)(1) Each agreement under section 103 shall provide that title to—

(A) the residual radioactive materials subject to the agreement, and

(B) any lands and interests therein which have been acquired by the State, under subsection (a) or (b), for the disposition of such materials,

shall be transferred by the State to the Secretary when the Secretary (with the concurrence of the Commission) determines that remedial action is completed in accordance with the requirements imposed pursuant to this title. No payment shall be made in connection with the transfer of such property from funds appropriated for purposes of this act other than payments for any administrative and legal costs incurred in carrying out such transfer.

(2) Custody of any property transferred to the United States under this subsection shall be assumed by the Secretary or such Federal agency as the President may designate. Notwithstanding any other provision of law, such property and minerals shall be maintained pursuant to a license issued by the Commission in such manner as will protect the public health, safety, and the environment. The United States shall not transfer title to property or interest therein acquired under this subsection to any person or State, except as provided in subsection (h).

(g) Each agreement under section 103 which permits any sale described in subsection (e)(1)(A) shall provide for the prompt reimbursement to the Secretary from the proceeds of such sale. Such reimbursement shall be in an amount equal to the lesser of—

(1) that portion of the fair market value of the lands or interests therein which bears the same ratio to such fair market value as the Federal share of the costs of acquisition by the State to such lands or interest therein bears to the total cost of such acquisition, or

(2) the total amount paid by the Secretary with respect to such acquisition.

The fair market value of such lands or interest shall be determined by the Secretary as of the date of the sale by the State. Any amounts received by the Secretary under this title shall be deposited in the Treasury of the United States as miscellaneous receipts.

(h) No provision of any agreement under section 103 shall prohibit the United States from disposing of any subsurface mineral rights by sale or lease (in accordance with laws of the United States applicable to the sale, lease, or other disposal of such rights) which are associated with land on which residual radioactive materials are disposed and which are transferred to the United States as required under this section if the

Secretary takes such action as the Commission deems necessary pursuant to a license issued by the Commission to assure that the residual radioactive materials will not be disturbed by reason of any activity carried on following such disposition. If any such materials are disturbed by any such activity, the Secretary shall insure, prior to disposition of the minerals, that such materials will be restored to a safe and environmentally sound condition as determined by the Commission, and that the costs of such restoration will be borne by the person acquiring such rights from the Secretary or from his successor or assign.

INDIAN TRIBE COOPERATIVE AGREEMENTS

SEC. 105. (a) After notifying the Indian tribe of the designation pursuant to section 102 of this title, the Secretary, in consultation with the Secretary of the Interior, is authorized to enter into a cooperative agreement, subject to section 113, with any Indian tribe to perform remedial action at a designated processiong site located on land of such Indian tribe. The Secretary shall, to the greatest extent practicable, enter into such agreements and carry out such remedial actions in accordance with the priorities established by him under section 102. Each such agreement, shall contain such terms and conditions as the Secretary deems appropriate and consistent with the purposes of this Act. Such terms and conditions shall require the following:

(1) The Indian tribe and any person holding any interest in such land shall execute a waiver (A) releasing the United States of any liability or claim thereof by such tribe or person concerning such remedial action and (B) holding the United States harmless against any claim arising out of the performance of any such remedial action.

(2) The remedial action shall be selected and performed in accordance with section 108 by the Secretary or such person as he may designate.

(3) The Secretary, the Commission, and the Administrator and their authorized representatives shall have a permanent right of entry at any time to inspect such processing site in furtherance of the provisions of this title, to carry out such agreement, and to enforce any rules prescribed under this Act.

Each agreement under this section shall take effect only upon concurrence of the Commission with the terms and conditions thereof.

(b) When the Secretary with the concurrence of the Commission determines removal of residual radioactive materials from a processing site on lands described in subsection (a) to be appropriate, he shall provide, consistent with other applicable provisions of law, a site or sites for the permanent disposition and stabilization in a safe and environmentally sound manner of such residual radioactive materials. Such materials shall be transferred to the Secretary (without pay-

ment therefor by the Secretary) and permanently retained and maintained by the Secretary under the conditions established in a license issued by the Commission, subject to section 104(f)(2) and (h).

ACQUISITION OF LAND BY SECRETARY

SEC. 106. (a) Where necessary or appropriate in order to consolidate in a safe and environmentally sound manner the location of residual radioactive materials which are removed from processing sites under cooperative agreements under this title, or where otherwise necessary for the permanent disposition and stabilization of such materials in such manner—

(1) the Secretary may acquire land and interests in land for such purposes by purchase, donation, or exchange, or under any other authority of law or

(2) the Secretary of the Interior may make available public lands administered by him for such purposes in accordance with other applicable provisions of law. Prior to acquisition of land under paragraph (1) or (2) of this subsection in any State, the Secretary shall consult with the Governor of such State. No lands may be acquired under such paragraph (1) or (2) in any State in which there is no (1) processing site designated under this title or (2) active uranium mill operation, unless the Secretary has obtained the consent of the Governor of such State. No lands controlled by any Federal agency may be transferred to the Secretary to carry out the purposes of this Act without the concurrence of the chief administrative officer of such agency.

(b) The value of any lands exchanged by the Secretary under this section shall be equal or if they are not equal, the values shall be equalized by the payment of money to the grantor or to the Secretary concerned as the circumstances require so long as payment does not exceed 25 per centum of the total value of the lands or interests transferred out of Federal ownership. The Secretary shall try to reduce the amount of the payment of money to as small an amount as possible.

FINANCIAL ASSISTANCE

SEC. 107. (a) In the case of any designated processing site for which an agreement is executed with any State for remedial action at such site, the Secretary shall pay not to exceed 90 per centum of the actual cost of such remedial action, including the actual costs of acquiring such site (and any interest therein) or any disposition site (and any interest therein) pursuant to section 103 of this title, and the State shall pay the remainder of such costs from non-Federal funds. The Secretary shall not pay the administrative costs incurred by any State to develop, prepare, and carry out any cooperative agreement executed with such State under this title, except the proportionate share of the administrative costs

associated with the acquisition of lands and interests therein acquired by the State pursuant to this title.

(b) In the case of any designated processing site located on Indian lands, the Secretary shall pay the entire cost of such remedial action.

REMEDIAL ACTION

SEC. 108. (a)(1) The Secretary or such person as he may designate shall select and perform remedial actions at designated processing sites and disposal sites in accordance with the general standards prescribed by the Administrator pursuant to section 275 a. (1) of the Atomic Energy Act of 1954. Since the State must share in the costs of such remedial action, the State shall participate fully in the selection and performance thereof. Such remedial action shall be selected and performed with the concurrence of the Commission and in consultation, as appropriate, with the Indian tribe and the Secretary of the Interior.

(2) The Secretary shall use such technology in performing such remedial action as will insure compliance with the general standards promulgated by the Administrator under section 275 a. (1) of the Atomic Energy Act of 1954 and will insure the safe and environmentally sound stabilization of residual radioactive materials. No such remedial action may be undertaken under this section before the promulgation of such standards.

(b) Prior to undertaking any remedial action under this title, the Secretary shall evaluate the mineral concentration of the residual radioactive materials at each designated processing site to determine whether, as a part of any remedial action program, recovery of such minerals is practicable. The Secretary, with the concurrence of the Commission, may permit the recovery of such minerals, under such terms and conditions as he may prescribe to carry out the purposes of this Act. Any person permitted by the Secretary to recover such mineral shall pay to the Secretary a share of the net profits derived from such recovery, as determined by the Secretary. Such share shall not exceed the total amount paid by the Secretary for carrying out remedial action at such designated site. After payment of such share to the United States under this subsection, such person shall pay to the State in which the residual radioactive materials are located a share of the net profits derived from such recovery, as determined by the Secretary. Such share shall not exceed the total amount paid by the State for carrying out remedial action at such designated site. The person recovering such minerals shall bear all the costs of such recovery. Any person carrying out mineral recovery activities under this paragraph shall be required to obtain any necessary license under the Atomic Energy Act of 1954 or under State law as permitted under section 274 of such Act.

RULES

SEC. 109. The Secretary may prescribe such rules consistent with the purposes of this Act as he deems appropriate pursuant to title V of the Department of Energy Organization Act.

ENFORCEMENT

SEC. 110. (a)(1) Any person who violates any provision of this or any cooperative agreement entered into pursuant to this title or any rule prescribed under this Act concerning any designated processing site, disposition site, or remedial action shall be subject to an assessment by the Secretary of a civil penalty of not more than $1,000 per day per violation. Such assessment shall be made by order after notice and an opportunity for a public hearing, pursuant to section 554 of title 5, United States Code.

(2) Any person against whom a penalty is assessed under this section may, within sixty calendar days after the date of the order of the Secretary assessing such penalty, institute an action in the United States court of appeals for the appropriate judicial circuit for judicial review of such order in accordance with chapter 7 of title 5, United States Code. The court shall have jurisdiction to enter a judgment affirming, modifying, or setting aside in whole or in part, the order of the Secretary, or the court may remand the proceeding to the Secretary for such further action as the court may direct.

(3) If any person fails to pay an assessment of a civil penalty after it has become a final and unappealable order, the Secretary shall institute an action to recover the amount of such penalty in any appropriate district court of the United States. In such action, the validity and appropriateness of such final assessment order or judgment shall not be subject to review. Section 402(d) of the Department of Energy Organization Act shall not apply with respect to the functions of the Secretary under this section.

(4) No civil penalty may be assessed against the United States or any State or political subdivision of a State or any official or employee of the foregoing.

(5) Nothing in this section shall prevent the Secretary from enforcing any provision of this title or any cooperative agreement or any such rule by injunction or other equitable remedy.

(b) Subsection (a) shall not apply to any licensing requirement under the Atomic Energy Act of 1954. Such licensing requirements shall be enforced by the Commission as provided in such Act.

PUBLIC PARTICIPATION

SEC. 111. In carrying out the provisions of this title, including the designation of processing sites, establishing priorities for such sites, the selection of remedial actions, and the execution of cooperative agreements, the Secretary, the Ad-

ministrator, and the Commission shall encourage public participation and, where appropriate, the Secretary shall hold public hearings relative to such matters in the States where processing sites and disposal sites are located.

TERMINATION; AUTHORIZATION

SEC. 112. (a) The authority of the Secretary to perform remedial action under this title shall terminate on the date seven years after the date of promulgation by the Administrator of general standards applicable to such remedial action unless such termination date is specifically extended by an Act of Congress enacted after the date of enactment of this Act.

(b) The amounts authorized to be appropriated to carry out the purposes of this title by the Secretary, the Administrator, the Commission, and the Secretary of the Interior shall not exceed such amounts as are established in annual authorization Acts for fiscal year 1979 and each fiscal year thereafter applicable to the Department of Energy. Any sums appropriated for the purposes of this title shall be available until expended.

LIMITATION

SEC. 113. The authority under this title to enter into or contracts or other obligations requiring the United States to make outlays may be exercised only to the extent provided in advance in annual authorization and appropriation Acts.

REPORTS TO CONGRESS

SEC. 114. (a) Beginning on June 1, 1980, and each year thereafter until June 1, 1986, the Secretary shall submit a report to the Congress with respect to the status of the actions required to be taken by the Secretary, the Commission, the Secretary of the Interior, the Administrator, and the States and Indian tribes under this Act and any amendments to other laws made by this Act. Each report shall—

(1) include data on the actual and estimated costs of the program authorized by this title;

(2) describe the extent of participation by the States and Indian tribes in this program;

(3) evaluate the effectiveness of remedial actions, and describe any problems associated with the performance of such actions; and

(4) contain such other information as may be appropriate.

Such report shall be prepared in consultation with the Commission, the Secretary of the Interior, and the Administrator and shall contain their separate views, comments, and recommendations, if any. The Commission shall submit to the Secretary and Congress such portion of the report under this subsection as relates to the authorities of the Commission under title II of this Act.

(b) Not later than July 1, 1979, the Secretary shall provide a report to the Congress which identifies all sites located on public or acquired lands of the United States containing residual radioactive materials and other radioactive waste (other than waste resulting from the production of electric energy) and specifies which Federal agency has jurisdiction over such sites. The report shall include the identity of property and other structures in the vicinity of such site that are contaminated or may be contaminated by such materials and the actions planned or taken to remove such materials. The report shall describe in what manner such sites are adequately stabilized and otherwise controlled to prevent radon diffusion from such sites into the environment and other environmental harm. If any site is not so stabilized or controlled, the report shall describe the remedial actions planned for such site and the timetable for performing such actions.

(c) Copies of the reports required by this section to be submitted to the Congress shall be separately submitted to the Committees on Interior and Insular Affairs and on Interstate and Foreign Commerce of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

ACTIVE OPERATIONS; LIABILITY FOR REMEDIAL ACTION

SEC. 115. (a) No amount may be expended under this title with respect to any site licensed by the Commission under the Atomic Energy Act of 1954 or by a State as permitted under section 274 of such Act at which production of any uranium product from ores (other than from residual radioactive materials) takes place.

(b) In the case of each processing site designated under this title, the Attorney General shall conduct a study to determine the identity and legal responsibility which any person (other than the United States, a State, or Indian tribe) who owned or operated or controlled (as determined by the Attorney General) such site before the date of the enactment of this Act may have under any law or rule of law for reclamation or other remedial action with respect to such site. The Attorney General shall publish the results of such study, and provide copies thereof to the Congress, as promptly as practicable following the date of the enactment of this Act. The Attorney General, based on such study, shall, to the extent he deems it appropriate and in the public interest, take such action under any provision of this title or under any provision of law in effect when uranium was produced at such site to require payment by such person of all or any part of the costs incurred by the United States for such remedial action for which he determines such person is liable.

TITLE II—URANIUM MILL TAILINGS LICENSING AND REGULATION

DEFINITION

SEC. 201. Section 11 e. of the Atomic Energy Act of 1954 is amended to read as follows:

"e. The term 'byproduct material' means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.".

CUSTODY OF DISPOSAL SITE

SEC. 202. (a) Chapter 8 of the Atomic Energy Act of 1954 is amended by adding the following new section at the end thereof:

"SEC. 83. OWNERSHIP AND CUSTODY OF CERTAIN BYPRODUCT MATERIAL AND DISPOSAL SITES.—

"a. Any license issued or renewed after the effective date of this section under section 62 or section 81 for any activity which results in the production of any byproduct material as defined in section 11 e. (2) shall contain such terms and conditions as the Commission determines to be necessary to assure that, prior to termination of such license—

"(1) the licensee will comply with decontamination, decommissioning, and reclamation standards prescribed by the Commission for sites (A) at which ores were processed primarily for their source material content and (B) at which such byproduct material is deposited, and

"(2) ownership of any byproduct material defined in section 11 e. (2) which resulted from such licensed activity shall be transferred to the United States.

Any license in effect on the date of the enactment of this section shall either contain such terms and conditions on renewal thereof after the effective date of this section, or shall comply with paragraphs (1) and (2) upon the termination of such license, whichever first occurs.

"b. (1) Any such license which is issued after the effective date of this section shall also contain such terms and conditions as the Commission determines to be necessary to assure that, prior to termination of such license and after the licensee has complied with the requirements of subsection a., any land (other than land owned by the United States) which is used for the disposal of such byproduct material shall be transferred to the United States, including both the surface estate and any interest in the subsurface estate which may be necessary to protect the public health, welfare, and the envi-

ronment. Following the Commission's determination of compliance under subsection d., the Secretary of Energy or the Federal agency designated by the President under subsection c. shall assume title and custody of the byproduct material and land transferred as provided in this subsection. Such officer or instrumentality shall maintain such material and land in such manner as will protect the public health and safety and the environment. Such custody may be transferred to another officer or instrumentality of the United States only upon approval of the President upon his determination that such officer or instrumentality meets the requirements of subsection c. Notwithstanding any other provision of law, such property and materials shall be maintained pursuant to a license issued by the Commission in such manner as will protect the public health, safety, and the environment.

"(2) In the case of any such license under section 62 which was in effect on the effective date of this section, the Commission may require, before the termination of such license, such transfer of land (as described in paragraph (1)) as may be necessary to protect the public health, welfare, and the environment from any effects associated with such byproduct material.

"(3) Material and land transferred to the United States as required under this subseetion shall be transferred without cost to the United States (other than administrative and legal costs incurred in carrying out such transfer). The United States shall not transfer title to material or property acquired under this subsection to any person, unless such transfer is in the same manner as provided under section 104(b) of the Uranium Mill Tailings Radiation Control Act of 1978.

"(4) The provisions of this subsection respecting transfer of title and custody to land to the United States shall not apply in the case of lands held in trust by the United States for any Indian tribe or lands owned by such Indian tribe subject to a restriction against alienation imposed by the United States. In the case of such lands which are used for the disposal of byproduct material as defined in section 11 e. (2), the licensee shall be required to enter into such arrangements with the Commission as may be appropriate to assure the long-term maintenance and monitoring of such lands by the United States.

"c. The Secretary of Energy or such Federal agency as the President shall designate shall have custody of such property or material. The President shall not designate the Commission for such purposes.

"d. Upon termination of any license to which this section applies, the Commission shall determine whether or not the licensee has complied with all applicable standards and requirements under such license.".

"(b) This section shall be effective three years after the enactment of this Act.

(c) The table of contents for chapter 8 of the Atomic Energy Act of 1954 is amended by inserting the following new item after the item relating to section 82:

"Sec. 83. Ownership and custody of certain byproduct material and disposal sites.".

AUTHORITY TO ESTABLISH CERTAIN REQUIREMENTS

SEC. 203. Section 161 of the Atomic Energy Act of 1954 is amended by adding the following new subsection at the end thereof:

"x. establish by rule, regulation, or order, after public notice, such standards and instructions as the Commission may deem necessary or disirable to ensure—

"(1) that any adequate bond, surety, or other financial arrangement (as determined by the Commission) will be provided, before termination of any license for byproduct material as defined in section 11 e. (2), by a licensee to permit the completion of all requirements established by the Commission for the decontamination, decommissioning, and reclamation of sites, structures, and equipment used in conjunction with byproduct material as so defined, and

"(2) that—

"(A) in the case of any such license issued or renewed after the date of the enactment of this subsection, to the maximum extent practicable, after termination of such license, no long-term maintenance and monitoring of such sites, structures, and equipment will will be necessary; and

"(B) in the case of each license for such material (whether in effect on the date of the enactment of this section or issued or renewed thereafter), if the Commission determines that any such long-term maintenance and monitoring is necessary, the licensee, before termination of any license for byproduct material as defined in section 11 e. (2), will make available such bonding, surety, or other financial arrangements as may be necessary to assure such long-term maintenance and monitoring.".

COOPERATION WITH STATES

SEC. 204. (a) Section 274 b. of the Atomic Energy Act of 1954 is amended by adding "as defined in section 11 e. (1)" after the words "byproduct materials" in paragraph (1); by renumbering paragraphs (2) and (3) as paragraphs (3) and (4); and by inserting the following new paragraph immediately after paragraph (1):

"(2) byproduct materials as defined in section 11 e. (2);".

(b) Section 274 d. (2) of such Act is amended by inserting the following before the word "compatible": "in accordance with the requirements of subsection o. and in all other respects".

"(2) conforms with applicable general standards promulgated by the Administrator of the Environmental Protection Agency under section 275, and

"(3) conforms to general requirements established by the Commission, with the concurrence of the Administrator, which are to the maximum extent practicable, comparable to requirements applicable to the possession, transfer, and disposal of similar hazardous material regulated by the Administrator under the Solid Waste Disposal Act.

"b. In carrying out its authority under this section, the Commission is authorized to—

"(1) by rule, regulation, or order require persons, officers, or instrumentalities exempted from licensing under section 81 of this Act to conduct monitoring, perform remedial work, and to comply with such other measures as it may deem necessary or desirable to protect health or to minimize danger to life or property, and

"(2) make such studies and inspections and to conduct such monitoring as may be necessary.

Any violation by any person other than the United States or any officer or employee of the United States of any rule or order of the Commission established under this section or section 83 shall be subject to a civil penalty in the same manner and in the same amount as violations subject to a civil penalty under section 234. Nothing in this section affects any authority of the Commission under any other provision of this Act.".

(b) The table of contents for such chapter 8 is amended by inserting the following new item after the item relating to section 83:

"Sec. 84. Authorities of Commission respecting certain byproduct materials.".

AUTHORITY OF ENVIRONMENTAL PROTECTION AGENCY RESPECTING CERTAIN BYPRODUCT MATERIAL

SEC. 206. Chapter 19 of the Atomic Energy Act of 1954 is amended by inserting after section 274 the following new section:

"SEC. 275. HEALTH AND ENVIRONMENTAL STANDARDS FOR URANIUM MILL TAILINGS.—

"a. (1) As soon as practicable, but not later than one year after the date of enactment of this section, the Administrator of the Environmental Protection Agency (hereinafter referred to in this section as the 'Administrator') shall, by rule, promulgate standards of general application (including standards applicable to licenses under section 104(h)) for the protection of the public health, safety, and the environment from radiological and nonradiological hazards associated with residual radioactive materials (as defined in section 101 of the Uranium Mill Tailings Radiation Control Act of 1978) located at inactive uranium mill tailings sites

and depository sites for such materials selected by the Secretary of Energy, pursuant to title I of the Uranium Mill Tailings Radiation Control Act of 1978. Standards promulgated pursuant to this subsection shall, to the maximum extent practicable, be consistent with the requirements of the Solid Waste Disposal Act.

"(2) As soon as practicable, but not later than eighteen months after the enactment of this section, the Administrator shall, by rule, promulgate standards of general application for the protection of the public health, safety, and the environment from radiological and nonradiological hazards associated with the processing and with the possession, transfer, and disposal of byproduct material, as defined in section 11 e. (2) of this Act at sites at which ores are processed primarily for their source material content, or which are used for the disposal of such byproduct material.

"(3) Standards promulgated pursuant to this section for nonradiological hazards shall, notwithstanding any other provision of this Act or any other law, be consistent with, to the greatest extent possible, the standards of the Solid Waste Disposal Act applicable to such hazards.

"(4) The Administrator may from time to time amend, modify, or change any standard promulgated under this section.

"(b)(1) Before the promulgation of any rule pursuant to this section, the Administrator shall publish the proposed rule in the Federal Register, together with a statement of the research, analysis, and other available information in support of such proposed rule, and provide a period of public comment of at least thirty days for written comments thereon and an opportunity, after such comment period and after public notice, for any interested person to present oral data, views, and arguments at a public hearing. There shall be a transcript of any such hearing. The Administrator shall consult with the Commission and the Secretary of Energy before promulgation of any such rule.

"(2) Judicial review of any rule promulgated under this section may be obtained by any interested person only upon such person filing a petition for review within sixty days after such promulgation in the United States court of appeals for the Federal judicial circuit in which such person resides or has his principal place of business. A copy of the petition shall be forthwith transmitted by the clerk of court to the Administrator. The Administrator thereupon shall file in the court the written submissions to, and transcript of, the written or oral proceedings on which such rule was based as provided in section 2112 of title 28, United States Code. The court shall have jurisdiction to review the rule in accordance with chapter 7 of title 5, United States Code, and to grant appropriate relief as provided in such chapter. The judgment of the court affirming, modifying, or setting aside, in whole or in part, any such rule shall be final, subject to judicial review by the Supreme Court of the United States upon certiorari or certification as provided in section 1254 of title 28, United States Code.

"(3) Any rule promulgated under this section shall not take effect earlier than sixty calendar days after such promulgation.

(c) The table of contents for chapter 19 of the Atomic Energy Act is amended by inserting the following new item after the item relating to section 274:

"Sec. 275. Health and environmental standards for uranium mill tailings.".

AUTHORIZATION OF APPROPRIATION FOR GRANTS

SEC. 207. There is hereby authorized to be appropriated for fiscal year 1980 to the Nuclear Regulatory Commission not to exceed $500,000 to be used for making grants to States which have entered into agreements with the Commission under section 274 of the Atomic Energy Act of 1954 to aid in the development of State regulatory programs under such section which implement the provisions of this Act.

EFFECTIVE DATE

SEC. 208. Except as otherwise provided in this tile the amendments made by this title shall take effect on the date of the enactment of this Act.

CONSOLIDATION OF LICENSES AND PROCEDURES

SEC. 209. The Nuclear Regulatory Commission shall consolidate, to the maximum extent practicable, licenses and licensing procedures under amendments made by this title with licenses and licensing procedures under other authorities contained in the Atomic Energy Act of 1954.

TITLE III—STUDY AND DESIGNATION OF TWO MILL TAILINGS SITES IN NEW MEXICO

STUDY

SEC. 301. The Commission, in consultation with the Attorney General and the Attorney General of the State of New Mexico, shall conduct a study to determine the extent and adequacy of the authority of the Commission and the State of New Mexico to require, under the Atomic Energy Act of 1954 (as amended by title II of this Act) or under State authority as permitted under section 274 of such Act or under other provision of law, the owners of the following active uranium mill sites to undertake appropriate action to regulate and control all residual radioactive materials at such sites to protect public health, safety, and the environment: the former Homestake-New Mexico Partners site near Milan, New Mexico, and the Anaconda carbonate process tailings site near Bluewater, New Mexico. Such study shall be completed and a report thereof submitted to the Congress and to the Secretary within one year after enactment of this Act, together with such recommendations as may be appropriate. If the Commission determines that such authority is

not adequate to regulate and control such materials at such sites in the manner provided in the first sentence of this section, the Commission shall include in the report a statement of the basis for such determination. Nothing in this Act shall be construed to prevent or delay action by a State as permitted under section 274 of the Atomic Energy Act of 1954 or under any other provision of law or by the Commission to regulate such residual radioactive materials at such sites prior to completion of such study.

DESIGNATION BY SECRETARY

SEC. 302. (a) Within 90 days from the date of his receipt of the report and recommendations submitted by the Commission under section 301, notwithstanding the limitations contained in section 101(6)(A) and in section 115(a), if the Commission determines, based on such study, that such sites cannot be regulated and controlled by the State or the Commission in the manner described in section 301, the Secretary may designate either or both of the sites referred to in section 301 as a processing site for purposes of title I. Following such designation, the Secretary may enter into cooperative agreements with the New Mexico to perform remedial action pursuant to such title concerning only the residual radioactive materials at such site resulting from uranium produced for sale to a Federal agency prior to January 1, 1971 under contract with such agency. Any such designation shall be submitted by the Secretary, together with his estimate of the cost of carrying out such remedial action at the designated site, to the Committee on Interior and Insular Affairs and the Committee on Interstate and Foreign Commerce of the House of Representatives and to the Committee on Energy and Natural Resources of the Senate.

(b)(1) No designation under subsection (a) shall take effect before the expiration of 120 calendar days (not including any day in which either House of Congress is not in session because of an adjournment of more than 3 calendar days to a day certain or an adjournment *sine die*) after receipt by such Committees of such designation.

(c) Except as otherwise specifically provided in subsection (a), any remedial action under title I with respect to any sites designated under this title shall be subject to the provisions of title I (including the authorization of appropriations referred to in section 112(b)).

PURPOSE OF THE BILL

H.R. 13650, as reported by the committee, established a remedial action program at certain inactive uranium mill tailings sites for the purpose of protecting the public from possible radiation health hazards resulting from such tailings, amends the Atomic Energy Act of 1954 to regulate control, and license certain byproduct material at existing and future active mill tailings operatings, and provides a study of certain sites, and, in addition, possible limited remedial action at such sites if regulatory authority under the 1954 act, as amended by this bill, proves inadequate.

LEGISLATIVE BACKGROUND

On April 27, 1978 the Department of Energy, on behalf of the administration, submitted to the Congress legislation to establish a remedial action program at inactive mill tailings sites through cooperative arrangements between the Secretary of Energy and the States and Indian Tribes. On May 3, 1978, the chairman of the Committee on Interior and Insular Affairs, Congressman Morris K. Udall, and the chairman of the committee, Congressman Harley O. Staggers, introduced the administration proposal as H.R. 12535.

On June 29, 1978, Congressman Udall also introduced H.R. 13382 which provided for the regulation of active uranium mill tailings sites. That bill was based on a proposal developed by the Nuclear Regulatory Commission.

Three bills, similar to H.R. 12535, were introduced by Congressman Marriott. They are:

H.R. 11698, introduced on March 21, 1978.

H.R. 12229, introduced on April 19, 1978 and co-sponsored by Congressmen Armstrong, Bauman, Edwards of Oklahoma, Hansen, Johnson of Colorado, Kazen, Lujan, Murphy of Pennsylvania, Rhodes, Roncalio, Rudd, Runnels, Skubitz, Symms, and Weaver.

H.R. 12938, introduced on June 1, 1978, was also co-sponsored by these Congressmen and Congressmen McDade, Ruppe, and Stump.

All of these bills were referred jointly to the Committee on Interior and Insular Affairs and this committee. Hearings were held on the bill in June 1978 by the Subcommittee on Energy and the Environment of the Interior and Insular Affairs Committee. On July 28, 1978, Chairman Udall introduced H.R. 13650 which is cosponsored by Congressmen Lujan, Sharp, Marriott, Johnson of Colorado, McKay, Vento, Kazen, Roncalio, Bauman, and Rhodes. H.R. 13650 which was also jointly referred to our committee and the Interior Affair Committee, combined many of the provisions of H.R. 12535 and H.R. 13382, as well as some features of the other bills.

The Subcommittee on Energy and Power, chaired by Congressman John D. Dingell, held hearings on all of these bill on June 19 and 20 and on August 2, 1978. Testimony was received from representatives of industry, the National Governors Association, the Environmental Policy Center, the Department of Energy, the Nuclear Regulatory Commission, and the Environmental Protection Agency.

On August 11, 1978, the Committee on Interior and Insular Affairs reported H.R. 13650 in amended form (H. Rept. 95-1480, Part I). On that same day, the Subcommittee on Energy and Power reported a similar version of the bill. Thereafter, Subcommittee Chairman Dingell and Chairman Udall, together with representatives of the minority on both committees, developed amendments to the Energy and Power version in order to reconcile the two versions and have the amended bill considered by the full House. The committee reported H.R. 13650 with an amendment that includes the provisions suggested by the Committee on Interior and Insular Affairs. Chairman Udall has indicated that he supports this amended version.

Background and Need for Legislation

A. NEED FOR A REMEDIAL ACTION PROGRAM

Uranium mills are a part of the nuclear fuel cycle. They extract uranium from ore for eventual use in nuclear weapons and powerplants, leaving radioactive sand-like waste—commonly called uranium mill tailings—in generally unattended piles. As a result of many years of uranium ore processing, about 140 million tons have now accumulated at active and inactive milling sites, according to the Nuclear Regulatory Commission.

NRC Chairman, Dr. Joseph M. Hendrie, describes how these piles are a hazard to the public health:

> The NRC believes that long-term release from tailings piles may pose a radiation health hazard if the piles are not effectively stabilized to minimize radon releases and prevent unauthorized use of the tailings.
>
> * * * * *
>
> Unlike high-level radioactive waste from the back end of the nuclear fuel cycle, which contains products of the fission reaction, mill tailings contain only naturally occurring radioactive elements, in small quantities. The radioactive decay of these elements leads to production of radon, a radioactive gas with a halflife of about four days, which can diffuse from a tailings pile into the atmosphere and subsequently expose persons to radiation far away from the pile. The increased exposure compared to exposure from radon already in the atmosphere from other sources is exceedingly slight, but this increase is in effect permanent. This is because radon production in mill tailings continues for times of the order of a hundred thousand years, so the tailings pile becomes a perpetual source injecting a small amount of radon into the atmosphere, unless some action is taken to keep the radon from escaping.
>
> The health effects of this radon production are tiny as applied to any one generation, but the sum of these exposures can be made large by counting far into the future, large enough in fact to be the dominant radiation exposure from the nuclear fuel cycle. Whether it is meaningful to attach significance to radiation exposures thousands of years in the future, or conversely, whether it is justifiable to ignore them, are questions without easy answers. The most satisfactory approach is to require every reasonable effort to dispose of tailings in a way that minimizes radon diffusion into the atmosphere.

The Assistant Administrator for Air and Waste Management of the Environmental Protection Agency, Mr. David G. Hawkins, testified concerning the health problems at these sites as follows:

> A summary table is given below which lists each site and an estimate of the 25-year cumulative potential lung cancers from inhalation of radon daughters if the site were left as it is.

The people in the area are not necessarily "threatened" by these tailings. The risk for potential lung cancer is increased due to radon emanating from the tailings pile. The calculations given in the table reflect a statistical increase in effects based on the number of people estimated to be exposed. Therefore highly populated areas show greater total effects than low population areas. In all cases the individual risk is less than 1×10^4 per year.

Summary of phase II reports—Health effects

Site	25-yr. potential lung cancers
Vitro (Salt Lake City, Utah)	24
Durango, Colo	6
Shiprock, N. Mex	5
Grand Junction, Colo	3
Riverton, Wyo	2
Gunnison, Colo	1
Rifle, Colo. (old and new)	1
Mexican Hat, Utah	.2
Lakeview, Oreg	.2
Falls City, Tex	.1
Tuba City, Ariz	.1
Naturita, Colo	.1
Ambrosia Lake, N. Mex	.1
Green River, Utah	.02
Slick Rock, Colo. (2 sites)	.02
Maybell, Colo	.02
Monument Valley, Ariz	.02
Lowman, Idaho	.002
Converse County, Wyo	.001

The potential health effects from radon daughters were calculated by DOE's contractor on a absolute risk basis. This is the numerical increase in the number of cancers per unit of exposure. Another basis for the risk estimates is the relative risk approach, which may give risk values higher by an order of magnitude. The relative risk estimate, is the estimated percent increase in cancer per unit of exposure. Unfortunately, existing information does not allow one to make an unequivocal choice, and thus it must be kept in mind that these projections of health impact are somewhat uncertain and based on extrapolations from a select population, namely underground uranium miners

The DOE and others contend that at these inactive sites, tailings "resulted from the operations of private companies which processed uranium ore under procurement contracts" for the Atomic Energy Commission from the mid-1940's to 1970 and that stabilization of the piles "was not included in these contracts, largely because these tailings were not believed to be a problem."

In May 1966, an official of the former AEC testified before a Senate Committee, saying:

> The Commission recognizes that, like tailings piles from other ore milling operations, tailings close to communities may involve dusting or erosion, or may be considered unsightly. Some of these tailings accumulations started before World War I when Colorado ores were processed for radium recovery. Other use of the same ores for vanadium recovery

at a later time added more tailings. Since 1948 uranium and vanadium recovery operations made further additions. Because most of the tailings have resulted from operations under AEC uranium procurement contracts, the Commission is especially interested in appropriate remedial actions. Through its Division of Raw Materials, the Commission has taken action and will continue to take action that involves the cooperative efforts of both the milling industry and State agencies. This includes the encouragement of voluntary control by the milling companies and support for the development of adequate and effective State regulations compatible with Executive Order 11258 on abatement of water pollution by Federal activities. The Commission plans to continue its cooperative effort with Federal, State, and local authorities and with the milling industry to achieve adequate pollution control. The Commission will continue to participate in special studies, special surveillance, or other technical assistance that may be appropriate.

Late in 1966, three Federal agencies, including AEC, issued a "Joint Federal Agency Position Regarding Control of Uranium Mill Tailings" which states:

> The Federal Water Pollution Control Administration, the Public Health Service, and the Atomic Energy Commission agree that inactive tailings piles resulting from uranium milling operations should be structurally stabilized and contained to prevent water and wind erosion. Active tailings piles should be managed to minimize such erosion during use.
>
> Planning, management, stabilization and containment of tailings piles are viewed as being the responsibility of the individual mill owners. Mill owners should develop, without undue delay, specific plans for accomplishing such management, stabilization and containment, and submit such plans through the appropriate state regulatory agencies for approval. The staffs of the Federal Water Pollution Control Administration, the Public Health Service, and the Atomic Energy Commission will be available to the state regulatory agencies, upon request, to provide advice and assistance regarding the development of pile stabilization and containment objectives and measures for achieving them.
>
> Compliance by mill owners with approved plans for stabilization and containment should be recognized as constituting fulfillment of mill owner responsibility with regard to such tailings piles. Obtaining and enforcement of tailings piles stabilization and containment plans should rest initially with the states concerned.

The DOE said that results of the efforts made under the 1966 agreement were "far from satisfactory".

Prior to that agreement, the Public Health Service recommended that "measures should be taken to prevent the erosion and spread of uranium mill tailings", although stating that there "is currently no significant immediate hazard associated with uranium mill tailings activities anywhere in the Colorado River Basin." Also, in 1960, a water pollution conference for the Colorado River Basin was held and, as a result, mill discharges were reportedly reduced.

Thus, it is clear that in the 1960's, the Federal Government and some States recognized a health problem with these tailings, but apparently they did not recognize the magnitude of it until the early 1970's, when an investigation began into the use of these tailings for construction purposes.

Regulatory authority over tailings presently is exerted by the NRC and the so-called agreement States indirectly as part of the licensing of active milling operations under the Atomic Energy Act of 1954. Once these operations cease, however, the NRC and the States generally have no further role. As already noted, the former Atomic Energy Commission which regulated these mills did not consider the tailings a significant health problem until the late 1960's.

In 1972, Congress enacted Public Law 92–314 which provides financial assistance to the State of Colorado to limit radiation exposure resulting from the use of these tailings for construction purposes in Grand Junction, Colo. That law was amended on February 21, 1978, by Public Law 95–236 which was also considered by this committee.

In 1974, Congress directed that the then Energy Research and Development Administration study all inactive uranium mill tailing sites. A two-phased study was conducted of a total of 22 inactive mill sites. Most of these produced uranium under contracts with the AEC during the period 1947 through 1970. These studies were all completed in January 1978. On the basis of these studies the Department of Energy developed H.R. 12535 to authorize a remedial action program to clean up these inactive sites and to reduce, to the extent practicable, possible public exposure to radiation from these unstabilized tailings piles.

In a commentary on the administration's proposal, the General Accounting Office, in a June 20, 1978 report entitled, "The Uranium Mill Tailings Cleanup: Federal Leadership at Last", expressed supoprt for the enactment of legislation to deal with this health problem, but pointed out several disadvantages as follows:

> The proposed program is estimated to cost up to $126 million, with the Federal Government bearing the heaviest burden, while receiving the least direct benefits. More important, the cleanup program could be considered as a precedent for the Federal Government to pay for cleaning up other nuclear facilities—a far more costly endeavor than the mill tailings cleanup. This is extremely important because the question of who should pay for cleaning up nuclear facilities has not yet been answered, primarily because very little decommissioning of these facilities has been done to date.
>
> Finally, while not as serious as the above, the technology to stabilize the mill tailings has not been fully developed, possibly preventing a truly satisfactory resolution of the problem at this time.

B. NEED FOR A REGULATORY PROGRAM

As already noted, the NRC now regulates these tailings at active mills indirectly through its licensing of source material milling under the Atomic Energy Act of 1954, largely as a result of the enactment of the National Environmental Policy Act of 1969. States are permitted

under the 1954 Act to license uranium milling under their own authorities through agreement with the NRC. Five of the 25 "Agreement States" now have such licensing programs. However, tailings are not now source material licensable by the NRC. Thus, once the underlying source material license for the mill terminates, there is no longer a "clear legal basis for further Commission regulatory control of the mill tailings", according to Dr. Hendrie. He added:

> The Environmental Protection Agency can exert regulatory authority over uranium mill tailings under the Resource Conservation and Recovery Act of 1976. However, EPA has no authority over the generation of the tailings (the source material milling licensed by the Commission or an Agreement State) and so far they have not developed any regulation to implement their authority over the disposal of tailings. I should perhaps point out that the RCRA does not give any authority whatever to the NRC, and consequently the Commission has not been able to base any plans for tailings regulations on the provisions of that Act. Finally, to complete the complicated regulatory picture, in Agreement States it is the State in most cases, rather than the Commission, that exercises regulatory control over the uramiun milling and tailings.

This situation was discussed at the Energy and Power Subcommittee hearings on H.R. 12535 and related bills on June 20, 1978. Chairman Dingell urged the NRC to submit quickly to Congress legislation to deal with this problem in order to prevent a repeat of the situation that led to the need for, and the development of, remedial legislation. Chairman Udall made a similar request. H.R. 13382 was the result of those requests.

Committee Action

The Committee on Interstate and Foreign Commerce met to consider H.R. 13650 on September 26, 1978. The committee approved the bill with an amendment in the nature of a substitute on that day and ordered it reported to the House by a unanimous vote, a quorum being present.

The committee is convinced that all tailings pose a potential and significant radiation health hazard to the public. Legislation is needed now to stabilize and control all such tailings in a safe and environmentally sound manner and to minimize or eliminate radiation health hazards to the public. This remedial action program will affect 26 million of the 140 million tons of tailings now located at various mill sites.

The committee, however, is also convinced that it would be a grievous and costly mistake to authorize a remedial program for inactive mill sites without also enacting regulatory legislation to control the even more serious problem at active mill sites. This portion of the bill will control about 120 million tons of the tailings at active operations.

The committee's amendment joins the two programs in one bill.

In authorizing a remedial action program, the committee does not recognize any Federal responsibility or liability for these tailings. The committee realizes that they were largely derived from milling operations conducted under Federal contract. However, that is not the compelling reason for recommending a remedial action program. The

significant factor is the lack of adequate authority under the Atomic Energy Act of 1954 to regulate these tailings. As the NRC testified:

> Historically, the NRC and its predecessor agency have not had regulatory jurisdiction over uranium mill tailings after mill operations are terminated because the tailings are not themselves licensable material. Regulatory control over tailings is exerted indirectly as part of the Commission's licensing of ongoing milling operations pursuant to licensing authority over source materials. Therefore, after operations had ceased at the 22 inactive sites being considered and all licensable quantities of source material removed, the regulatory staff had no further role.

The lack of any control over these inactive sites under the 1954 act and other laws to require clean up of these sites is the principal basis for committee action to authorize this remedial program. This situation does not exist at active mill tailings sites. Those sites, even those with tailings derived from Federal contracts, are subject to NRC regulation as a result of the enactment of NEPA in 1970. The NRC can require these operators, as a condition to the granting of a license, to take steps to stabilize these piles, although the control is not adequate. Indeed, the NRC testified that it has obtained commitments from some licensees to cope with the problem to some degree. This bill will provide additional authority to effectively control tailings at these active and all future sites.

The existence of Federal contracts in the 1950's and 1960's provides an additional basis for establishing this program, as does the fact that some sites are no longer owned by persons who operated the mills prior to closing, but we stress that the lack of any specific statutory authority requiring the effective stabilization of these mills by the NRC or the States after operations ceased and licenses terminated is the principal reason for recommending this program.

It is for this and other reasons that the committee also stresses that it does not consider this bill a precedent to be followed in the case of other waste management problems, such as the one noted by the GAO earlier in this report. The situation at these inactive sites is quite unique in that there was once Federal licensing of the operations, but, due to a loophole in the law, the sites escaped control after operations ceased. Moreover, in each case, most, if not all, of the production was for Federal purposes.

Sites Included

Title I of the bill provides for the designation of the sites by the Secretary of Energy to be eligible for remedial action. The bill, as reported by the committee, does not specifically identify the sites as did the version reported by the Committee on Interior and Insular Affairs, because the committee was informed by the DOE in a September 5, 1978, response to an inquiry by Subcommittee Chairman Dingell, that the 22 sites studied by the DOE are not all located within the 20 named locations referenced in that committee's version of H.R. 13650. The DOE said:

> It is correct that not all of the sites are located within the boundaries of the communities listed in the bill. Further, some

of these communities are probably not incorporated, and thus do not have well defined boundaries. Several of the designations do not refer to communities * * * The sites which are clearly outside of the communities listed in the [Interior Committee] bill are:

Utah—Mexican Hat.

Colorado—Rifle (new), Gunnison, Naturita, Maybell, Slick Rock (2 sites).

New Mexico—Ambrosia Lake (not as community).

Wyoming—Riverton, Converse County (not a community).

Texas—Falls City.

Arizona—Tuba City, Monument Valley (not a community).

Idaho—Lowman.

There is an active mill operated by Conoco-Pioneer near Falls City, Texas, and two active mills in the Ambrosia Lake area in McKinley County, New Mexico, owned by Kerr-McGee Corp., and United Nuclear-Homestake Partners.

The following table shows each of the inactive sites studied at which tailings exist, the name of the contractor that provided processed uranium to the United States, and other relevant data:

TABLE I

Location (A)	Contractor to the United States (B)	Dates of operation (C)	Contract dates (where less than C) (D)	Part of production sold to United States in contract period (E)
Arizona:				
Monument [1]	Vanadium Corp. of America	1955–67		All.
Tuba City [1]	El Paso Natural Gas	1956–66		All.
Colorado:				
Durango [2]	Vanadium Corp. of America	1943–63		All.
Grand Junction	Climax Uranium Co. and Amax Uranium Co.	1951–70	1951–65	All.
Gunnison	Gunnison Mining Co. and successors	1958–62		All.
Maybell	Union Carbide Corp. (UCC)	1957–64		All.
Naturita	Vanadium Corp. of America [3]	1939–63		All.
New Rifle	Union Carbide Corp	1958–72	1958–70	All.
Old Rifle	do	1924–58	1946–58	All.
Slick Rock (NC)	Became Government property in 1949	1931–43	None	
Slick Rock (UCC)	Union Carbide Corp	1957–61		All.
Idaho: Lowman	Porter Bros	1955–60		All.
New Mexico:				
Ambrosia Lake	Phillips Petroleum Co	1958–63		All.
Shiprock	Kerr-McGee 1954–63, Vanadium Corp. of America, 1963–58.	1954–68		All.
Oregon: Lakeview	Lakeview Mining Co. [3]	1958–60		All.
Texas:				
Falls City	Susquehanna Western, Inc	1961–73	1961–70	All.
Ray Point	do	1970–73	None	
Utah:				
Green River	Union Carbide Corp	1958–61		All.
Mexican Hat	Texas Zinc Minerals	1957–65		All.
Salt Lake City	Vitro Chemical Co	1951–68		All.
Wyoming:				
Riverton	Susquehanna Western, Inc	1958–63		All.
Converse County	Western Nuclear	1962–65		All.
Pennsylvania: Canonsburg:	Standard Chemical Co	1911–22	None	
	Vitro Manufacturing Co	1930–42	None	
	do	1943–57	1943–57	All.

[1] Navajo Reservation.
[2] Being evaluated for tailings processing or residual values.
[3] And successor.

Of the sites named in table I the following, according to the DOE, would be considered as eligible for designation under title I of the bill as reported by the committee:

1. Salt Lake City, Utah.
2. Green River, Utah.
3. Mexican Hat, Utah.
4. Durango, Colo.
5. Grand Junction, Colo.
6. Rifle, Colo. (2 locations).
7. Gunnison, Colo.
8. Naturita, Colo.
9. Maybell, Colo.
10. Slick Rock, Colo. (2 locations).
11. Shiprock, N. Mex.
12. Ambrosia Lake, N. Mex.
13. Riverton, Wyo.
14. Converse County, Wyo.
15. Lakeview, Oreg.
16. Falls City, Ariz.
17. Tuba City, Ariz.
18. Monument Valley, Ariz.
19. Lowman, Idaho.
20. Canonsburg, Pa.

The following table provides some additional data about these inactive sites and other Government-owned and active sites that are not covered by title I of this bill:

TABLE II. URANIUM MILL TAILINGS

The following tabulation was developed by the Department of Energy to show the following:

Column 1. Tailings were accumulated as a result of total concentrated production (U_3O_8) purchased by the AEC.

Column 2. Tailings accumulated as a result of concentrate roduction (U_3O_8) partially purchased by AEC and partially purchased on the open market—tailings comingled.

Colmun 3. Tailings accumulated as a result of concentrate production (U_3O_8) supplied to the open market—none purchased by the AEC.

	Col 1	Col. 2	Col. 3
A. Inactive millsites included in phase II reports:			
Arizona:			
Monument	All		Navajo Tribe.
Tuba City	All		Do.
Colorado:			
Durango	All		Ranchers exploration and development.
Grand Junction		Comingled	Bob Shumway & Castings, Inc.
Gunnison	All		Decker, Bishop & McEachern.
Maybell	All		Union Carbide Corp.
Naturita	All		Foote Mineral Corp. and Ranchers Exploration.
New Rifle		Comingled	Union Carbide Corp.
Old Rifle	All		Do.
Slick Rock (NC)	All		Do.
Slick Rock (UCC)	All		Rocky Mountain Gas (5A), Union Carbide Corp.
Idaho: Lowman	All		Velsicol Chemical Corp.

	Col 1	Col. 2	Col. 3
A. Inactive missiles included in phase II reports—Continued			
New Mexico:			
Ambrosia Lake (Phillips)	All		United Nuclear Corp.
Shiprock	All		Navajo Tribe.
Oregon: Lakeview	All		Precision Pine.
Texas:			
Falls City—SWI		Comingled	Solution Engineering.
Ray Point		None	Exxon.
Utah:			
Green River	All		Union Carbide Corp.
Mexican Hat	All		Navajo Tribe.
Salt Lake City	All		Moench, Richards (29A), Salt Lake County Suburban Sanitation District (99A).
Wyoming:			
Riverton	All		Solution Engineering.
Converse County	All		Western Nuclear.
Pennsylvania: Canonsburg		Comingled	Canon Development Co.
B. Government owned:			
South Dakota: Edgemont		do	
Utah: Monticello	All		
C. Currently active:			
Colorado:			
Canon City		Comingled	Cotter Corp.
Uravan		do	Union Carbide Corp.
New Mexico:			
Anaconda:			
Old Carbonate	All		Anaconda Corp.
New		Comingled	
Kerr-McGee		do	Kerr-McGee Corp.
Sohio		None	Sohio.
United Nuclear:			
Church Rock		do	United Nuclear Corp.
New Mexico Partners—Old	All		Do.
Homestake Partners—New		Comingled	United Nuclear—Homestake Partners.
Texas: Falls City		None	Conoco & Pioneer Nuclear.
Utah:			
Atlas		Comingled	Atlas Corp.
Rio Algom		None	Rio Algom Corp.
Washington: Ford		Comingled	Dawn Mining Co.
Wyoming:			
Exxon—PRB		None	Exxon.
Federal-American:			
Partners			
Gas Hills		Comingled	Federal-American Partners.
Lucky Mc:			
Gas Hills		do	Utah International, Inc.
Shirley Basin		None	Do.
Rocky Mountain Energy—Powder River Basin.		do	Rocky Mountain Energy.
Union Carbide—Gas Hills		Comingled	Union Carbide Corp.
Western Nuclear-Jeffrey City		do	Phelps Dodge.
Petrotomics—Shirley Basin		do	Petrotomics Co.

Cost of Remedial Action at Inactive Sites

As proposed by the administration and the committee on Interior and Insular Affairs, DOE would pay 100 percent of the costs of remedial action at inactive sites involving Indian lands. The committee has not altered that proposal. The estimated cost of remedial action at Indian lands is between $10 and $21 million, according to the Department of Energy.

In addition, the administration proposed that the remedial action involving non-Indian lands would be cost-shared with the States. The Federal share proposed would be a maximum of 75 percent. The States would pay the remainder.

Various other approaches were suggested to limit the State share significantly. The committee, in reporting this bill, increased the maximum Federal share to 90 percent.

The committee rejected suggestions that this program be funded entirely by the Federal Government or that the share of the States be limited to less than 10 percent of the costs, and at the same time, provide all manner of State approvals or concurrences in the remedial

action program. The committee is concerned about the precedent of such proposals and about their effect on the Federal budget.

The committee is particularly concerned about the cost of this program. The range of the estimated cost of the part of the program subject to cost sharing under the administration proposal of a maximum of 75 percent is between $80 million and $120 million depending on the extent of remedial action required. This estimate includes no escalation figure. It is based on cost estimates prepared at the time the reports were prepared during 1976 and early 1977. In an August 15, 1978, letter to Subcommittee Chairman Dingell, the DOE said:

> For the purpose of adjusting for escalation, a starting date of July 1, 1977, is reasonable. Recently, escalation has been around 10 percent per year. In a remedial program estimated to require 8 years to conduct, escalation becomes a major factor. It is a compelling reason for starting and completing the work on each site at the earliest possible date.Assuming remedial legislation were to be enacted by October 1978, and the EPA standards and criteria were promulgated in 6 months. DOE could begin remedial work by July 1979. At 10 percent escalation, the estimated program cost by then would become $97 to $152 million. The effect of escalation thereafter will depend on the schedule on which the work is performed.

The States received some benefits from the Federal contracts when the mills were operating. They will clearly benefit substantially from this program through the improvement of these sites so that they can be put to beneficial use again. The DOE estimates that the market value of many of these sites will be enhanced significantly after the remedial action. For example, the DOE estimates that the Durango, Colo., site will have a market value of $10,000 per acre and that the Grand Junction and Garrison sites will have a value of $8,000 per acre. The Salt Lake City, Utah, site is estimated to have a $13,000 per acre market value after decontamination. The present value of these sites is far less.

Given these considerations, plus the additional factor that the committee, like the DOE, does not believe that the Federal Government is responsible for these tailings, the committee believes that the 90 percent maximum Federal share is more than generous. At the 90 percent level, the Department of Energy estimates that the range for the Federal share is between $98 million and $180 million. The committee also believes that since the bulk of the costs will be paid by the Nation's taxpayers, the States should not have "concurrence" or "veto" authority over the remedial action program, although the committee intends that DOE clearly consult with the States.

SECTION-BY-SECTION ANALYSIS AND COMMITTEE COMMENTS

Section 1—Short title

This section provides that the short title for the Act is the "Uranium Mill Tailings Radiation Control Act of 1978".

Section 2—Findings and purposes

Subsection (a) sets forth several congressional findings. There is a general finding that uranium mill tailings pose a potential and sig-

nificant radiation health hazard to the public and that the protection of the public health, safety, and welfare and the regulation of interstate commerce require a Federal effort to provide for the stabilization, disposal, and control, in a safe and environmentally sound manner, of the tailings in order to prevent and minimize health and environmental hazards. In addition, there are findings that at certain inactive sites such tailings resulted from Federal contracts for the purchase of uranium at a time when the health hazards were not apparently fully recognized by Federal agencies, although some environmental hazards were recognized as early as 1960 by governmental agencies; that such sites are not now subject to regulation under the Atomic Energy Act of 1954; that milling operations at these sites terminated prior to 1973; that in 1972, Congress authorized a similar remedial action program in Grand Junction, Colo., concerning such tailings; and that the public interest requires financial assistance to undertake remedial actions concerning these inactive sites.

Subsection (b) sets forth the purposes of this act. The first purpose is to provide a program to assess the tailings at inactive sites and to provide remedial action at such sites, including the reprocessing, as appropriate, of tailings to extract the minerals that have a significant value from such tailings, where practicable, in order to stabilize and control such tailings. The second purpose is to provide for the regulation of such tailings at during active operations and after termination of those mill operations in order to stabilize and control such tailings in a safe and environmentally sound manner and to minimize or eliminate radiation health hazards to the public.

TITLE I—REMEDIAL ACTION PROGRAM

Section 101—Definitions

This section defines several terms used in the act. Of particular importance are the terms "processing site" and "residual radioactive materials". The former is composed of the sites, including the mill, where there are residual radioactive materials and at which all or substantially all the uranium was produced for sale to a Federal agency prior to January 1971 under a contract with that agency. It does not include a site owned or controlled by a Federal agency prior to January 1, 1978, or one that is owned or controlled by a Federal agency after that date. Also, it does not include a site that is licensed under the Atomic Energy Act of 1954, which license is in effect on January 1, 1978, or is licensed after such date. The term also includes structures and buildings located in the vicinity of such site which are contaminated with residual radioactive materials derived from such site. The Secretary of Energy, in consultation with the NRC, will determine which structures and buildings are eligible to be included as part of the designated processing site. It is expected that the Secretary and the Nuclear Regulatory Commission will use sound judgment in this regard and be concerned about costs, as well as health.

The term "residual radioactive material" is the tailings wastes that the Secretary of Energy determines to be radioactive. It also includes other wastes which the Secretary determines to be radioactive.

Section 102—Designations of processing sites

This section provides for the designation by the DOE of processing sites and the establishment of priorities for remedial action at those

sites. In designating sites, the Secretary of Energy must consult with the Environmental Protection Agency, the Nuclear Regulatory Commission, and the States. In the case of Indian lands, he would consult with the tribal officials and the Interior Department, as well as the EPA and NRC. The designations will also establish the boundaries of the processing site.

The committee is concerned that the DOE expend funds on a priority basis in order to correct the most serious problems first. Thus, the bill requires the DOE to assess the health hazard to the public at each site with the help of the EPA and establish priorities for remedial action. It is intended that DOE rely heavily on the EPA advice in establishing these priorities.

Both the designations and priorities must be completed within 1 year after enactment. Within 30 days thereafter, the DOE must notify the States and Indian tribes of the designations and priorities. The bill does not authorize designation or the establishment of priorities after the one year deadline. However, the committee does recognize that designation of all structures and buildings "in the vicinity" of a processing site may not be practicable within this timeframe and allows some flexibility. The committee expects the DOE to act expeditiously on these designations as well. At the same time, the DOE should be assured that serious contamination that poses a health hazard of the structures and buildings actually exists.

The bill precludes jurisdictional review of the designations and priorities.

Section 103—State Cooperative Agreements

Once the designations are made and all priorities are established, the DOE may negotiate and enter into cooperative agreements with the affected States pursuant to this section for the purpose of carrying out remedial action on non-Indian lands. Again the bill stresses that agreements should be developed in accordance with the priorities established so that the sites that pose the greatest danger to the population centers will be addressed first. The bill, however, does not preclude the DOE from proceeding to a lower priority sites in those cases, for example, where agreement does not appear certain or where the best type of remedial action is not fully known. The provision recognizes that there are a limited amount of funds and time available and that the seriousness of the health danger to population centers should be the principal criterion for action.

Subsection (b) requires that the DOE include terms and conditions necessary to implement remedial action and insure effective completion of such action.

Subsection (c) places a duty on the State, not on the DOE, to obtain written consent from the owner of the site authorizing the remedial action, unless the site is acquired. This consent must also be obtained for the buildings and structures in the vicinity of the site. The remedial action is in essence a voluntary program. The DOE cannot acquire the processing site. Only the State can do so. If the State does not, consent is required.

The consent must include a waiver releasing the United States of any liability or claim concerning the remedial action and holding the Government harmless against any claim arising out of the performance of the remedial action. The waiver would apply to the property owner,

his heirs, successors, and assigns. This provision is similar to section 202(d) of Public Law 92-314. It is not a total release of liability. It would not affect those not covered by the release who might file a claim against the United States, although the committee stresses that nothing in this bill should be construed to recognize any liability on the part of the United States for any occurrence prior to enactment or after enactment. Further, the act does not affect other responsibilities or requirements under other provisions of law, including workman's compensation laws.

The committee notes that the property owner will benefit from the voluntary remedial action provided by this act. Clearly, the committee does not want to find that at some later date the United States is faced with a claim from such owner, his heirs, successors or assigns concerning such remedial action or arising from such action.

This section also requires that each cooperative agreement provide effective assurance that the DOE, NRC, and EPA have a permanent right of entry at any time to inspect the processing sites covered by the agreements, to carry out the agreement, and to enforce the act and any rules prescribed under this act. In the case of structures and buildings in the vicinity of the site, this right of entry can be terminated when the Secretary determines that the remedial action is completed.

No cooperative agreement may be effective until it is concurred in by the NRC. It is the intention of the committee that the Secretary and the NRC will work out a procedure where representatives of both will participate in the development of the agreement so that concurrence will not be delayed. However, it is also important to stress that the NRC, as an independent agency, is not expected to rubber stamp these agreements, but to approve only those that clearly meet the requirements and purposes of this act.

Subsection (f) authorizes the DOE in any cooperative agreement entered into with a State or an Indian tribe to provide for the reimbursement of the actual costs incurred for remedial action performed on structures or buildings in the vicinity of a processing site. The Secretary will determine the costs for reimbursement. The reimbursement can only be made to the property owner of record at thetime of the remedial action and only for costs incurred by such owner. The remedial action must have been completed prior to enactment of this legislation and the application must have been filed by the owner with the Secretary and the affected State of Indian tribe within one year after a cooperative agreement is approved by the Secretary and the NRC. The remedial action must achieve the puroses of the act and be consistent with EPA standards. Quite clearly unless the remedial action was properly done, reimbursement would not be appropriate. The reimbursement is, of course subject to the finding and percentage limitations of this act.

Section 104—Acquisition and disposition of lands and materials

The cooperative agreement will require that the affected State acquire the processing site before remedial action is initiated if such acquisition is determined appropriate by the Secretary and the NRC. The acquisition is to include subsurface interests, as well as subsurface interests if the Secretary and the NRC determine that such interests be acquired. Such acquisition is to be accomplished pursuant to State law. It is not intended that the DOE acquire this site.

Provision is also made for removal of the residual radioactive materials from the processing site to another site, if the DOE and NRC agree that such removal is appropriate. The agreement will specify that the depository site to be acquired by the State. Such acquisition will include subsurface interests if the Secretary and the NRC believe such acquisition appropriate.

The committee is concerned about the cost of acquisition under section and expect that it be utilized only when necessary and that care be taken to acquire the lands and interests at the lowest cost. The committee intends that if the materials are to be removed from a processing site, the DOE and NRC will probably not need to acquire that site but merely provide that State enter into an agreement with the property owner for such removal. The committee believes that the acquisition must include subsurface interests to prevent the creation of future hazards to the public through disruption of the tailings in an attempt to recover underlying minerals.

No acquisition is required in the case of structures and buildings outside the processing and depository site.

Once the materials are removed from a processing site, the committee is concerned that future purchasers are given notice that the site containing these materials has been cleaned up. The Secretary is required to issue regulations for such notice that the States must follow, including provision for notice in local land records. Of particular concern, is that the person purchasing the site immediately after the materials are removed or otherwise cleaned up is given adequate and effective notice by the seller. Other than the use of notice in the land records, it is not intended that subsequent sellers provide future purchasers such data. Presumably, the land records can be flagged so that a title searcher will automatically notify future purchasers.

The State may dispose of the processing site acquired by it after completion of the remedial action or the State may retain the site or donate it for public purposes or transfer it, without cost, to the United States. Such disposal must be approved by the DOE and the NRC. Before offering to sell the lands, the State must give the person who sold the property to the State an opportunity to acquire it back at the fair market value determined as of the date of the sale to such person.

The cooperative agreements shall provide that title to the residual radioactive materials or the entire tailings, plus the lands and interests therein, acquired by a State for their final disposition shall be transferred to the Secretary of Energy at no cost to the United States, except possible administrative and legal costs incurred as a result of the transfer. This provision is not to be construed to prevent the Secretary from sharing the costs of acquisition by the State as provided in this act. Once transferred, the materials and land and interests therein cannot be disposed of except as provided in this section.

If the States sells a processing site, it must reimburse the United States from the proceeds of the sale. The State must also sell the site at fair market value as determined by the DOE. Proceeds from such sale, plus any other monies received by the DOE under this act must be deposited as miscellaneous receipts. The annual report of the Secretary should indicate the sums so deposited.

Subsection (h) authorizes the DOE to dispose of subsurface minerals underlying the site on which such materials are located after such site

has been transferred to the DOE. The minerals must be disposed of by sale or lease and in accordance with applicable laws of the United States concerning the sale or lease of minerals. However, the Secretary may only do so if there is adequate assurance that mineral development does not disturb the depository site. There must also be an NRC license. If the depository site is disturbed, the DOE must provide for termination or suspension of mineral development and require the mineral developer to restore the site at no cost to the United States.

Section 105—Indian tribe cooperative agreements

This section provides for cooperative agreements between the DOE and Indian tribes. The provisions are nearly identical to the provisions of section 103.

The committee does not intend by this act to affect the responsibilities of the Secretary of the Interior as trustee for any Indian tribe. However, the committee intends that any release executed under section 105 shall be fully binding on the Indian tribe and that the Secretary of the Interior, in exercising such responsibilities, is also fully bound by such waiver and may not recognize any claim covered by it.

Section 106—Acquisition of land by Secretary

This section authorizes the DOE to acquire lands for the purpose of consolidating in a safe and environmentally sound manner residual radioactive materials which are removed from processing sites or where otherwise necessary to carry out the purposes of this act. The committee recognizes that it may not be safe or environmentally sound or practicable to have a series of depository sites scattered among several States. Consolidation of these materials into a few sites may be a better solution. This section provides that option.

The section authorizes acquisition by purchase, including condemnation, donation, or exchange. It also provides for the transfer of public lands administered by Interior and available for this purpose. Surplus lands could also be used.

In each acquisition, the DOE is required to consult with the State where the acquisition will occur. In the case of a proposed acquisition, in a State where there is no designated processing site and no active uranium mill operating, the Secretary must obtain the concurrence of the Governor before acquiring the land. The committee belives that concurrence is appropriate where a State does not have tailings. But it does not appear reasonable to give a State such concurrence authority over a Federal program if that State already has active or inactive mill tailings.

Before Federal lands may be transferred to the Secretary, the agency administering those lands must concur. Moreover, the transfer must be consistent with the laws applicable to those lands. The committee does not intend by this section to encourage the use of Federal lands, particularly those that are part of the National Park, Fish and Wildlife, and Forest Systems.

Section 107—Financial assistance

This section authorizes the DOE to pay up to 90 percent of the actual costs of remedial action at the designated processing site, including the buildings and structures in the vicinity of such site. Land acquisition is also to be cost shared, including any preparatory or other work at a depository site. The State must pay the remaining

share of the costs. However, the State cannot use Federal funds to pay this share. The Federal share will not cover any State costs incurred in the development, preparation, or execution of cooperative agreement, other than land acquisition costs.

In the case of Indians, the DOE will pay all the costs.

Section 108—Remedial action

This section provides that the DOE or a person designated by the DOE shall select and perform the remedial action in accordance with EPA general standards. The NRC must concur in both the selection and performance. Provision is also made for consultation with the Indian tribe and the Secretary of Interior. In the case of sites in non-Indian lands, the States are intended to have a significant role in the selection because they are sharing in the costs. It is intended that the DOE have complete flexibility in selecting contractors so long as the NRC concurs.

The DOE is also directed to use technology in performing remedial action that will insure compliance with the EPA standards and insure the safe and environmentally sound stabilization of the materials. The committee is concerned about the adequacy of the technology to deal with this problem. It is intended that the DOE not rush headlong into using technology that may be effective for a short period of time. The committee does not want to visit this problem again with additional aid. The remedial action must be done right the first time.

No provision for R and D was included because it is believed that the DOE has adequate R and D authority now. The committee urges that the DOE and EPA move rapidly to improve the technology for remedial action.

This section precludes undertaking any remedial action before EPA finally promulgates general standards. Clearly, this is essential. The DOE should not proceed until these standards are developed. Even the selection of depository sites could be affected by such standards.

It should be noted that nothing in this title should be construed as affecting any existing responsibility of NRC, DOE, and EPA to comply with NEPA concerning this remedial action program.

Subsection (b) requires the DOE to evaluate the mineral content of these materials and to determine if recovery is practicable. The DOE is then authorized, with NRC concurrence, to enter into contracts for recovery of the minerals, consistent with the EPA standards and the purposes of this act. This recovery may take place as part of the remedial action effort. The cost of recovery, including related work, to insure compliance with such standards and purposes will be paid by the person recovering the minerals. The States and the Secretary will participate in the net profits. The amount of the profit to be shared will be determined by the DOE as part of the agreement. The committee's intention is that the person recovering the minerals be able to make a reasonable profit. Clearly, such recovery should only be undertaken if it is consistent with the purposes of this Act and will not impede effective and prompt remedial action.

Section 109—Rules

This section provides for DOE rules and regulations in accordance with section 501 of the DOE Organization Act.

Section 110—Enforcement

This section provides for enforcement through the use of civil penalties and equitable remedies as appropriate. Section 502(c) of the DOE Organization Act applies to this section.

Section 111—Public participation

This section directs the DOE, EPA, and NRC to allow the public an opportunity to participate, particularly at the local level, in the designation of processing sites and the establishment of priorities, and in the selection of depository sites, the execution of cooperative agreements, and other matters. Hearings at the local level are required, where requested. The objective is to give the people and officials affected an opportunity to learn what is planned for their area and its impact on them. It is not intended that hearings be held at all sites, however. Moreover, it is expected that this provision will not delay the program, but should be helped in gaining public support.

Section 112—Termination; authorization

This section requires that the remedial action program terminate 7 years after the EPA standards are finally promulgated, unless Congress extends the program by late authorization. This termination is limited to the remedial action program only. It is not intended to terminate the enforcement or other authorities under the Act for maintaining and monitoring depository sites once remedial action is completed.

This section also provides that appropriation for title I shall be established in annual authorization and appropriation acts for the DOE. Funds for fiscal year 1979 are included in the DOE authorization bill for fiscal year 1979 (H.R. 11392) which is pending House Floor action.

Section 113—Limitation

This section is intended to insure compliance with Budget Act requirements.

Section 114—Reports to Congress

Subsection (a) provides for an annual report to Congress concerning actions under title I and title II of the bill.

Subsection (b) directs the DOE to report by July 1979 to Congress concerning various locations under the jurisdictions of the DOE and other Federal agencies where residual radioactive materials or other radioactive wastes are located. These wastes do not include spend fuel from nuclear power reactors. The report must identify the site and the agency with jurisdiction. It will also identify structures, buildings, or other improvements in the vicinity of the sites which are contaminated or may be contaiminated by such materials or tailings. The report must describe the condition of the sites and materials and tailings and what has been done or is planned to stabilize the sites and make them safe, including a timetable for action, if needed. The committee expects that the EPA and the NRC will participate in the study and report.

The committee understands there that are a number of federally owned or controlled sites with such materials or tailings, such as the TVA site mentioned earlier and a DOE site in Lewiston, N.Y., and some in New Jersey. The committee wants to have these sites identified by the DOE and have data concerning the health or environmental problems associated with the sites and on what, if anything, is being done to eliminate such problems and when.

Section 115—Active operations; liability for remedial action

This section prohibits DOE from expending funds for remedial action at active mill tailing sites. The committee is aware that at some mills, tailings were accumulated years ago under Federal contract. But, as noted earlier in this report, the tailings are commingled with tailings derived from commercial operations. Also, they are subject to regulation by the NRC or the States. Consistent with the views of the committee as to the basis for title I, the committee does not believe it appropriate to finance the stabilization of any part of these tailings which are subject to regulation under the 1954 act. However, Subcommittee Chairman Dingell has recently written to the DOE concerning these mills to obtain more data. The committee expects NRC to exercise all its responsibility concerning these sites under the 1954 law.

This section also directs the Justice Department to study each site eligible for remedial action under title I in order to determine the identity of those who owned or controlled the site before enactment of this act, including past owners. The study must also determine the legal responsibility, if any, of such persons under any law or rule of law in effect at the time the mill was producing uranium for Federal purposes for the reclamation or remedial action at the site. Justice must provide a report of its findings to Congress. Based on the study, the Attorney General is directed, to the extent he deems appropriate and in the public interest, to take action under Federal or State law, in effect at the time of the Federal contract for the purchase of uranium from the mill, to require reimbursement from such person of all or part of remedial action costs of the United States for which he determines such person is liable.

During hearings concerning this legislation, the DOE contended that it was difficult to "fix legal responsibility for the tailings problem". The DOE said:

> The Federal Government and States do not appear to be legally responsible since they exerted neither operational control or regulatory jurisdiction over the tailings. The Federal Government was a mere purchaser of product from a number of privately-owned companies.
>
> Insofar as the companies that operated the mills are concerned, we have a rather mixed bag of circumstances. Some companies have acted responsibly and endeavored to establish and maintain a cover of vegetation on the tailings to stop wind and water erosion. Others sold the properties or simply allowed the lease on the land to expire. Some of the corporations no longer exist. There were no requirements in the Government contracts for tailings stabilization and the companies were not aware of the potential health and safety risks resulting from exposure to the tailings. It therefore is questionable whether any companies are legally responsible.

In response to questions, the DOE provided two memoranda prepared by the AEC which purport to be "legal opinions" concerning AEC's regulation of the tailings. Neither opinion appears to deal with the question at issue. Indeed, one opinion deals with the question of transferring wastes from the mills to other persons and not with the question of stabilization and control at the mills.

The committee is not persuaded that liability exists or does not exist. The objective of this provision is to require a careful study by the Justice Department to resolve the issue and, if appropriate, to require action to recover costs from the responsible persons. Clearly, if a site is not currently owned or controlled by the person who contracted with the United States to sell the uranium, such action to recover remedial action costs inappropriate. But it is the intention of the committee that we find out. The committee stresses that this section is not intended to create new or additional law under which Justice could recover costs. Justice must look to the law as it was at or prior to termination of mill operations.

TITLE II—URANIUM MILL TAILINGS LICENSING AND REGULATION

This title amends the Atomic Energy Act of 1954. It reinforces the authority of the Nuclear Regulatory Commission to regulate the uranium mill process and mill tailings disposal. The "Agreement States" program, under which certain States license uranium milling activities, is modified to require that State licensing standards be equivalent to those of the Commission, and it requires public participation and environmental review as part of the State licensing procedures. Title II also reinforces the NRC's authority to make financial arrangements with uranium milling companies to insure proper stabilization and care of uranium mill tailings.

Section 201—Definition

This section amends the definition of "byproduct material" in the Atomic Energy Act of 1954 to include uranium mill tailings and other wastes. Previouly, tailings have been controlled through the licensing process for uranium mills. This amendment would subject tailings to specific licensing authority. (Section 209 requires that the milling and mill tailings licensing process be consolidated.)

Section 202—Custody of disposal site

This section adds a new section 83 to Chapter 8 of the Atomic Energy Act of 1954.

Subsection (a) of the the new section requires that any license issued or renewed under sections 62 or 81 of the 1954 act, after the effective date of the section, for an activity resulting in the production of any byproduct material as defined in section 11e.(2) of the 1954 act must contain terms and conditions prescribed by the NRC. These terms and conditions are primarily designed to assure that, prior to termination of any license, the licensee will comply with decontamination, decommissioning, and reclamation standards prescribed by the NRC pursuant to the new section 161x of the 1954 act for the mill sites, including any depositories of the byproduct material. Such terms and conditions will also provide that title and control of such byproduct material shall be transferred to the United States. Licenses in effect on enactment of this act must, depending on which event just occurs, either contain such terms and conditions when next renewed after the effective date of the section or shall comply with these statutory provisions upon termination of the license.

Subsection (b) requires that licenses issued after the effective date of the new section 83 must include terms and conditions for the transfer of land used to dispose of tailings from active operations to the

United States. This will occur before termination of the license, but after the land has met the requirements of subsection (a). This transfer will include surface and subsurface interests. Similar provision is made for the transfer of such interest to the United States in the case of a license in effect before the effective date of this section. However, in such case, the NRC has some discretion because such licenses may not own the subsurface or even the surface interests and thus could not transfer the land to the United States.

Once title to the land and interests therein are transferred to the United States they cannot be disposed of. However, the underlying minerals may be sold or leased as provided in section 104(h) of this act.

The above provisions concerning transfer of title do not apply to Indian lands. In the case of those lands, provision is made for agreements between the NRC and the Indians to assure proper maintenance and monitoring by the United States.

The NRC is required to make a determination at the time of termination of a license that these requirements and standards have been met. The determination must be in writing.

Section 203—Authority to establish certain requirements

This section amends section 161 of the 1954 act by adding a new section to that section providing for the issuance by rule, regulation, or order of standards and instructions concerning financial arrangements which must be made by licensees for the cost of stabilization and, if necessary, the long-term cost of maintenance and monitoring. Such arrangements must be made before a license is terminated, and may be by bond, surety, or other means to insure that the NRC has the flexibility to effectively implement this provision fully.

Subparagraph (1) requires the Commission to regulate the disposal of uranium milling and mill tailings in such a way that, when each license is terminated, reclamation and stabilization already has been implemented by the licensee and so that no long-term maintenance and monitoring is required to protect the public and the environment.

This section is effective on the date of enactment.

The committee intends that the NRC comply with the applicable provisions of the so-called Administrative Procedures Act in issuing the rules, regulations, or issuing orders authorized by this section. This is not intended to mean that such rulemaking, etc., is subject to the adjudication provisions of that law. But, as a minimum, the rulemaking provisions of this law (5 U.S.C. 553) shall apply.

The committee notes that many of the provisions of title II of the act may make it difficult for existing licensees to comply with because of the financial impact or the time it will take do to so. The NRC should take such factors into account and provide a means to alleviate or mitigate those problems where appropriate while assuring that the purposes of this act are fully met. The committee believes and expects that these purposes should be met without causing mill closings and putting people out of work. At the same time, the committee recognizes that, despite past efforts by a licensee, the control and stabilization may not be adequate to meet the requirements of these amendments to the 1954 act.

Section 204—Cooperation with States

This section amends section 274 of the Atomic Energy Act to provide for adherence by Agreement States to minimum Federal standards for uranium mill tailings control, stabilization and disposal.

It allows States to discontinue licensing or uranium milling and mill tailings, while retaining authority to continue licensing other radioactive materials licensable under the Agreement States' program. Under current law, States which did not want to regulate uranium milling would have to terminate their entire agreement program with the Commission. It also amends current provisions of law concerning the review of these agreements.

Subsection (e) adds a new subsection to section 274. It requires that State standards for licensing uranium mill tailings and uranium milling must to the extent practicable be equivalent to, or exceed, those of the Commission. In addition, licenses issued by States must require that, upon termination of such licenses, mill tailings disposal sites will be transferred without cost to permanent Federal custody. State licensing procedures are required to include provisions for public participation and environmental reviews. This new subsection includes the preparation of a written analysis "consistent with" the provisions of NEPA. The committee stresses the words "consistent with". It is not the intention that a State enact NEPA laws or adopt guidelines such as are now in effect under NEPA. The intent is to insure that any analysis (by a State) is carried out in a manner that is consistent with NEPA, so that mills located in a non-agreement State are not subject to different requirements than their competitors which are located in an agreement State. Indeed, that is an objective of the entire subsection.

Subsection (f) reserves the right of the Commission to determine that mill tailings piles created under Agreement State licensing have met applicable requirements before they are turned over to Federal custody.

Subsection (g) requires the Commission to review the regulatory programs of each Agreement States, as soon as practicable 3 years after the date of enactment of the act, to determine whether the standards applied by the State are at least equivalent to those of the Commission. If the Commission determines that the State's program does not comply, it may suspend or terminate that part of its agreement with the State under which the State is permitted to license and regulate uranium milling and mill tailings activities. Regulatory authority would then revert to the Commission.

Provision is also made for amending such agreements to insure that fees collected by States for reclamation or long-term maintenance and monitoring are transferred to the United States upon termination of a license. Also, if such fees are collected, they must be adequate. The committee does not want to have this provision construed as requiring or discouraging such fees. That is a State decision.

Similarly, the committee intends that State laws and procedures govern the licensing, but this act establishes minimum procedures for this purpose.

Subsection (h) continues for 3 years State control over these tailings. After that period, if a State has not entered into an agreement, the NRC will license the mills.

Section 205—Authorities of Commission respecting certain byproduct material

Section 205 authorizes the Commission to promulgate, implement and enforce regulations governing permanent Federal custody of uranium mill tailings disposal sites and governing the activities of the Department of Energy under title I of the act.

Section 206—Authority of Environmental Protection Agency respecting certain byproduct material

Subsection (a)(1) requires EPA to set standards of general applicability for sites covered by title I of this bill. The standards must be consistent with the Solid Waste Disposal Act.

The committee observes that EPA testified that it could set such standards in 6 months. The committee was skeptical and allowed more time. However, EPA is encouraged to act within the 6 months goal EPA established for itself.

Subsection (a)(2) provides for such general standards for the title II program.

These provisions differ from those in the version of H.R. 13650 as reported by the Committee on Interior and Insular Affairs. Since reporting, both committees held considerable discussions with the EPA and NRC and developed these provisions. In an August 9, 1978, letter to Subcommittee Chairman Dingell, Administrator Costle said:

> Title II would prospectively grant the uranium mill tailings licensing function to the NRC. We agreed that NRC would establish management requirements for the uranium mill tailings; that such requirements would be comparable, to the maximum extent practicable, to requirements applicable to the possession, transfer, and disposal of similar hazardous material under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976; and that in establishing general management requirements, the NRC would obtain the concurrence of EPA.
>
> Under both titles, EPA would retain its generally applicable standards-setting authority under the Atomic Energy Act of 1954, as amended.
>
> I believe this formulation for agency responsibility will best contribute to an effective program for the control of uranium mill tailings. Both EPA and NRC believe it is necessary to implement such a program as soon as possible.

The committee is satisfied with this resolution of a very difficult problem. The committee stresses that the EPA standards are not to be site-specific.

The committee bill does not contain a disclaimer concerning the Clean Air Act and the Federal Water Pollution Control Act. It is unnecessary. The bill does not affect those laws specifically, nor is it intended to do so by implication or otherwise. The committee did not think it wise to mention some environmental laws since failure to mention some would preclude the applicability of those not mentioned. The committee merely stresses that this Act does not change those laws.

Section 207—Authorization of appropriation for grants

This section authorizes $500,000 in fiscal year 1980 for grants to those States with agreements with the NRC.

Section 208—Effective Date

The bill is effective on enactment unless otherwise stated.

Section 209—Consolidation of licenses and procedures

This section directs the NRC to consolidate all license and licensing procedures under amendments made by this title with other such license and licensing procedures under the 1954 act, to the greatest extent practicable.

TITLE III—STUDY AND DESIGNATION OF TWO MILL TAILING SITES IN NEW MEXICO

This title provides for a study by the NRC of two actual mill sites in New Mexico which purportedly have segregated those tailings piles that were derived from production for uranium for Federal purposes. From those derived from production of uranium for commercial purposes the NRC must determine if the 1954 law, as amended by this bill, provides effective regulation and control of these sites. If the study concludes that such law is not adequate, then the DOE may, within 90 days after completion of the study, designate the sites as eligible for assistance under title I of the bill. This designation will enable the DOE to enter into agreements with New Mexico for remedial action at such sites. Before the designation becomes final, the designation, together with cost and other data, must be reported to Congress, and wait for the lapse of 120 calendar days before initiating agreement with the State and remedial action.

ECONOMIC IMPACT

This legislation is not expected to have any significant inflationary impact. Over the next 7 years, 22 tailing sites will be treated at a total cost ranging anywhere from $15 million to $200 million, depending largely upon whether tailings will be treated and stored at their present location or, instead, moved to newly prepared disposal sites. Little of this cost is expected to be incurred during the next 3 years because of the time required to identify and prepare disposal sites. Additional costs may be borne by individual states if new disposal sites are required. But even taking these additional costs into account, the impact of the legislation on inflation and overly economic performance is expected to be immeasurable.

Cost of Legislation

The committee requested a report from the Congressional Budget Office when H.R. 13650 was ordered reported on September 26, 1978. However, the CBO was unable to respond by the time of filing of this report.

The bill does not authorize any appropriations in fiscal year 1979.

Oversight Statement—Committee on Government Operations

No findings or recommendations on oversight activities pursuant to clause 2(b)(2) rule X and clause 2(1)(2)(D) under rule XI of the rules of the House of Representatives have been submitted by the Committee on Government Operations for inclusion in this report.

Departmental Reports

The committee received the following reports:

DEPARTMENT OF ENERGY,
Washington, D.C., September 14, 1978.

Hon. JOHN D. DINGELL,
Chairman, Subcommittee on Energy and Power, Committee on Interstate and Foreign Commerce, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your request for the views of the Department of Energy (DOE) on the August 14, 1978, Committee Print, cited as the "Uranium Mill Tailings Radiation Control Act of 1978."

A number of changes agreed to by the Subcommittee in its markup of the "Residual Radioactive Materials Act of 1978" (the Administration bill) cause us some concern. As you know, the Administration bill provided for a cooperative Federal/State program in which the Federal Government would pay 75 percent of the direct costs of remedial action, while the State would pay 25 percent. The justifications for this financing formula were clearly set forth in our testimony before the Subcommittee. DOE considers the reasons for the 75/25 percent split to be compelling and persuasive; however, we understand the motivations which influenced the Subcommittee to limit the States' share to 10 percent of the costs of the program. While DOE prefers the funding formula of the Administration bill, we nevertheless are pleased with the Subcommittee's decision not to impose a ceiling upon the States' contribution to the remedial action program.

With respect to the question of limiting the liability of the United States in connection with the performance of the remedial action, DOE continues to support the language proposed in the Administration bill, which provided for a release of liability dating from enactment of the legislation through the completion of the remedial action. Such a release would not have affected the United States' liability, if any, for actions taken either prior to or after completion of the remedial action, but would merely have protected the United States during the time specified. In any event, although we would prefer a broader waiver, DOE is pleased that the concept of a limited release of liability has been accepted by the Subcommittee as reflected in Section 102(c) of the Committee Print.

As we understand it, the licensing and regulation portion of the Committee Print provides that the Environmental Protection Agency (EPA) will promulgate performance standards for the remedial action while the Nuclear Regulatory Commission is to have exclusive jurisdiction over the licensing of uranium mill tailings and enforcement of the performance standards set by EPA. We trust that the report language will clearly define the respective roles of these two agencies in order to avoid any possible conflict or inconsistency.

My staff and I appreciate the time and effort your Subcommittee has spent in marking up this legislation. We will be happy to provide the full Committee with any further information or assistance it may require during its markup.

The Office of Management and Budget has advised that there is no objection to the submission of this report from the standpoint of the Administration's program.

Sincerely,

JOHN F. O'LEARY,
Deputy Secretary.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., September 15, 1978.

Hon. HARLEY O. STAGGERS,
Chairman,
Committee on Interstate and Foreign Commerce,
U.S. House of Representatives,
Washington, D.C.

DEAR MR. CHAIRMAN: This responds to your request for our view on H.R. 13650 as reported by the Subcommittee on Energy and Power of the House Interstate and Foreign Commerce Committee, the proposed "Uranium Mill Tailings Radiation Control Act of 1978."

We do not object to enactment of H.R. 13650 as reported by the Subcommittee on Energy and Power of the House Interstate and Foreign Commerce Committee if the bill is amended as suggested herein.

Title I of H.R. 13650 would authorize the Secretary of Energy to enter into cooperative agreements with States to perform remedial action at inactive uranium processing sites. Title II would amend the Atomic Energy Act of 1954 to include uranium mill tailings within the definition of "byproduct material" and would require that Nuclear Regulatory Commission licenses and renewals require that prior to termination of a license, the licensee comply with NRC-established decontamination, decomissioning and reclamation standards and requirements, and that ownership of the byproduct material be transferred to the United States on termination.

We have the following comments on the provisions of H.R. 13650 as reported by the Subcommittee on Energy and Power of the House Interstate and Foreign Commerce Committee. Section 104(b)(2) provides that State acquisition of a site for disposition and stabilization of residual radioactive materials shall not be required if the Secretary of Energy, with the concurrence of the Nuclear Regulatory Commission, designates a site owned by a Federal agency for such disposition and stabilization. We believe that section 104(b)(2) should incorporate the provision in section 106(a), governing acquisition of land by the Secretary of Energy, which permits the Secretary of the Interior to make public lands available to the Secretary of Energy for disposition of residual radioactive materials in accordance with other applicable provisions of law. We also suggest that section 106(a)(2) be amended to read: "the Secretary of the Interior may make available public lands administered by him for such purposes. . . ."

Section 105(a)(1) of the bill provides that cooperative agreements entered into between the Secretary of Energy and Indian tribes shall require that Indian tribes execute a waiver releasing the United States from any liability concerning the remedial action performed by the Secretary of Energy or his designee. This provision should be amended to include the statement that the provision does not affect the responsibilities of the Secretary of the Interior as trustee for any Indian tribe.

In order to consolidate residual radioactive materials for storage in a safe manner, section 106 of the bill authorizes the Secretary of Energy to acquire land, and provides, in addition, that the Secretary of the Interior may "make available public lands for such pur-

poses in accordance with other applicable provisions of law." We believe that section 106(a)(2) should apply to all managers of federally owned land, not just the Secretary of the Interior.

Section 108(a)(1) authorizes the Secretary of Energy to select and perform remedial action. The selection and performance of remedial action is to be done with the concurrence of the Nuclear Regulatory Commission and in consultation, as appropriate, with the Indian tribe and the Secretary of the Interior. The last sentence of section 108(a)(1) provides that since a State "must share in the costs of such remedial action, the State shall participate fully in the selection thereof." The word "such" appears to imply that States pay part of the costs of remedial action pursuant to agreements between the Secretary of Energy and Indian tribes. Since this is not the case, we recommend that the last sentence of section 108(a)(1) be amended to say, "Since a State must, pursuant to an agreement between the Secretary of Energy and the State, share in the costs of remedial action, the State shall participate fully in the selection of the type of remedial action to be performed."

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely,

GUY R. MARTIN,
Assistant Secretary.

CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

In compliance with clause 3 of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

ATOMIC ENERGY ACT OF 1954

* * * * * * *

CHAPTER 8. BYPRODUCT MATERIAL

Sec. 81. Domestic Distribution.
Sec. 82. Foreign Distribution of Byproduct Material.
Sec. 83. Ownership and custody of certain byproduct material and disposal sites.
Sec. 84. Authorities of Commission respecting certain byproduct material.

* * * * * * *

CHAPTER 19. MISCELLANEOUS

Sec. 241. Transfer of Property.
Sec. 251. Report to Congress.
Sec. 261. Appropriations.
Sec. 271. Agency Jurisdiction.
Sec. 272. Applicability of Federal Power Act.
Sec. 273. Licensing of Government Agencies.
Sec. 274. Cooperation with States.
Sec. 275. Health and environmental standards for uranium mill tailings:
Sec. 281. Separability.
Sec. 291. Short Title.

* * * * * * *

CHAPTER 2. DEFINITIONS

SEC. 11. DEFINITIONS.—The intent of Congress in the definitions as given in this section should be construed from the words or phrases used in the definitions. As used in this Act:

a. * * *

* * * * * * *

e. The term "byproduct material" means (*1*) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, *and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.*

* * * * * * *

SEC. 8. OWNERSHIP AND CUSTODY OF CERTAIN BYPRODUCT MATERIAL AND DISPOSAL SITES.—

a. Any license issued or renewed after the effective date of this section under section 62 or section 81 for any activity which results in the production of any byproduct material as defined in section 11e.(2) shall contain such terms and conditions as the Commission determines to be necessary to assure that, prior to termination of such license—

(1) the licensee will comply with decontamination, decommissioning, and reclamation standards prescribed by the Commission for sites (A) at which ores were processed primarily for their source material content and (B) at which such byproduct material is deposited, and

(2) ownership of any byproduct material defined in section 11e.(2) which resulted from such licensed activity shall be transferred to the United States.

Any license in effect on the date of the enactment of this section shall either contain such terms and conditions on renewal thereof after the effective date of this section, or shall comply with paragraphs (1) and (2) upon the termination of such license, whichever first occurs.

b. (1) Any such license which is issued after the effective date of this section shall also contain such terms and conditions as the Commission determines to be necessary to assure that, prior to termination of such license and after the licensee has complied with the requirements of subsection a., any land (other than land owned by the United States) which is used for the disposal of such byproduct material shall be transferred to the United States, including both the surface estate and any interest in the subsurface estate which may be necessary to protect the public health, welfare, and the environment. Following the Commission's determination of compliance under subsection d., the Secretary of Energy or the Federal agency designated by the President under subsection c. shall assume title and custody of the byproduct material and land transferred as provided in this subsection. Such officer or instrumentality shall maintain such material and land in such manner as will protect the public health and safety and the environment. Such custody may be transferred to another officer or instrumentality of the United States only upon approval of the President upon his determination that such officer or instrumentality meets the requirements of subsection c. Notwithstanding any other provision of law, such property and materials shall be maintained pursuant to a license issued by the Commission in such manner as will protect the public health, safety, and the environment.

(2) In the case of any such license under section 62 which was in effect on the effective date of this section, the Commission may require, before the termination of such license, such transfer of land (as described in paragraph (1) as may be necessary to protect the public health, welfare, and the environment from any effects associated with such byproduct material.

(3) Material and land transferred to the United States as required under this subsection shall be transferred without cost to the United States (other than administrative and legal costs incurred in carrying out such transfer). The United States shall not transfer title to material or property acquired under this subsection to any person, unless such transfer is in the same manner as provided under section 104(h) of the Uranium Mill Tailings Radiation Control Act of 1978.

(4) The provisons of this subsection respecting transfer of title and custody to land to the United States shall not apply in the case of lands held in trust by the United States for any Indian tribe or lands owned by such Indian tribe subject to a restriction against alienation imposed by the United States. In the case of such lands which are used for the disposal of byproduct material as defined in section 11e.(2), the licensee shall be required to enter into such arrangements with the Commission as may be appropriate to assure the long-term maintenance and monitoring of such lands by the United States.

c. The Secretary of Energy or such Federal agency as the President shall designate shall have custody of such property or material. The President shall not designate the Commission for such purposes.

d. Upon termination of any license to which this section applies, the Commission shall determine whether or not the licensee has complied with all applicable standards and requirements under such license.

SEC. 84. AUTHORITIES OF COMMISSION RESPECTING CERTAIN BYPRODUCT MATERIAL—

a. The Commission shall insure that the management of any byproduct material as defined in section 11e.(2) is carried out in such manner as—

(1) the Commission deems appropriate to protect the public health and safety and the environment,

(2) conforms with applicable general standards promulgated by the Administrator of the Environmental Protection Agency under section 275, and

(3) conforms to general requirements established by the Commission, with the concurrence of the Administrator, which are to the maximum extent practicable, comparable to requirements applicable to the possession, transfer, and disposal of similar hazardous material regulated by the Administrator under the Solid Waste Disposal Act.

b. In carrying out its authority under this section, the Commission is authorized to—

(1) by rule, regulation, or order require persons, officers, or instrumentalities exempted from licensing under section 81 of this Act to conduct monitoring, perform remedial work, and to comply with such other measures as it may deem necessary or desirable to protect health or to minimize danger to life or property, and

(2) make such studies and inspections and to conduct such monitoring as may be necessary.

Any violation by any person other than the United States or any officer or employee of the United States of any rule or order of the Commission established under this section or section 83 shall be subject to a civil penalty in the same manner and in the same amount as violations subject to a civil penalty under section 234. Nothing in this section affects any authority of the Commission under any other provision of this Act.

* * * * * * *

CHAPTER 14. GENERAL AUTHORITY

SEC. 161. GENERAL PROVISIONS.—In the performance of its functions the Commission is authorized to—

a. * * *

* * * * * * *

x. establish by rule, regulation, or order, after public notice, such standards and instructions as the Commission may deem necessary or desirable to ensure—

(1) that an adequate bond, surety, or other financial arrangement (as determined by the Commission) will be provided, before termination of any license for byproduct material as defined in section 11e.(2), by a licensee to permit the completion of all requirements established by the Commission for the decontamination, decommissioning, and reclamation of sites, structures, and equipment used in conjunction with byproduct material as so defined, and

(2) that—

(A) in the case of any such license issued or renewed after the date of the enactment of this subsection, to the maximum extent practicable, after termination of such license, no long-term maintenance and monitoring of such sites, structures, and equipment will be necessary; and

(B) in the case of each license for such material (whether in effect on the date of the enactment of this section or issued or renewed thereafter), if the Commission determines that any such long-term maintenance and monitoring is necessary, the licensee, before termination of any license for byproduct material as defined in section 11e.(2), will make available such bonding, surety, or other financial arrangements as may be necessary to assure such long-term maintenance and monitoring.

CHAPTER 19. MISCELLANEOUS

* * * * * * *

SEC. 274. COOPERATION WITH STATES.—

a. * * *

b. Except as provided in subsection c., the Commission is authorized to enter into agreements with the Governor of any State providing for discontinuance of the regulatory authority of the Commission under chapters 6, 7, and 8, and section 161 of this Act, with respect to any one or more of the following materials within the State—

(1) byproduct materials *as defined in section 11e.(1)*;

(2) byproduct materials as defined in section 11e.(2);

[2] (3) source materials;

[3] (4) special nuclear materials in quantities not sufficient to form a critical mass.

During the duration of such an agreement it is recognized that the State shall have authority to regulate the materials covered by the agreement for the protection of the public health and safety from radiation hazards.

c. No agreement entered into pursuant to subsection b. shall provide for discontinuance of any authority and the Commission shall retain authority and responsibility with respect to regulation of—

(1) the construction and operation of any production or utilization facility;

(2) the export from or import into the United States of byproduct, source, or special nuclear material, or of any production or utilization facility;

(3) the disposal into the ocean or sea of byproduct, source, or special nuclear waste materials as defined in regulations or orders of the Commission;

(4) the disposal of such other byproduct, source, or special nuclear material as the Commission determines by regulation or order should, because of the hazards or potential hazards thereof, not be so disposed of without a license from the Commission.

The Commission shall also retain authority under any such agreement to make a determination that all applicable standards and requirements have been met prior to termination of a license for byproduct material as defined in section 11e(2). Notwithstanding any agreement between the Commission and any State pursuant to subsection b., the Commission is authorized by rule, regulation, or order to require that the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing source, byproduct, or special nuclear material shall not transfer possession or control of such product except pursuant to a license issued by the Commission.

d. The Commission shall enter into an agreement under subsection b. of this section with any State if—

(1) The Governor of that State certifies that the State has a program for the control of radiation hazards adequate to protect the public health and safety with respect to the materials within the State covered by the proposed agreement, and that the State desires to assume regulatory responsibility for such materials; and

(2) the Commission finds that the State program is *in accordance with the requirements of subsection o. and in all other respects* compatible with the Commission's program for the regulation of such materials, and that the State program is adequate to protect the public health and safety with respect to the materials covered by the proposed agreement.

* * * * * * *

j. The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the State with which an agreement under subsection b. has become effective, or upon request of the Governor of such State, may terminate or suspend *all or part of* its agreement with the State and reassert the licensing and regulatory authority vested in it under this Act, if the Commission finds that

(1) such termination or suspension is required to protect the public health and safety, *or (2) the State has not complied with one or more of the requirements of this section. The Commission shall periodically review such agreements and actions taken by the States under the agreements to ensure compliance with the provisions of this section.*

* * * * * * *

n. As used in this section, the term "State" means any State, Territory, or possession of the United States, the Canal Zone, Puerto Rico, and the District of Columbia. *As used in this section, the term "agreement" includes any amendment to any agreement.*

o. In the licensing and regulation of any activity which results in the production of byproduct material as defined in section 11e.(2) under an agreement entered into pursuant to subsection b., a State shall require—

(1) compliance with the requirements of subsections a.(2), b.(1), and b.(2) of section 83 (respecting ownership by the United States of byproduct material and land), and

(2) compliance with standards which shall be adopted by the State for the protection of the public health, safety and the environment from hazards associated with such material which are equivalent, to the extent practicable, or more stringent than, standards adopted and enforced by the Commission for the same purpose pursuant to sections 83a.(1) and 84a. and 275, and

(3) procedures which—

(A) in the case of licenses, provide for advance public notice, an opportunity for a public hearing with rights to present direct and rebuttal evidence and conduct cross-examination, and a written decision which is based only on evidence in the record and which is subject to judicial review;

(B) in the case of rulemaking, provide opportunity for public participation in the form of written comments or a public hearing and which provide for judicial review of the rulemaking decision;

(C) require the preparation for each license of a written analysis consistent with the policy and provisions of the National Environmental Policy Act of 1969 of the impact of the operations under such license on the environment, which shall be available to the public before the commencement of any such proceedings; and

(D) prohibit any major construction activity with respect to such material, prior to complying with the provisions of subparagraph (C).

If any State under such agreement imposes upon any licensee any requirement for the payment of funds to such State for the reclamation or long-term maintenance and monitoring of such material, such agreement shall be amended by the Commission to provide that such State shall transfer to the United States upon termination of the license issued to such licensee the total amount collected by such State from such licensee for such purpose. If such payments are required, they must be sufficient to insure compliance with the standards referred to in paragraph (2). No State shall be required under paragraph (2) to conduct proceedings concerning any license or regulation which would duplicate proceedings conducted in such State by the Commission.

SEC. 275. HEALTH AND ENVIRONMENTAL STANDARDS FOR URANIUM MILL TAILINGS—

a. (1) As soon as practicable, but not later than one year after the date of enactment of this section, the Administrator of the Environmental Protection Agency (hereinafter referred to in this section as the "Administrator") shall, by rule, promulgate standards of general application (including standards applicable to licenses under section 104(h)) for the protection of the public health, safety, and the environment from radiological and nonradiological hazards associated with residual radioactive materials (as defined in section 101 of the Uranium Mill Tailings Radiation Control Act of 1978) located at inactive uranium mill tailings sites and depository sites for such materials selected by the Secretary of Energy, pursuant to title I of the Uranium Mill Tailings Radiation Control Act of 1978. Standards promulgated pursuant to this subsection shall, to the maximum extent practicable, be consistent with the requirements of the Solid Waste Disposal Act.

(2) As soon as practicable, but not later than eighteen months after the enactment of this section, the Administrator shall, by rule, promulgate standards of general application for the protection of the public health, safety, and the environment from radiological and nonradiological hazards associated with the processing and with the possession, transfer, and disposal of byproduct material, as defined in section 11e.(2) of this Act at sites at which ores are processed primarily for their source material content, or which are used for the disposal of such byproduct material.

(3) Standards promulgated pursuant to this section for nonradiological hazards shall, notwithstanding any other provision of this Act or any other law be consistent with, to the greatest extent possible, the standards of the Solid Waste Disposal Act applicable to such hazards.

(4) The Administrator may from time to time amend, modify, or change any standard promulgated under this section.

b. (1) Before the promulgation of any rule pursuant to this section, the Administrator shall publish the proposed rule in the Federal Register, together with a statement of the research, analysis, and other available information in support of such proposed rule, and provide a period of public comment of at least thirty days for written comments thereon and an opportunity, after such comment period and after public notice, for any interested person to present oral data, views, and arguments at a public hearing. There shall be a transcript of any such hearing. The Administrator shall consult with the Commission and the Secretary of Energy before promulgation of any such rule.

(2) Judicial review of any rule promulgated under this section may be obtained by any interested person only upon such person filing a petition for review within sixty days after such promulgation in the United States court of appeals for the Federal judicial circuit in which such person resides or has his principal place of business. A copy of the petition shall be forthwith transmitted by the clerk of court to the Administrator. The Administrator thereupon shall file in the court the written submissions to, and transcript of, the written or oral proceedings on which such rule was based as provided in section 2112 of title 28, United States Code. The court shall have jurisdiction to review the rule in accordance with chapter 7 of title 5, United States Code, and to grant appropriate relief as provided in such chapter. The judgment of the court affirming, modifying, or setting aside, in whole or in part, any such rule shall be final, subject to judicial review by the Supreme Court of the United States upon certiorari or certification as provided in section 1254 of title 28, United States Code.

(3) Any rule promulgated under this section shall not take effect earlier than sixty calendar days after such promulgation.

c. Nothing in this Act applicable to byproduct materials, as defined in section 11e.(2) of this Act, shall be construed to affect the authority of the Administrator under section 402 of the Federal Water Pollution Control Act or under the Clean Air Act.

* * * * * * *

SUPPLEMENTAL VIEWS ON H.R. 13650—URANIUM MILL TAILINGS RADIATION CONTROL ACT OF 1978

We concur with the majority on the need to take remedial action to safely dispose of residual uranium mill tailings. These tailings are an unavoidable by-product of the first stage of the nuclear fuel cycle. When uranium is extracted from raw ore, a radioactive, sand-like waste remains. This waste—called uranium mill tailings—can constitute a health hazard unless proper disposal methods are utilized. By sharing costs on a 90/10 basis with the affected states, the Federal government can effectively do its part to safely dispose of these tailings, which were once thought to be harmless.

We remain concerned, however, about the Attorney General's authority to study the liability (for remedial action costs), if any, of former owners or operators of these processing sites. After all, when these former owners or operators negotiated their cost-plus contracts with the Federal government, a very small amount was set aside for tailings disposal because the tailings were not believed to be health hazards. The cost of remedial action now contemplated to safely dispose of these tailings far exceeds that prior bargained-for amount, and will negate bargained-for profits.

After the study is completed, the Attorney General is authorized to take action under any appropriate law to require payment by a person found to be liable. We do not believe that the Attorney General should be empowered to enforce state laws in taking action against these former owners or operators. However, the majority has assured us that the Attorney General must exercise discretion in instituting any civil actions to recover remedial costs. Specifically, the majority has agreed that if the site is not currently owned or controlled by the persons who contracted with the United States, such civil action may be inappropriate. It is also our understanding with the majority that no new Federal authority is being conferred on the Attorney General by this provision of this bill.

With these understandings, we support H.R. 13650 and urge bipartisan support for this measure.

CLARENCE J. BROWN.
JAMES M. COLLINS.
NORMAN F. LENT.
CARLOS J. MOORHEAD.
MATTHEW J. RINALDO.

O

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: just wanted to let you know I spoke with Dan
Date: Monday, January 09, 2017 11:43:22 AM

From: Seidman, Emily
Sent: Friday, December 16, 2016 2:19 PM
To: Collections.SubW
Subject: FW: just wanted to let you know I spoke with Dan

From: Rodman, Sonja
Sent: Thursday, December 01, 2016 3:17 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: just wanted to let you know I spoke with Dan

and it looks like Sub W is going to move forward – signature next week perhaps??

Sonja L. Rodman, Assistant General Counsel for Air Toxics, Consumer Protection and Indoor Air / Office of General Counsel / U.S. Environmental Protection Agency / (202) 564-4079 / 202-768-2120 (cell)

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: just wanted to let you know I spoke with Dan
Date: Monday, January 09, 2017 11:43:09 AM

From: Seidman, Emily
Sent: Friday, December 16, 2016 2:19 PM
To: Collections.SubW
Subject: FW: just wanted to let you know I spoke with Dan

From: Rodman, Sonja
Sent: Thursday, December 01, 2016 5:48 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: RE: just wanted to let you know I spoke with Dan

Thanks! I appreciate your willingness to join and I'm sorry for pushing to have this scheduled tomorrow when you're out. I just really want to keep it moving if we can.

Sonja L. Rodman, Assistant General Counsel for Air Toxics, Consumer Protection and Indoor Air / Office of General Counsel / U.S. Environmental Protection Agency / (202) 564-4079 / 202-768-2120 (cell)

From: Seidman, Emily
Sent: Thursday, December 01, 2016 4:20 PM
To: Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: just wanted to let you know I spoke with Dan

Great - thanks for the update! Earlier this week he mentioned that he was going to reach out to you. Glad you were able to connect.

I'm compressed tomorrow, but am planning to join the call with Aaron and Matt on OSWRO. I'm happy for you to take the lead since you're more familiar with the OMB process but I can be available to provide additional information about the case if it's helpful.

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

From: Rodman, Sonja
Sent: Thursday, December 01, 2016 3:17 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: just wanted to let you know I spoke with Dan

and it looks like Sub W is going to move forward – signature next week perhaps??

Sonja L. Rodman, Assistant General Counsel for Air Toxics, Consumer Protection and Indoor Air / Office of General Counsel / U.S. Environmental Protection Agency / (202) 564-4079 / 202-768-2120 (cell)

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: any word on signature?
Date: Monday, January 09, 2017 11:42:57 AM

From: Seidman, Emily
Sent: Friday, December 16, 2016 2:20 PM
To: Collections.SubW
Subject: FW: any word on signature?

From: Seidman, Emily
Sent: Wednesday, December 14, 2016 9:08 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: any word on signature?

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: any word on signature?
Date:	Monday, January 09, 2017 11:42:34 AM

From: Seidman, Emily
Sent: Friday, December 16, 2016 2:20 PM
To: Collections.SubW
Subject: FW: any word on signature?

From: Schultheisz, Daniel
Sent: Wednesday, December 14, 2016 9:10 AM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: RE: any word on signature?

Still with OP.

From: Seidman, Emily
Sent: Wednesday, December 14, 2016 9:08 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: any word on signature?

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: subpart w update
Date: Monday, January 09, 2017 11:42:21 AM

From: Seidman, Emily
Sent: Friday, December 16, 2016 2:20 PM
To: Collections.SubW
Subject: FW: subpart w update

From: Seidman, Emily
Sent: Friday, December 16, 2016 1:43 PM
To: Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: subpart w update

Small chance of signature today. More likely, signature will be Monday or Tuesday. Dan will keep you updated in my absence.

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Conclusion of EO 12866 and 13563 Review: EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:42:03 AM

From: Seidman, Emily
Sent: Friday, December 16, 2016 2:45 PM
To: Collections.SubW
Subject: FW: Conclusion of EO 12866 and 13563 Review: EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Tuesday, November 08, 2016 5:40 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: Conclusion of EO 12866 and 13563 Review: EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

This email serves as notice that the Office of Management and Budget (OMB) has concluded its review with a finding of consistent with change under Executive Orders 12866 and 13563 of the U.S. Environmental Protection Agency's (EPA) final rule entitled, "Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings" (2060-AP26).

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

Aaron L. Szabo
Policy Analyst
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W Update
Date: Monday, January 09, 2017 11:41:43 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:15 AM
To: Collections.SubW
Subject: FW: Subpart W Update

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 8:44 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald <Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: Subpart W Update

To the Subpart W Workgroup:

OMB officially cleared Subpart W this week. We are now working to get the package prepared to submit for signature. Thanks for all your assistance.

Dan

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Conclusion of EO 12866 and 13563 Review: EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:41:29 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:15 AM
To: Collections.SubW
Subject: FW: Conclusion of EO 12866 and 13563 Review: EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Susan Stahle
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stahle.susan@epa.gov

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Tuesday, November 08, 2016 5:40 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: Conclusion of EO 12866 and 13563 Review: EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

This email serves as notice that the Office of Management and Budget (OMB) has concluded its review with a finding of consistent with change under Executive Orders 12866 and 13563 of the U.S. Environmental Protection Agency's (EPA) final rule entitled, "Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings" (2060-AP26).

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

Aaron L. Szabo

Policy Analyst
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:41:17 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:15 AM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

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stahle.susan@epa.gov

From: Reid Rosnick [mailto:rosnickr@gmail.com]
Sent: Monday, November 07, 2016 7:19 AM
To: Edwards, Jonathan <Edwards.Jonathan@epa.gov>
Cc: Peake, Tom <Peake.Tom@epa.gov>; OAR-ORIA-RPD <OARORIARPD@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Jon -- Many thanks for your kind words. It's funny that you used a sports metaphor. When I heard the news last week I wrote that I felt as if I had left the bases loaded with no outs. Fortunately RPD has the talent to come in and make the save. Thanks again, I hope to stop by before the weather changes to say hello. Thank you so much. -- Reid

On Sunday, November 6, 2016, Edwards, Jonathan <Edwards.Jonathan@epa.gov> wrote:

> Reid-- There are several folks that deserve thanks and recognition for their efforts on Subpart W but I don't want to lose sight of your contributions in particular because you're like that relentless halfback who pounds the football down the field in 2 or 3 yard gains quarter after quarter only to be carted off the field before the final whistle -- but so instrumental in the victory. Many thanks -- Jon
>
> Sent from my iPhone
>
> On Nov 4, 2016, at 6:43 PM, Reid Rosnick <rosnickr@gmail.com> wrote:

Great news! Thanks, Tom.

On Friday, November 4, 2016, Peake, Tom <Peake.Tom@epa.gov> wrote:

> Great news on Subpart W!
>
> Dan has heard from OMB that the rule has cleared the interagency review process!
> There is still clean-up and finalizing everything and getting the docket in order and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.
>
> Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.
>
> Tom Peake
> US EPA Radiation Protection Division
> Director, Center for Waste Management and Regulations
> phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:41:03 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:15 AM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

Susan Stahle
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Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Edwards, Jonathan
Sent: Sunday, November 06, 2016 7:27 AM
To: Reid Rosnick <rosnickr@gmail.com>
Cc: Peake, Tom <Peake.Tom@epa.gov>; OAR-ORIA-RPD <OARORIARPD@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Reid-- There are several folks that deserve thanks and recognition for their efforts on Subpart W but I don't want to lose sight of your contributions in particular because you're like that relentless halfback who pounds the football down the field in 2 or 3 yard gains quarter after quarter only to be carted off the field before the final whistle -- but so instrumental in the victory. Many thanks -- Jon

Sent from my iPhone

On Nov 4, 2016, at 6:43 PM, Reid Rosnick <rosnickr@gmail.com> wrote:

> Great news! Thanks, Tom.
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> On Friday, November 4, 2016, Peake, Tom <Peake.Tom@epa.gov> wrote:
>
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process!
There is still clean-up and finalizing everything and getting the docket in order and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.

Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.

Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: terrific news on Subpart W!
Date:	Monday, January 09, 2017 11:40:51 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:15 AM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

Susan Stahle
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stahle.susan@epa.gov

From: Flynn, Mike
Sent: Saturday, November 05, 2016 10:55 AM
To: Reid Rosnick <rosnickr@gmail.com>
Cc: Peake, Tom <Peake.Tom@epa.gov>; OAR-ORIA-RPD <OARORIARPD@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Great to hear - congratulations everyone!

Mike

Mike Flynn
Associate Deputy Administrator
Office of the Administrator
U.S. Environmental Protection Agency
202-564-4711

On Nov 4, 2016, at 6:43 PM, Reid Rosnick <rosnickr@gmail.com> wrote:

Great news! Thanks, Tom.

On Friday, November 4, 2016, Peake, Tom <Peake.Tom@epa.gov> wrote:

> Great news on Subpart W!
>
> Dan has heard from OMB that the rule has cleared the interagency review process!
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>
> Tom Peake
> US EPA Radiation Protection Division
> Director, Center for Waste Management and Regulations
> phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:40:38 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:15 AM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
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202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Reid Rosnick [mailto:rosnickr@gmail.com]
Sent: Friday, November 04, 2016 6:44 PM
To: Peake, Tom <Peake.Tom@epa.gov>
Cc: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Great news! Thanks, Tom.

On Friday, November 4, 2016, Peake, Tom <Peake.Tom@epa.gov> wrote:

> Great news on Subpart W!
>
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>
> Tom Peake

US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:40:22 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:15 AM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

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stahle.susan@epa.gov

From: Veal, Lee
Sent: Friday, November 04, 2016 6:29 PM
To: Peake, Tom <Peake.Tom@epa.gov>
Cc: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Congratulations all!

Lee Ann B Veal
Director, CREM
Office 202-343-9448
Cell 202-617-4322

On Nov 4, 2016, at 4:54 PM, Peake, Tom <Peake.Tom@epa.gov> wrote:

> And special thanks to Phil, too!
>
> ---
>
> **From:** Peake, Tom

Sent: Friday, November 04, 2016 4:50 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: terrific news on Subpart W!

Great news on Subpart W!

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Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: terrific news on Subpart W!
Date:	Monday, January 09, 2017 11:40:08 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:16 AM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

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202-564-5603 (fax)
stahle.susan@epa.gov

From: Egidi, Philip
Sent: Friday, November 04, 2016 5:00 PM
To: Peake, Tom <Peake.Tom@epa.gov>; OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Aw shucks.
I really didn't have to contribute that much since Dan was in charge - it was written as well as could be!
I am impressed with his clarity and communication skills on this effort.
It will be great to see the final rule published...

PVE

From: Peake, Tom

Sent: Friday, November 4, 2016 4:54:16 PM
To: OAR-ORIA-RPD; Flynn, Mike; Edwards, Jonathan; Cherepy, Andrea
Cc: Reid Rosnick ; Rodman, Sonja; Seidman, Emily; Stahle, Susan
Subject: RE: terrific news on Subpart W!

And special thanks to Phil, too!

From: Peake, Tom
Sent: Friday, November 04, 2016 4:50 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: terrific news on Subpart W!

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Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: terrific news on Subpart W!
Date:	Monday, January 09, 2017 11:39:54 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:16 AM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

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stahle.susan@epa.gov

From: Peake, Tom
Sent: Friday, November 04, 2016 4:54 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: RE: terrific news on Subpart W!

And special thanks to Phil, too!

From: Peake, Tom
Sent: Friday, November 04, 2016 4:50 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: terrific news on Subpart W!

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Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.

Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: terrific news on Subpart W!
Date:	Monday, January 09, 2017 11:39:37 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:16 AM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
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To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
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Subject: terrific news on Subpart W!

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Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:39:23 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:16 AM
To: Collections.SubW
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Susan Stahle
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stahle.susan@epa.gov

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Friday, November 04, 2016 3:22 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Dan,

Thank you again for the response to comments. The interagency reviewers agree with the use of the EPA preferred approach.

At this time, please provide a redline-strikeout version reflecting all of the changes during the

interagency review and a clean version. I have also opened up ROCIS for amendment such that the revised versions of the documents can be uploaded. Please have OP email me when the new version has been uploaded to ROCIS.
Thank you again and please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Schultheisz, Daniel [mailto:Schultheisz.Daniel@epa.gov]
Sent: Friday, November 4, 2016 9:24 AM
To: Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Aaron:

Attached is EPA's proposed response to the additional comment from the interagency review of the Subpart W final rule. We provide two options to clarify the point noted by the commenter, with our preferred option identified. Please let me know if you need anything else. Thanks.

FYI, I will be on travel next Monday and Tuesday, but should be able to respond to emails. Thanks.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Thursday, October 27, 2016 3:57 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja

<Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Attached please find the summary of additional interagency comments under EO 12866 and 13563 for the EPA draft final rule entitled, "Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings" (2060-AP26) in response to the most recent response provided by EPA.

Please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:38:49 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:16 AM
To: Collections.SubW
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Friday, November 04, 2016 10:27 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Thanks Dan. We will get back to you as soon as possible.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget

202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Schultheisz, Daniel [mailto:Schultheisz.Daniel@epa.gov]
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FYI, I will be on travel next Monday and Tuesday, but should be able to respond to emails. Thanks.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Thursday, October 27, 2016 3:57 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
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Attached please find the summary of additional interagency comments under EO 12866 and 13563 for the EPA draft final rule entitled, "Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings" (2060-AP26) in response to the most recent response provided by EPA.

Please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: From Greenwire -- AIR POLLUTION: EPA overhauls emission rules for uranium plants
Date: Monday, January 09, 2017 11:38:31 AM

From: Stahle, Susan
Sent: Thursday, December 22, 2016 10:17 AM
To: Collections.SubW
Subject: FW: From Greenwire -- AIR POLLUTION: EPA overhauls emission rules for uranium plants

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Peake, Tom
Sent: Wednesday, December 21, 2016 4:04 PM
To: Seidman, Emily <seidman.emily@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Veal, Lee <Veal.Lee@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Cc: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: FW: From Greenwire -- AIR POLLUTION: EPA overhauls emission rules for uranium plants

FYI

From: peake.tom [mailto:email_this@eenews.net]
Sent: Wednesday, December 21, 2016 3:55 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; White, Rick <White.Rick@epa.gov>; rosnickr@gmail.com
Subject: From Greenwire -- AIR POLLUTION: EPA overhauls emission rules for uranium plants

This Greenwire story was sent to you by: peake.tom@epa.gov

Personal message: Greenwire article on Subpart W

AN E&E NEWS PUBLICATION

AIR POLLUTION

EPA overhauls emission rules for uranium plants

Sean Reilly, E&E News reporter

Published: Wednesday, December 21, 2016

This story was updated at 2:27 p.m. EST.

U.S. EPA has finished a long-awaited rewriting of standards for radon emissions from uranium processing facilities that appears to take some steps to allaying watchdog groups' objections to the original proposal.

EPA Administrator Gina McCarthy signed the **final rule** yesterday, more than 2 ½ years after the agency unveiled the draft. The revisions are the first since 1989 to the standards for facilities that manage the uranium byproduct known as tailings.

The final version scraps a proposal to stop using a numeric radon emissions limit for tailings impoundments built before 1989. As a replacement, EPA had initially wanted to use the same work practice standards — such as limiting the size of impoundments as a means of curtailing radon releases — that are in place for impoundments built after 1989.

Meshing the two sets of requirements had been part of the rationale for undertaking the overhaul. But in the final rule, EPA officials said they were wrong in assuming that the two types of impoundments were "equivalent" in terms of the types of liner systems installed; they also had mistakenly thought that one cell at a Utah processing facility would close in 2014 when it instead remains open.

"On first blush from looking at the final rule, it appears that EPA did address some of our concerns," Jennifer Thurston, director of the Colorado-based Information Network for Responsible Mining, said in an email yesterday. She added that other provisions still fall short of what is "most protective" for the environment.

The final regulations will also retain monitoring requirements for the pre-1989 impoundments.

At the nonprofit Uranium Watch, Sarah Fields similarly singled out the decision to keep the numeric radon emissions standard for the older impoundments but said in a phone interview that the agency should have extended the same yardstick to newer facilities.

"EPA is just trying to save the industry money," said Fields, program director for the Utah-based organization. "I'm incredibly disappointed that they wouldn't do their job to protect the public health and safety."

The draft form of the regulations had also drawn industry objections. The National Mining Association, for example, in 2014 had called "indefensible" a part of the draft plan that would regulate evaporation and storage ponds at uranium recovery facilities.

In an email this afternoon, however, NMA spokesman Luke Popovich said EPA "eliminated an unrealistic and costly requirement for nonconventional impoundments."

"The final rule will significantly reduce the costs of compliance," Popovich said.

By EPA's description, the regulations protect the public and the environment from emissions of radon-222 that may be thrown off by radium contained in the tailings.

In a **summary** of the new regulations, the agency said the revised regulations will limit the size of conventional impoundments "that can exist at any one time" and spell out design and construction requirements, such as double liners and leak detection systems. The new regulations also require companies to use "generally available control technology" to limit radon emissions from the evaporation and holding ponds that are collectively dubbed "non-conventional impoundments."

The new regulations will take effect 60 days after their publication in the *Federal Register*.

EPA began the review that led to yesterday's release under a 2009 agreement with conservation groups. Its direct impact will be felt in the Midwestern and Mountain West states that are home to the processing facilities covered by the rule.

At present, the United States has just one conventional uranium mill — White Mesa in Utah — in operation, while two others in Utah and Wyoming are on standby, according to the final rule. There are also a half-dozen active "in situ leach" (ISL) facilities that pump a solution underground to free uranium deposits. Five are in Wyoming; the sixth is in Nebraska. Four other ISL facilities in Texas are on standby.

Energy Fuels Inc., the Colorado-based firm that owns the White Mesa mill, has not had a chance to review the final version of the regulations, a spokesman said in an email this morning.

E&E News

E&E News
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From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W Statuses
Date: Monday, January 09, 2017 11:38:17 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:08 PM
To: Collections.SubW
Subject: FW: Subpart W Statuses

From: Shogren, Angela
Sent: Wednesday, November 02, 2016 3:52 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: FW: Subpart W Statuses

FYI on Subpart W status

(This means that they are actively working on it and we are still on track to start pilot testing in December. Hopefully we will have something to see after Veterans Day – but before Thanksgiving!)

From: Mitchell, Greg
Sent: Wednesday, November 02, 2016 11:28 AM
To: Shogren, Angela <Shogren.Angela@epa.gov>
Subject: Subpart W Statuses

Generally good news from CGI..

Subpart W is being Constructed

- CGI is scheduled Provision Flow/Roles by upcoming Monday
- May see sample flow by Monday after Veterans Day Holiday (same as the Mirroring)

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: WHW Entry for NESHAP Subpart W
Date: Monday, January 09, 2017 11:38:03 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:09 PM
To: Collections.SubW
Subject: FW: WHW Entry for NESHAP Subpart W

From: Lee, Raymond
Sent: Thursday, November 03, 2016 1:31 PM
To: Knapp, Kristien <Knapp.Kristien@epa.gov>
Cc: Cyran, Carissa <Cyran.Carissa@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: WHW Entry for NESHAP Subpart W

Hi Kristien,

Here's the White House Weekly blurb in prep for publication of the NESHAP Subpart W rule. We will be conservative for now with the dates and if it gets signed earlier, then great!

Thanks,

Ray

_____

As early as the third week in November, EPA will publish the final revisions to the "National Emission Standards for Operating Uranium Mill Tailings," Subpart W of 40 CFR part 61. With this rule, the Agency will require the use of generally available control technology (GACT) to limit radon emissions from tailings at all uranium recovery facilities. The Agency agreed to issue this rulemaking through a settlement agreement with two groups: Colorado Citizens Against Toxic Waste and the Rocky Mountain Clean Air Action. This final rule will add and refine definitions, as well as confirm its applicability to all facilities that manage uranium byproduct material/tailings, including conventional mills, in-situ leach facilities and heap leach piles.

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:37:44 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:09 PM
To: Collections.SubW
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Friday, November 04, 2016 10:27 AM
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Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
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Thanks Dan. We will get back to you as soon as possible.

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Aaron:

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FYI, I will be on travel next Monday and Tuesday, but should be able to respond to emails. Thanks.

Dan Schultheisz
U.S. Environmental Protection Agency
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Radiation Protection Division
(202) 343-9349

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To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
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Please let me know if you have any questions.

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Aaron_L_Szabo@omb.eop.gov

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Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Dan,

Thank you again for the response to comments. The interagency reviewers agree with the use of the EPA preferred approach.

At this time, please provide a redline-strikeout version reflecting all of the changes during the interagency review and a clean version. I have also opened up ROCIS for amendment such that the revised versions of the documents can be uploaded. Please have OP email me when the new version has been uploaded to ROCIS.
Thank you again and please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget

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Office of Management and Budget
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Aaron_L_Szabo@omb.eop.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:37:17 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:09 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Peake, Tom
Sent: Friday, November 04, 2016 4:50 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: terrific news on Subpart W!

Great news on Subpart W!

Dan has heard from OMB that the rule has cleared the interagency review process!
There is still clean-up and finalizing everything and getting the docket in order and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.

Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.

Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

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To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Peake, Tom
Sent: Friday, November 04, 2016 4:54 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: RE: terrific news on Subpart W!

And special thanks to Phil, too!

From: Peake, Tom
Sent: Friday, November 04, 2016 4:50 PM
To: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
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Tom Peake
US EPA Radiation Protection Division

Director, Center for Waste Management and Regulations
phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:36:46 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:10 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Egidi, Philip
Sent: Friday, November 04, 2016 5:00 PM
To: Peake, Tom <Peake.Tom@epa.gov>; OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
Cc: Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Aw shucks.
I really didn't have to contribute that much since Dan was in charge - it was written as well as could be!
I am impressed with his clarity and communication skills on this effort.
It will be great to see the final rule published...

PVE

From: Peake, Tom
Sent: Friday, November 4, 2016 4:54:16 PM
To: OAR-ORIA-RPD; Flynn, Mike; Edwards, Jonathan; Cherepy, Andrea
Cc: Reid Rosnick ; Rodman, Sonja; Seidman, Emily; Stahle, Susan
Subject: RE: terrific news on Subpart W!

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There is still clean-up and finalizing everything and getting the docket in order and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.

Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.

Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:36:30 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:10 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Veal, Lee
Sent: Friday, November 04, 2016 6:29 PM
To: Peake, Tom <Peake.Tom@epa.gov>
Cc: OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Congratulations all!

Lee Ann B Veal
Director, CREM
Office 202-343-9448
Cell 202-617-4322

On Nov 4, 2016, at 4:54 PM, Peake, Tom <Peake.Tom@epa.gov> wrote:

> And special thanks to Phil, too!
>
> ---
>
> **From:** Peake, Tom
> **Sent:** Friday, November 04, 2016 4:50 PM
> **To:** OAR-ORIA-RPD <OARORIARPD@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>
> **Cc:** Reid Rosnick <rosnickr@gmail.com>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
> **Subject:** terrific news on Subpart W!
>
> Great news on Subpart W!

Dan has heard from OMB that the rule has cleared the interagency review process! There is still clean-up and finalizing everything and getting the docket in order and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.

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Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:32:34 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:10 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Flynn, Mike
Sent: Saturday, November 05, 2016 10:55 AM
To: Reid Rosnick <rosnickr@gmail.com>
Cc: Peake, Tom <Peake.Tom@epa.gov>; OAR-ORIA-RPD <OARORIARPD@epa.gov>; Edwards, Jonathan <Edwards.Jonathan@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Great to hear - congratulations everyone!

Mike

Mike Flynn
Associate Deputy Administrator
Office of the Administrator
U.S. Environmental Protection Agency
202-564-4711

On Nov 4, 2016, at 6:43 PM, Reid Rosnick <rosnickr@gmail.com> wrote:

> Great news! Thanks, Tom.
>
> On Friday, November 4, 2016, Peake, Tom <Peake.Tom@epa.gov> wrote:
>
> > Great news on Subpart W!
> >
> > Dan has heard from OMB that the rule has cleared the interagency review process!
> > There is still clean-up and finalizing everything and getting the docket in order

and loose ends addressed, and, while time-consuming, its anti-climactic. The hard part of the interagency review is done. December is a probable time for a Federal Register notice.

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Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: terrific news on Subpart W!
Date: Monday, January 09, 2017 11:32:22 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:10 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Edwards, Jonathan
Sent: Sunday, November 06, 2016 7:27 AM
To: Reid Rosnick <rosnickr@gmail.com>
Cc: Peake, Tom <Peake.Tom@epa.gov>; OAR-ORIA-RPD <OARORIARPD@epa.gov>; Cherepy, Andrea <Cherepy.Andrea@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>
Subject: Re: terrific news on Subpart W!

Reid-- There are several folks that deserve thanks and recognition for their efforts on Subpart W but I don't want to lose sight of your contributions in particular because you're like that relentless halfback who pounds the football down the field in 2 or 3 yard gains quarter after quarter only to be carted off the field before the final whistle -- but so instrumental in the victory. Many thanks -- Jon

Sent from my iPhone

On Nov 4, 2016, at 6:43 PM, Reid Rosnick <rosnickr@gmail.com> wrote:

> Great news! Thanks, Tom.
>
> On Friday, November 4, 2016, Peake, Tom <Peake.Tom@epa.gov> wrote:
>
> > Great news on Subpart W!
> >
> > Dan has heard from OMB that the rule has cleared the interagency review process!
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> >
> > Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.

Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations
phone: 202-343-9765

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: terrific news on Subpart W!
Date:	Monday, January 09, 2017 11:32:07 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:10 PM
To: Collections.SubW
Subject: FW: terrific news on Subpart W!

From: Edwards, Jonathan
Sent: Sunday, November 06, 2016 1:35 PM
To: Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Lewis, Josh <Lewis.Josh@epa.gov>
Subject: Fwd: terrific news on Subpart W!

FYI-- speed is of the essence.

Sent from my iPhone

Begin forwarded message:

> **From:** "McCabe, Janet" <McCabe.Janet@epa.gov>
> **Date:** November 6, 2016 at 9:26:58 AM EST
> **To:** "Edwards, Jonathan" <Edwards.Jonathan@epa.gov>, "Shaw, Betsy" <Shaw.Betsy@epa.gov>, "Lewis, Josh" <Lewis.Josh@epa.gov>, "Cyran, Carissa" <Cyran.Carissa@epa.gov>
> **Cc:** "Vaught, Laura" <Vaught.Laura@epa.gov>
> **Subject: RE: terrific news on Subpart W!**
>
> That is fantastic!
>
> I really encourage you to move the package just as quickly as you can through to signature from the Administrator. There is a substantial delay at the office of the federal register right now, and there is no assurance that it will be published promptly—in fact just the opposite. OAQPS, OTAQ and OAP are very good at moving packages very quickly once there is clearance, in a matter of days more often than not, so if you need assistance with that, please reach out.
>
> Congrats—this is a significant milestone!

From: Edwards, Jonathan
Sent: Sunday, November 06, 2016 7:32 AM
To: McCabe, Janet <McCabe.Janet@epa.gov>; Shaw, Betsy <Shaw.Betsy@epa.gov>; Lewis, Josh <Lewis.Josh@epa.gov>
Subject: Fwd: terrific news on Subpart W!

FYI-- good news Friday on NESHAPS subpart W

Sent from my iPhone

Begin forwarded message:

> **From:** "Peake, Tom" <Peake.Tom@epa.gov>
> **Date:** November 4, 2016 at 4:49:42 PM EDT
> **To:** OAR-ORIA-RPD <OARORIARPD@epa.gov>, "Flynn, Mike" <Flynn.Mike@epa.gov>, "Edwards, Jonathan" <Edwards.Jonathan@epa.gov>, "Cherepy, Andrea" <Cherepy.Andrea@epa.gov>
> **Cc:** "Reid Rosnick " <rosnickr@gmail.com>, "Rodman, Sonja" <Rodman.Sonja@epa.gov>, "Seidman, Emily" <seidman.emily@epa.gov>, "Stahle, Susan" <Stahle.Susan@epa.gov>
> **Subject: terrific news on Subpart W!**
>
> Great news on Subpart W!
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> Dan has heard from OMB that the rule has cleared the interagency review process!
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>
> Special thanks to Dan, Reid, Val, Tony and OGC staff for all their contributions.
>
> Tom Peake
> US EPA Radiation Protection Division
> Director, Center for Waste Management and Regulations
> phone: 202-343-9765

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: What else? Subpart W
Date: Monday, January 09, 2017 11:31:54 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:11 PM
To: Collections.SubW
Subject: FW: What else? Subpart W

-----Original Message-----
From: Schultheisz, Daniel [mailto:Schultheisz.Daniel@epa.gov]
Sent: Sunday, November 06, 2016 5:14 PM
To: Perrin, Alan <Perrin.Alan@epa.gov>
Subject: What else? Subpart W

Alan:

On Friday I forwarded the message with the rlso and clean versions to Caryn Muellerleile and left her a voicemail. I also left a voicemail for Carissa telling her to check with you if they need anything. I called Nicole Owens but did not leave her a message. I have asked Ray Lee to work with OP to make sure they are able to load the files into ROCIS.

Let me know if anything comes up. Hope you are feeling better. Thanks.

Dan

Sent from my iPhone

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:31:42 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:11 PM
To: Collections.SubW
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

From: Lee, Raymond
Sent: Sunday, November 06, 2016 6:10 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Muellerleile, Caryn <Muellerleile.Caryn@epa.gov>
Subject: Re: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Will do, Dan! Caryn, let me know if there's anything else you need on our end.

Thanks,

Ray

From: Schultheisz, Daniel
Sent: Friday, November 4, 2016 3:40:35 PM
To: Muellerleile, Caryn
Cc: Lee, Raymond
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Caryn:

OMB has opened ROCIS for Subpart W. I have also left you a voicemail, and one for Ann Johnson. Thanks.

Ray, I will be on travel Monday and Tuesday. Can you touch base with Caryn and Ann to see if there is anything else we need to do? Thanks.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Schultheisz, Daniel
Sent: Friday, November 04, 2016 3:33 PM
To: 'Szabo, Aaron L. EOP/OMB' <Aaron_L_Szabo@omb.eop.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Aaron:

Thank you for the quick review. Both redline and clean versions are attached for your consideration. I will coordinate with OP to get them into ROCIS.

FYI, I did incorporate language from the earlier comment response into the preamble to supplement the definitional revision in the latest response.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Friday, November 04, 2016 3:22 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule --

Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Dan,

Thank you again for the response to comments. The interagency reviewers agree with the use of the EPA preferred approach.

At this time, please provide a redline-strikeout version reflecting all of the changes during the interagency review and a clean version. I have also opened up ROCIS for amendment such that the revised versions of the documents can be uploaded. Please have OP email me when the new version has been uploaded to ROCIS.
Thank you again and please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Schultheisz, Daniel [mailto:Schultheisz.Daniel@epa.gov]
Sent: Friday, November 4, 2016 9:24 AM
To: Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Aaron:

Attached is EPA's proposed response to the additional comment from the interagency review of the Subpart W final rule. We provide two options to clarify the point noted by the commenter, with our preferred option identified. Please let me know if you need anything else. Thanks.

FYI, I will be on travel next Monday and Tuesday, but should be able to respond to emails. Thanks.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division

(202) 343-9349

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Thursday, October 27, 2016 3:57 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Attached please find the summary of additional interagency comments under EO 12866 and 13563 for the EPA draft final rule entitled, "Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings" (2060-AP26) in response to the most recent response provided by EPA.

Please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: RTC Sections
Date: Monday, January 09, 2017 11:31:27 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:11 PM
To: Collections.SubW
Subject: FW: RTC Sections

From: Seidman, Emily
Sent: Monday, November 07, 2016 9:20 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: RTC Sections

Thanks, Dan. I'll begin my review and be in touch with you. Safe travels today and tomorrow.

From: Schultheisz, Daniel
Sent: Monday, November 07, 2016 8:37 AM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: RTC Sections

Emily:

Here are five RTC sections updated to reflect the contents of the preamble. There should not be any significant changes needed, but I would like you to look them over. I anticipate the final version will not include the comment excerpts, but they are retained here for completeness. Thanks.

Dan

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:31:11 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:11 PM
To: Collections.SubW
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

From: Perrin, Alan
Sent: Monday, November 07, 2016 2:57 PM
To: Owens, Nicole <Owens.Nicole@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Hi Nicole,

Yes, the files Dan sent over on Friday are what need to go in to ROCIS so that we can get final close out from OMB. I am out of the office as well, and constrained to an iPhone, so unless you spotted something troubling, e.g., a clean file that isn't actually clean, please proceed.

Thanks for checking. -Alan

~~~~~~~~~~~~~~

Alan Perrin
dsk 202-343-9775
mbl 202-279-0376

On Nov 7, 2016, at 2:45 PM, Owens, Nicole <Owens.Nicole@epa.gov> wrote:

> Hi.
>
> Caryn was out of the office on Friday and is out today. I'm just double checking that what is attached is what you would like us to upload into ROCIS.
~~~~~~~~~~~~~~

Thanks,
Nicole

From: Johnson, Ann
Sent: Monday, November 07, 2016 2:38 PM
To: Owens, Nicole <Owens.Nicole@epa.gov>
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Here it is, Nicole.

It looks fine to me. I'll also forward Dan's message from Friday.

From: Schultheisz, Daniel
Sent: Friday, November 04, 2016 3:33 PM
To: Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Aaron:

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FYI, I did incorporate language from the earlier comment response into the preamble to supplement the definitional revision in the latest response.

Dan Schultheisz
U.S. Environmental Protection Agency
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Radiation Protection Division
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Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Dan,

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Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
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Aaron_L_Szabo@omb.eop.gov

From: Schultheisz, Daniel [mailto:Schultheisz.Daniel@epa.gov]
Sent: Friday, November 4, 2016 9:24 AM
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Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Aaron:

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need anything else. Thanks.

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Office of Radiation and Indoor Air
Radiation Protection Division
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To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
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Please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

<EO12866_NESHAP Subpart W 2060 AP26 Final Rule FRN_20161104 RLSO.docx>

<EO12866_NESHAP Subpart W 2060 AP26 Final Rule FRN_20161104.docx>

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: FYI - targeted publication dates for ORIA rules
Date: Monday, January 09, 2017 11:30:59 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:11 PM
To: Collections.SubW
Subject: FW: FYI - targeted publication dates for ORIA rules

From: Lee, Raymond
Sent: Monday, November 07, 2016 3:16 PM
To: DeCair, Sara <DeCair.Sara@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>
Cc: Peake, Tom <Peake.Tom@epa.gov>; Veal, Lee <Veal.Lee@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; White, Rick <White.Rick@epa.gov>
Subject: FYI - targeted publication dates for ORIA rules

Hi all,

I have been working with the OAR special assistants and given we're hoping for November signatures for 192, Subpart W and PAGs, we are targeting the week of 12/5 as a publication date for all three rules when talking what's coming down the pike for Janet. Normally FR processing takes only about a week but there is a backlog there (no surprise given the time of year and the election) and things are taking two weeks to get out.

If things get pushed, we will modify our projections accordingly.

Thanks!

Ray

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date:	Monday, January 09, 2017 11:30:44 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:11 PM
To: Collections.SubW
Subject: FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

From: Owens, Nicole
Sent: Monday, November 07, 2016 3:33 PM
To: Perrin, Alan <Perrin.Alan@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Great. We just uploaded this and let Aaron know.

Nicole

From: Perrin, Alan
Sent: Monday, November 07, 2016 2:57 PM
To: Owens, Nicole <Owens.Nicole@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Hi Nicole,

Yes, the files Dan sent over on Friday are what need to go in to ROCIS so that we can get final close out from OMB. I am out of the office as well, and constrained to an iPhone, so unless you spotted something troubling, e.g., a clean file that isn't actually clean, please proceed.

Thanks for checking. -Alan

~~~~~~~~~~~~~~

Alan Perrin
dsk 202-343-9775
mbl 202-279-0376

On Nov 7, 2016, at 2:45 PM, Owens, Nicole <Owens.Nicole@epa.gov> wrote:

> Hi.
>
> Caryn was out of the office on Friday and is out today. I'm just double checking that what is attached is what you would like us to upload into ROCIS.
>
> Thanks,
> Nicole
>
> ---
>
> **From:** Johnson, Ann
> **Sent:** Monday, November 07, 2016 2:38 PM
> **To:** Owens, Nicole <Owens.Nicole@epa.gov>
> **Subject:** FW: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
>
> Here it is, Nicole.
>
> It looks fine to me. I'll also forward Dan's message from Friday.
>
> ---
>
> **From:** Schultheisz, Daniel
> **Sent:** Friday, November 04, 2016 3:33 PM
> **To:** Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
> **Cc:** Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
> **Subject:** RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
>
> Aaron:
>
> Thank you for the quick review. Both redline and clean versions are attached for your consideration. I will coordinate with OP to get them into ROCIS.
>
> FYI, I did incorporate language from the earlier comment response into the preamble
~~~~~~~~~~~~~~

to supplement the definitional revision in the latest response.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Friday, November 04, 2016 3:22 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Dan,

Thank you again for the response to comments. The interagency reviewers agree with the use of the EPA preferred approach.

At this time, please provide a redline-strikeout version reflecting all of the changes during the interagency review and a clean version. I have also opened up ROCIS for amendment such that the revised versions of the documents can be uploaded. Please have OP email me when the new version has been uploaded to ROCIS.
Thank you again and please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From: Schultheisz, Daniel [mailto:Schultheisz.Daniel@epa.gov]
Sent: Friday, November 4, 2016 9:24 AM
To: Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip

<Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: RE: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Aaron:

Attached is EPA's proposed response to the additional comment from the interagency review of the Subpart W final rule. We provide two options to clarify the point noted by the commenter, with our preferred option identified. Please let me know if you need anything else. Thanks.

FYI, I will be on travel next Monday and Tuesday, but should be able to respond to emails. Thanks.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Thursday, October 27, 2016 3:57 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: Summary of Interagency Comments under EO12866 and 13563 for EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

Attached please find the summary of additional interagency comments under EO 12866 and 13563 for the EPA draft final rule entitled, "Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings" (2060-AP26) in response to the most recent response provided by EPA.

Please let me know if you have any questions.

Aaron L. Szabo
Policy Analyst
Office of Information and Regulatory Affairs

Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

<EO12866_NESHAP Subpart W 2060 AP26 Final Rule FRN_20161104 RLSO.docx>

<EO12866_NESHAP Subpart W 2060 AP26 Final Rule FRN_20161104.docx>

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Conclusion of EO 12866 and 13563 Review: EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)
Date: Monday, January 09, 2017 11:30:20 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:12 PM
To: Collections.SubW
Subject: FW: Conclusion of EO 12866 and 13563 Review: EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

From: Szabo, Aaron L. EOP/OMB [mailto:Aaron_L_Szabo@omb.eop.gov]
Sent: Tuesday, November 08, 2016 5:40 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Johnson, Ann <Johnson.Ann@epa.gov>; Werner, Jacqueline <Werner.Jacqueline@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>; Szabo, Aaron L. EOP/OMB <Aaron_L_Szabo@omb.eop.gov>
Subject: Conclusion of EO 12866 and 13563 Review: EPA Final Rule -- Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (2060-AP26)

This email serves as notice that the Office of Management and Budget (OMB) has concluded its review with a finding of consistent with change under Executive Orders 12866 and 13563 of the U.S. Environmental Protection Agency's (EPA) final rule entitled, "Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings" (2060-AP26).

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

Aaron L. Szabo
Policy Analyst
Office of Management and Budget
202-395-3621
Aaron_L_Szabo@omb.eop.gov

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30
Date:	Monday, January 09, 2017 11:30:04 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:12 PM
To: Collections.SubW
Subject: FW: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

From: Nesky, Anthony
Sent: Wednesday, November 09, 2016 3:33 PM
To: McMichael, Nate <McMichael.Nate@epa.gov>; Lynn, Tricia <lynn.tricia@epa.gov>
Cc: Millett, John <Millett.John@epa.gov>; Wieder, Jessica <Wieder.Jessica@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

If it helps,we have put it in the conference call notes on our Subpart W website that we hope to have the rule signed by the end of the year.

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov

From: McMichael, Nate
Sent: Wednesday, November 09, 2016 3:32 PM
To: Lynn, Tricia <lynn.tricia@epa.gov>
Cc: Millett, John <Millett.John@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Wieder, Jessica <Wieder.Jessica@epa.gov>
Subject: FW: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

Hi Tricia - Here is our response for this one:

OMB has completed its review and we will make the rule available online once it is signed.

Can you let him know off the record that it should be posted later this month, per John's note below. We will let you know when it is posted and you can flag it for him.

From: Millett, John

Sent: Wednesday, November 09, 2016 3:25 PM
To: McMichael, Nate <McMichael.Nate@epa.gov>; Cyran, Carissa <Cyran.Carissa@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Wieder, Jessica <Wieder.Jessica@epa.gov>
Subject: RE: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

Thanks -- See below --

From: McMichael, Nate
Sent: Wednesday, November 09, 2016 3:19 PM
To: Cyran, Carissa <Cyran.Carissa@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Wieder, Jessica <Wieder.Jessica@epa.gov>
Cc: Millett, John <Millett.John@epa.gov>
Subject: RE: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

Just chatted with Carissa. Looks like we're targeting the 18th, but I don't want to cause confusion by giving a date that's not firm.

ORIA- How does this look?

OMB has completed its review and we will make the rule available online once it is signed. [with an off the record assurance from Tricia that it should be soon/within the month, and she'll let them know as soon as it happens.]

From: McMichael, Nate
Sent: Wednesday, November 09, 2016 3:07 PM
To: Cyran, Carissa <Cyran.Carissa@epa.gov>; Nesky, Anthony <Nesky.Tony@epa.gov>; Wieder, Jessica <Wieder.Jessica@epa.gov>
Subject: Fwd: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

Do you know when we expect to sign this? I don't think we'll give an exact date since it could change, but do we have a target?

Sent from my iPhone

Begin forwarded message:

> **From:** "Lynn, Tricia" <lynn.tricia@epa.gov>
> **Date:** November 9, 2016 at 3:02:31 PM EST
> **To:** "McMichael, Nate" <McMichael.Nate@epa.gov>, "Sharpe, Kristinn" <Sharpe.Kristinn@epa.gov>
> **Subject: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30**
>
> Deadline: TODAY, 11/9/16 @ 3:30 PM
> Outlet: Greenwire/E&E News
> Reporter: Sean Reilly

sreilly@eenews.net

Nate & Kristinn—

Is this for you?

Reporter Inquiry:

According to the reginfo.gov site, OMB completed its review of the final rule (http://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201604&RIN=2060-AP26) yesterday. Can you let me know whether it's been signed yet or if not, when the signing is expected?

Tricia Lynn
Office of Public Affairs
U.S. EPA
Office: 202.564.2615

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30
Date: Monday, January 09, 2017 11:29:50 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:12 PM
To: Collections.SubW
Subject: FW: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

From: Lynn, Tricia
Sent: Wednesday, November 09, 2016 3:41 PM
To: Nesky, Anthony <Nesky.Tony@epa.gov>; McMichael, Nate <McMichael.Nate@epa.gov>
Cc: Millett, John <Millett.John@epa.gov>; Wieder, Jessica <Wieder.Jessica@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

Thanks everyone!

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Sent: Wednesday, November 09, 2016 3:33 PM
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Cc: Millett, John <Millett.John@epa.gov>; Wieder, Jessica <Wieder.Jessica@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

If it helps,we have put it in the conference call notes on our Subpart W website that we hope to have the rule signed by the end of the year.

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov

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ORIA- How does this look?

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Office of Public Affairs
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Office: 202.564.2615

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To: Thornton, Marisa
Subject: Fw: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30
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Subject: FW: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

From: Millett, John
Sent: Wednesday, November 09, 2016 3:46 PM
To: Nesky, Anthony <Nesky.Tony@epa.gov>; McMichael, Nate <McMichael.Nate@epa.gov>; Lynn, Tricia <lynn.tricia@epa.gov>
Cc: Wieder, Jessica <Wieder.Jessica@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: MEDIA INQUIRY - Greenwire/E&E News, NESHAP Final Rule; DDL: TODAY, 11/9 @ 3:30

That's great – something posted online about timing that Tricia can point to, if asked.

From: Nesky, Anthony
Sent: Wednesday, November 09, 2016 3:33 PM
To: McMichael, Nate <McMichael.Nate@epa.gov>; Lynn, Tricia <lynn.tricia@epa.gov>
Cc: Millett, John <Millett.John@epa.gov>; Wieder, Jessica <Wieder.Jessica@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
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Tony Nesky
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nesky.tony@epa.gov

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Tricia Lynn
Office of Public Affairs
U.S. EPA
Office: 202.564.2615

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W Update
Date: Monday, January 09, 2017 11:28:46 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:13 PM
To: Collections.SubW
Subject: FW: Subpart W Update

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 8:44 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald <Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: Subpart W Update

To the Subpart W Workgroup:

OMB officially cleared Subpart W this week. We are now working to get the package prepared to submit for signature. Thanks for all your assistance.

Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W Update
Date: Monday, January 09, 2017 11:28:31 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:13 PM
To: Collections.SubW
Subject: FW: Subpart W Update

From: Johnson, Ann
Sent: Thursday, November 10, 2016 8:45 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Subpart W Update

Thanks, Dan.

Any idea when it might come to OP?

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 8:44 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald <Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
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Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W Update
Date: Monday, January 09, 2017 11:28:11 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:13 PM
To: Collections.SubW
Subject: FW: Subpart W Update

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 8:59 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>
Subject: RE: Subpart W Update

My hope is to have the package out of my hands (ORIA management review) next week. If it actually gets to OAR next week, OP might see it the following week, which is a short week. I'll give you an update next week.

From: Johnson, Ann
Sent: Thursday, November 10, 2016 8:45 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Subpart W Update

Thanks, Dan.

Any idea when it might come to OP?

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 8:44 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald <Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>

Subject: Subpart W Update

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From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Subpart W Update
Date:	Monday, January 09, 2017 11:27:28 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:13 PM
To: Collections.SubW
Subject: FW: Subpart W Update

From: Johnson, Ann
Sent: Thursday, November 10, 2016 8:59 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Subpart W Update

Thanks!

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 8:59 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>
Subject: RE: Subpart W Update

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From: Johnson, Ann
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To: Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom

<Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald <Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
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Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W Update
Date: Monday, January 09, 2017 11:27:16 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:14 PM
To: Collections.SubW
Subject: FW: Subpart W Update

From: Brozowski, George
Sent: Thursday, November 10, 2016 9:05 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Subpart W Update

Good morning and thanks for the update. As sublead region for rad, do you need any help on this?

George P. Brozowski
Regional Health Physicist/Radon Coordinator
US EPA – R6
1445 Ross Avenue
Mail Stop - 6MM-XU
Dallas, TX 75202
214-665-8541 o
214-755-1530 c

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 7:44 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald <Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: Subpart W Update

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Dan

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Subpart W Update
Date:	Monday, January 09, 2017 11:26:59 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:14 PM
To: Collections.SubW
Subject: FW: Subpart W Update

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 9:08 AM
To: Brozowski, George <brozowski.george@epa.gov>
Subject: RE: Subpart W Update

Not that I can think of, but I will let you know. Thanks for the offer.

From: Brozowski, George
Sent: Thursday, November 10, 2016 9:05 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Subpart W Update

Good morning and thanks for the update. As sublead region for rad, do you need any help on this?

George P. Brozowski
Regional Health Physicist/Radon Coordinator
US EPA – R6
1445 Ross Avenue
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Dallas, TX 75202
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214-755-1530 c

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 7:44 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald

<Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: Subpart W Update

To the Subpart W Workgroup:

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Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Applicability of Subpart W to Uranium Recovery Facilities
Date: Monday, January 09, 2017 11:26:45 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:14 PM
To: Collections.SubW
Subject: FW: Applicability of Subpart W to Uranium Recovery Facilities

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From: Brozowski, George
Sent: Thursday, November 10, 2016 11:07 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: FW: Applicability of Subpart W to Uranium Recovery Facilities

Good morning and would you mind reviewing the briefing notes on Subpart W below and let me know what you think? Thanks!

George P. Brozowski
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US EPA – R6
1445 Ross Avenue
Mail Stop - 6MM-XU
Dallas, TX 75202
214-665-8541 o
214-755-1530 c

From: Brozowski, George
Sent: Thursday, November 10, 2016 10:01 AM
To: Snowbarger, Robert <Snowbarger.Robert@epa.gov>
Subject: RE: Applicability of Subpart W to Uranium Recovery Facilities

Good morning and thanks for the compliment. A briefing sheet was done for Subpart T (more of a water issue; I helped Phil Dillenger on it).

I can take what I sent you & Steve and make a briefing paper out of it. Not a problem.

George P. Brozowski
Regional Health Physicist/Radon Coordinator
US EPA – R6
1445 Ross Avenue

Mail Stop - 6MM-XU
Dallas, TX 75202
214-665-8541 o
214-755-1530 c

From: Snowbarger, Robert
Sent: Thursday, November 10, 2016 9:59 AM
To: Brozowski, George <brozowski.george@epa.gov>
Subject: RE: Applicability of Subpart W to Uranium Recovery Facilities

Looks good. Wasn't there a briefing sheet produced for this in the past?

Thanks

From: Brozowski, George
Sent: Thursday, November 10, 2016 9:52 AM
To: Snowbarger, Robert <Snowbarger.Robert@epa.gov>
Subject: Applicability of Subpart W to Uranium Recovery Facilities

Good morning and Steve wanted a refresher on Subpart W. Here's what he's getting.

- NESHAP Subpart W is a radon emission standard for operating uranium mill tailings.
- The standard (61.252) states radon-222 emissions to the ambient air from an existing uranium mill tailing pile shall not exceed 20 pC1/m^2.
- Subpart W applies to "owners or operators of facilities licensed to manage uranium byproduct material during and following the processing of uranium ores, commonly referred to as uranium mills and their associated tailings – 40 CFR 61.250.
- Subpart W defines uranium byproduct material or tailings as "the waste produced by the extraction or concentration of uranium from any ore processed primarily for its source material content – 40 CFR 61.251(g).
- Therefore, any type of uranium recovery facility that is managing uranium byproduct material or tailings during its operation is subject to Subpart W.
  - These facilities include, but are not limited to, conventional mills, in-situ leach facilities and heap leach facilities, specifically the structures at the facilities that are used to manage or contain the uranium byproduct material.
- Common names for these structures include, but are not limited to, impoundments, tailings impoundments, evaporation or holding ponds and heap leach piles.
  - Applicability is based on what an individual structure contains.
- When the regulation was promulgated in 1989, the majority of facilities were classic tailings impoundments. Over the past 25 years there has been a switch in process to In-Situ leach (ISL) facilities. Evaporation ponds are the predominant unit at ISL facilities.
- As of November 10, 2016, the Office of Management and Budget officially approved the language in the Subpart W package. This Subpart applies to operating uranium mill tailing piles. HQ, with assistance from the regions, are working to get the package prepared for signature.

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Dallas, TX 75202
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From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Legal Responses for Review
Date: Monday, January 09, 2017 11:26:29 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:15 PM
To: Collections.SubW
Subject: FW: Legal Responses for Review

From: Seidman, Emily
Sent: Thursday, November 10, 2016 4:45 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Legal Responses for Review

These look good. No comments from me. Thanks.

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 2:33 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: Legal Responses for Review

Only the last issue is not included in the preamble.

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W package and routing
Date: Monday, January 09, 2017 11:26:18 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:16 PM
To: Collections.SubW
Subject: FW: Subpart W package and routing

From: Schultheisz, Daniel
Sent: Monday, November 14, 2016 11:54 AM
To: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Subpart W package and routing

Ray:

I am hoping to get the signature package moving this week. Here's the process as I understand it. Let me know if I have something off. I am particularly interested in Steps 4-6. This provides an opportunity to swap out pages that need updating (e.g., inserting docket references or correcting typos). Thanks.

Step 1: Signature package to OAR (Ruth/Wendy) (after ORIA review)

- Package includes (based on OMB submittal package and other requirements)
  - Rule/preamble
  - Action Memo (for Janet's signature)
  - Action Information (new requirement)
  - Transmittal note from Jon to Janet
  - Communications materials (fact sheet, Qs and As, desk statement/press release)
  - Response to Comments and BID/EIA (not required, but I would like to include for completeness)
  - Anything else?
  - Is a desk statement/press release still required (we did not send one with the OMB submittal)?
  - How many copies?
  - CD required?
  - Does everything go electronically now, with no paper copies?

Step 2: Signature package to OP (transmitted by OAR after Janet signs the Action Memo)

Step 3: Signature package to Administrator (transmitted by OP after review/processing)

Step 4: Signature package returned to ORIA to prepare for Federal Register (after Administrator signature)

- Docket must be complete by midnight on day of signature

Step 5: Post electronic version of signed rule on website (not required)

Step 6: Publication package to OP

- Package includes
  - Electronic version of rule/preamble
  - Printed copy of rule/preamble
  - Federal Register typesetting request
  - Memo to FR attesting that the electronic version is a true copy of the printed version
  - Anything else?

Step 7: Publication package to the FR (transmitted by OP)

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W package and routing
Date: Monday, January 09, 2017 11:25:50 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:16 PM
To: Collections.SubW
Subject: FW: Subpart W package and routing

From: Lee, Raymond
Sent: Monday, November 14, 2016 3:23 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Subpart W package and routing

Hi Dan,

Here is actually what I sent to Sara for PAGs regarding what you need to send now electronically:

Currently effective, when an ADP action is ready for the Administrator to sign, the lead office may initially submit material electronically to the regulatory management division (RMD). This includes:

- The document for Administrator's signature.
- Signed and dated Action Memorandum.
- For economically significant rules, the Regulatory Impact Assessment.
- Communications materials/fact sheet, if your office or region requires you to do so.
- FR Cover Sheet form and Typesetting Request form, if the action will be published in the FR (don't forget this needs to be filled out and approved accordingly by the budget folks, i.e. Beth and then Angela Lawson/someone in DCN).

And this is just FYI, once it does get approved by OP (we will need to do this later):

Once approved for the Administrator's signature by OP management, the lead office then submits the following to RMD:

- The original, single-sided document for the Administrator's signature plus three copies (can be double-sided).

- Signed and dated Action Memorandum.
- Electronic copy of your document on a ***rewritable*** compact disc (CD-RW). Please note that each document (proposal, direct final, etc.) should have its own CD-RW. The CD-RW should also contain a copy of the Typesetting Request form.
- One Federal Register Typesetting Request form (original or copy), if the action will be published in the FR.
- One FR Cover Sheet form (original or copy).
- One copy of the communications plan, if your office or region requires you to do so.
- One copy of the fact sheet, if your office or region requires you to do so.
- One double-sided copy of your Regulatory Impact Assessment (RIA) for final rules that are economically significant.

So once you're ready to submit the package and we have ORIA sign-off, **I would put all the pertinent docs in an e-mail and send it to Ruth Morgan (morgan.ruthw@epa.gov) and cc Wendy McQuilkin (mcquilkin.wendy@epa.gov). I would maybe even cc Carissa Cyran (cyran.carissa@epa.gov), one of OAR's special assistants, to give her a heads-up.** Let them know this package has been cleared by ORIA management and is ready to move through RMD/OAR and OP.

As far as Step 1 goes, you have everything you need as far as I'm concerned. Just don't forget the typesetting request and generic FR letter (Sara has examples if you need, or I can send you some as well). But yes, after OP clears it we will need to follow these steps and get the hard copies back to RMD/OAR once OP clears it.

This process is still relatively new, but this pretty much covers our bases. If by chance they need something else, I'm sure they'll let us know.

Let me know if you have any questions!

Thanks,

Ray

From: Schultheisz, Daniel
Sent: Monday, November 14, 2016 11:53:41 AM
To: Lee, Raymond
Subject: Subpart W package and routing

Ray:

I am hoping to get the signature package moving this week. Here's the process as I understand it. Let me know if I have something off. I am particularly interested in Steps 4-6. This provides an

opportunity to swap out pages that need updating (e.g., inserting docket references or correcting typos). Thanks.

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  - Memo to FR attesting that the electronic version is a true copy of the printed version
  - Anything else?

Step 7: Publication package to the FR (transmitted by OP)

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W ICR
Date: Monday, January 09, 2017 11:25:27 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:16 PM
To: Collections.SubW
Subject: FW: Subpart W ICR

-----Original Appointment-----
From: Schultheisz, Daniel
Sent: Monday, November 14, 2016 4:11 PM
To: Seidman, Emily
Subject: Accepted: Subpart W ICR
When: Tuesday, November 15, 2016 11:30 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Emily and Sonja will call Dan (343-9349)

Call my cell instead: (202) 236-8264

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Subpart W package and routing
Date:	Monday, January 09, 2017 11:25:16 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:17 PM
To: Collections.SubW
Subject: FW: Subpart W package and routing

From: Schultheisz, Daniel
Sent: Monday, November 14, 2016 4:28 PM
To: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: RE: Subpart W package and routing

Okay, so the FR forms need to go to OP with the signature package. That means they should go to OAR, because OAR (Ruth/Wendy) will send the package to OP for its review. Is that correct?

And it looks like there is another step. After OP completes its review, it does not forward the package directly to the Administrator for signature. Instead, OAR (we) send the *full* package (including paper copies) to OP *again* (with any changes requested by OP), and OP then forwards *that* package to the Administrator for signature. Is that correct? And then we get it back to prepare for FR publication? Or does OP send it directly to the FR after signature?

From: Lee, Raymond
Sent: Monday, November 14, 2016 3:23 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Subpart W package and routing

Hi Dan,

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- One double-sided copy of your Regulatory Impact Assessment (RIA) for final rules that are economically significant.

So once you're ready to submit the package and we have ORIA sign-off, **I would put all the pertinent docs in an e-mail and send it to Ruth Morgan (morgan.ruthw@epa.gov) and cc Wendy McQuilkin (mcquilkin.wendy@epa.gov). I would maybe even cc Carissa Cyran (cyran.carissa@epa.gov), one of OAR's special assistants, to give her a heads-up.** Let them know this package has been cleared by ORIA management and is ready to move through RMD/OAR and OP.

As far as Step 1 goes, you have everything you need as far as I'm concerned. Just don't forget the typesetting request and generic FR letter (Sara has examples if you need, or I can send you some as well). But yes, after OP clears it we will need to follow these steps and get the hard copies back to RMD/OAR once OP clears it.

This process is still relatively new, but this pretty much covers our bases. If by chance they need something else, I'm sure they'll let us know.

Let me know if you have any questions!

Thanks,

Ray

From: Schultheisz, Daniel
Sent: Monday, November 14, 2016 11:53:41 AM
To: Lee, Raymond
Subject: Subpart W package and routing

Ray:

I am hoping to get the signature package moving this week. Here's the process as I understand it. Let me know if I have something off. I am particularly interested in Steps 4-6. This provides an opportunity to swap out pages that need updating (e.g., inserting docket references or correcting typos). Thanks.

Step 1: Signature package to OAR (Ruth/Wendy) (after ORIA review)

- Package includes (based on OMB submittal package and other requirements)
  - Rule/preamble
  - Action Memo (for Janet's signature)
  - Action Information (new requirement)
  - Transmittal note from Jon to Janet
  - Communications materials (fact sheet, Qs and As, desk statement/press release)
  - Response to Comments and BID/EIA (not required, but I would like to include for completeness)
  - Anything else?
  - Is a desk statement/press release still required (we did not send one with the OMB submittal)?
  - How many copies?
  - CD required?
  - Does everything go electronically now, with no paper copies?

Step 2: Signature package to OP (transmitted by OAR after Janet signs the Action Memo)

Step 3: Signature package to Administrator (transmitted by OP after review/processing)

Step 4: Signature package returned to ORIA to prepare for Federal Register (after Administrator signature)

- Docket must be complete by midnight on day of signature

Step 5: Post electronic version of signed rule on website (not required)

Step 6: Publication package to OP

- Package includes
  - Electronic version of rule/preamble
  - Printed copy of rule/preamble
  - Federal Register typesetting request
  - Memo to FR attesting that the electronic version is a true copy of the printed version
  - Anything else?

Step 7: Publication package to the FR (transmitted by OP)

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Communications Plan
Date: Monday, January 09, 2017 11:25:02 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:18 PM
To: Collections.SubW
Subject: FW: Communications Plan

-----Original Message-----
From: Schultheisz, Daniel [mailto:Schultheisz.Daniel@epa.gov]
Sent: Tuesday, November 15, 2016 8:12 AM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Subject: Communications Plan

Tony:

Can you take a look at the Subpart W communications plan and see what needs updating? The version that went with the proposal is probably on the G: drive, but I'm not sure where. You may also have that version. Thanks.

Dan

Sent from my iPhone

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W ICR
Date: Monday, January 09, 2017 11:24:52 AM
Attachments: Subpart W ICR.msg

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:18 PM
To: Collections.SubW
Subject: FW: Subpart W ICR

From: Seidman, Emily
To: Rodman, Sonja; Schultheisz, Daniel
Subject: Subpart W ICR

UPDATE: Please use the following call in number:

Call In Number: 202-564-1700 or 1-866-564-1700

Conference Extension: 1107874

Participant Code: 234567

Scheduling some time to touch base on the Subpart W ICR.

Please feel free to propose another time if that would be better.

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Communications Plan
Date: Monday, January 09, 2017 11:24:40 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:18 PM
To: Collections.SubW
Subject: FW: Communications Plan

From: Schultheisz, Daniel
Sent: Tuesday, November 15, 2016 9:40 AM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Subject: Fwd: Communications Plan

Please also see if we have a draft desk statement/press release. Thanks.

Sent from my iPhone

Begin forwarded message:

> **From:** <Schultheisz.Daniel@epa.gov>
> **Date:** November 15, 2016 at 8:11:30 AM EST
> **To:** <Nesky.Tony@epa.gov>
> **Subject: Communications Plan**
>
> Tony:
>
> Can you take a look at the Subpart W communications plan and see what needs updating? The version that went with the proposal is probably on the G: drive, but I'm not sure where. You may also have that version. Thanks.
>
> Dan
>
> Sent from my iPhone

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Communications Plan
Date: Monday, January 09, 2017 11:24:28 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:19 PM
To: Collections.SubW
Subject: FW: Communications Plan

From: Schultheisz, Daniel
Sent: Tuesday, November 15, 2016 10:04 AM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Subject: Fwd: Communications Plan

Can you also search the docket to see if it includes the draft Information Collection Request? I have a listing you sent me a while back, but I truncated and deleted columns to print it. I don't see it, but can't be sure. Thanks.

Sent from my iPhone

Begin forwarded message:

> **From:** "Schultheisz, Daniel" <Schultheisz.Daniel@epa.gov>
> **Date:** November 15, 2016 at 9:39:49 AM EST
> **To:** "Nesky, Anthony" <Nesky.Tony@epa.gov>
> **Subject: Fwd: Communications Plan**
>
> Please also see if we have a draft desk statement/press release. Thanks.
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** <Schultheisz.Daniel@epa.gov>
> > **Date:** November 15, 2016 at 8:11:30 AM EST
> > **To:** <Nesky.Tony@epa.gov>
> > **Subject: Communications Plan**
> >
> > Tony:
> >
> > Can you take a look at the Subpart W communications plan and see what needs updating? The version that went with the proposal is probably on the G: drive, but I'm not sure where. You may also have that version. Thanks.

Dan

Sent from my iPhone

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Communications Plan
Date: Monday, January 09, 2017 11:23:59 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:19 PM
To: Collections.SubW
Subject: FW: Communications Plan

From: Nesky, Anthony
Sent: Tuesday, November 15, 2016 10:11 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Communications Plan

I'm dealing with the PAG package right now, but you will be my next priority today.

From: Schultheisz, Daniel
Sent: Tuesday, November 15, 2016 10:03 AM
To: Nesky, Anthony
Subject: Fwd: Communications Plan

Can you also search the docket to see if it includes the draft Information Collection Request? I have a listing you sent me a while back, but I truncated and deleted columns to print it. I don't see it, but can't be sure. Thanks.

Sent from my iPhone

Begin forwarded message:

> **From:** "Schultheisz, Daniel" <Schultheisz.Daniel@epa.gov>
> **Date:** November 15, 2016 at 9:39:49 AM EST
> **To:** "Nesky, Anthony" <Nesky.Tony@epa.gov>
> **Subject: Fwd: Communications Plan**
>
> Please also see if we have a draft desk statement/press release. Thanks.
>
> Sent from my iPhone

Begin forwarded message:

From: <Schultheisz.Daniel@epa.gov>
Date: November 15, 2016 at 8:11:30 AM EST
To: <Nesky.Tony@epa.gov>
Subject: Communications Plan

Tony:

Can you take a look at the Subpart W communications plan and see what needs updating? The version that went with the proposal is probably on the G: drive, but I'm not sure where. You may also have that version. Thanks.

Dan

Sent from my iPhone

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Communications Plan
Date: Monday, January 09, 2017 11:23:35 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:19 PM
To: Collections.SubW
Subject: FW: Communications Plan

From: Schultheisz, Daniel
Sent: Tuesday, November 15, 2016 10:40 AM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Subject: Re: Communications Plan

How can I ask for more?

Sent from my iPhone

On Nov 15, 2016, at 10:11 AM, Nesky, Anthony <Nesky.Tony@epa.gov> wrote:

> I'm dealing with the PAG package right now, but you will be my next priority today.
>
> ---
>
> **From:** Schultheisz, Daniel
> **Sent:** Tuesday, November 15, 2016 10:03 AM
> **To:** Nesky, Anthony
> **Subject:** Fwd: Communications Plan
>
> Can you also search the docket to see if it includes the draft Information Collection Request? I have a listing you sent me a while back, but I truncated and deleted columns to print it. I don't see it, but can't be sure. Thanks.
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** "Schultheisz, Daniel" <Schultheisz.Daniel@epa.gov>
> > **Date:** November 15, 2016 at 9:39:49 AM EST
> > **To:** "Nesky, Anthony" <Nesky.Tony@epa.gov>

Subject: Fwd: Communications Plan

Please also see if we have a draft desk statement/press release. Thanks.

Sent from my iPhone

Begin forwarded message:

> **From:** <Schultheisz.Daniel@epa.gov>
> **Date:** November 15, 2016 at 8:11:30 AM EST
> **To:** <Nesky.Tony@epa.gov>
> **Subject: Communications Plan**
>
> Tony:
>
> Can you take a look at the Subpart W communications plan and see what needs updating? The version that went with the proposal is probably on the G: drive, but I'm not sure where. You may also have that version. Thanks.
>
> Dan
>
> Sent from my iPhone

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Communications Plan
Date: Monday, January 09, 2017 11:23:20 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:19 PM
To: Collections.SubW
Subject: FW: Communications Plan

From: Nesky, Anthony
Sent: Tuesday, November 15, 2016 10:41 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Communications Plan

I'm sure you'll manage!

From: Schultheisz, Daniel
Sent: Tuesday, November 15, 2016 10:39 AM
To: Nesky, Anthony
Subject: Re: Communications Plan

How can I ask for more?

Sent from my iPhone

On Nov 15, 2016, at 10:11 AM, Nesky, Anthony <Nesky.Tony@epa.gov> wrote:

> I'm dealing with the PAG package right now, but you will be my next priority today.
>
> ---
>
> **From:** Schultheisz, Daniel
> **Sent:** Tuesday, November 15, 2016 10:03 AM
> **To:** Nesky, Anthony
> **Subject:** Fwd: Communications Plan
>
> Can you also search the docket to see if it includes the draft Information Collection Request? I have a listing you sent me a while back, but I truncated and

deleted columns to print it. I don't see it, but can't be sure. Thanks.

Sent from my iPhone

Begin forwarded message:

> **From:** "Schultheisz, Daniel" <Schultheisz.Daniel@epa.gov>
> **Date:** November 15, 2016 at 9:39:49 AM EST
> **To:** "Nesky, Anthony" <Nesky.Tony@epa.gov>
> **Subject: Fwd: Communications Plan**
>
> Please also see if we have a draft desk statement/press release. Thanks.
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** <Schultheisz.Daniel@epa.gov>
> > **Date:** November 15, 2016 at 8:11:30 AM EST
> > **To:** <Nesky.Tony@epa.gov>
> > **Subject: Communications Plan**
> >
> > Tony:
> >
> > Can you take a look at the Subpart W communications plan and see what needs updating? The version that went with the proposal is probably on the G: drive, but I'm not sure where. You may also have that version. Thanks.
> >
> > Dan
> >
> > Sent from my iPhone

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: FY17 budget project sheet template
Date: Monday, January 09, 2017 11:23:07 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:19 PM
To: Collections.SubW
Subject: FW: FY17 budget project sheet template

From: Schultheisz, Daniel
Sent: Tuesday, November 15, 2016 10:49 AM
To: Egidi, Philip <Egidi.Philip@epa.gov>
Cc: Walsh, Jonathan <Walsh.Jonathan@epa.gov>
Subject: Re: FY17 budget project sheet template

It's probably reasonable to assume that work in FY17 will focus on any legal challenges. And that may be something that just needs a placeholder until we see how things develop. Ultimately Subpart W will be wholly within the NESHAPs portfolio. We should have enough in place to complete the rulemaking. So I sleeve it to you to figure out who does a budget sheet. How's that for punting?

Sent from my iPhone

On Nov 15, 2016, at 10:39 AM, Egidi, Philip <Egidi.Philip@epa.gov> wrote:

> I am going to assume that any Subpart W work in FY17 would fall under a Rad NESHAPS work assignment, i.e., am punting that to Jon Walsh. Is that a good assumption?
>
> PVE
> Philip Egidi
> Environmental Scientist
> U.S. Environmental Protection Agency
> Radiation Protection Division
> Washington, DC
> (202) 343-9186 (work)
> (970) 209-2885 (Cell)
>
> "The health of the people is the highest law."
> Cicero (106 - 43 BC)
>
> ---
>
> **From:** Schultheisz, Daniel

Sent: Tuesday, November 15, 2016 8:54 AM
To: OAR-ORIA-RPD-CWMR <OARORIARPDCWMR@epa.gov>
Subject: Fwd: FY17 budget project sheet template

Attached is the FY17 project sheet template. Please submit your proposed project sheets to Tom by Wednesday, November 30. Thanks.

Sent from my iPhone

Begin forwarded message:

> **From:** "Perrin, Alan" <Perrin.Alan@epa.gov>
> **Date:** November 10, 2016 at 5:51:31 PM EST
> **To:** "Veal, Lee" <Veal.Lee@epa.gov>, "Peake, Tom" <Peake.Tom@epa.gov>, "Boyd, Mike" <Boyd.Mike@epa.gov>, "White, Rick" <White.Rick@epa.gov>
> **Cc:** "Snead, Kathryn" <Snead.Kathryn@epa.gov>, "Schultheisz, Daniel" <Schultheisz.Daniel@epa.gov>, "Wieder, Jessica" <Wieder.Jessica@epa.gov>, "Pawel, David" <Pawel.David@epa.gov>
> **Subject: FY17 budget project sheet template**
>
> Template for FY17 attached for those of you that want to get started.
>
> ~~~~~~~~~~~~~~~
>
> **Alan Perrin, Deputy Director**
> **Radiation Protection Division, USEPA**
> **ofc (202) 343-9775 | mbl (202) 279-0376**

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W Update
Date: Monday, January 09, 2017 11:22:41 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:19 PM
To: Collections.SubW
Subject: FW: Subpart W Update

From: Hooper, Charles A.
Sent: Tuesday, November 15, 2016 11:17 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Subpart W Update

Dan,
I'm not on the workgroup anymore. Is this package signature for all regions, or just the workgroup regions/members?

From: Schultheisz, Daniel
Sent: Thursday, November 10, 2016 7:44 AM
To: Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald <Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker, Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: Subpart W Update

To the Subpart W Workgroup:

OMB officially cleared Subpart W this week. We are now working to get the package prepared to submit for signature. Thanks for all your assistance.

Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W Update
Date: Monday, January 09, 2017 11:22:26 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:19 PM
To: Collections.SubW
Subject: FW: Subpart W Update

From: Schultheisz, Daniel
Sent: Tuesday, November 15, 2016 11:20 AM
To: Hooper, Charles A. <Hooper.CharlesA@epa.gov>
Subject: Re: Subpart W Update

Chuck:

Thanks for reminding me. This note was just for informational purposes. The package will be for the Administrator's signature. No action by the workgroup is necessary.

Dan

Sent from my iPhone

On Nov 15, 2016, at 11:17 AM, Hooper, Charles A. <Hooper.CharlesA@epa.gov> wrote:

> Dan,
> I'm not on the workgroup anymore. Is this package signature for all regions, or just the workgroup regions/members?
>
> ---
>
> **From:** Schultheisz, Daniel
> **Sent:** Thursday, November 10, 2016 7:44 AM
> **To:** Johnson, Ann <Johnson.Ann@epa.gov>; Ayres, Sara <Ayres.Sara@epa.gov>; Hooper, Charles A. <Hooper.CharlesA@epa.gov>; Zhen, Davis <Zhen.Davis@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Egidi, Philip <Egidi.Philip@epa.gov>; Fairchild, Susan <Fairchild.Susan@epa.gov>; Brozowski, George <brozowski.george@epa.gov>; Law, Donald <Law.Donald@epa.gov>; Ginsberg, Marilyn <Ginsberg.Marilyn@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>; Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Seidman, Emily <seidman.emily@epa.gov>; Walker,

Stuart <Walker.Stuart@epa.gov>; Stahle, Susan <Stahle.Susan@epa.gov>; Benner, Tim <Benner.Tim@epa.gov>; Mills, Jason <Mills.Jason@epa.gov>; Rodman, Sonja <Rodman.Sonja@epa.gov>
Subject: Subpart W Update

To the Subpart W Workgroup:

OMB officially cleared Subpart W this week. We are now working to get the package prepared to submit for signature. Thanks for all your assistance.

Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W package and routing
Date: Monday, January 09, 2017 11:22:09 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:19 PM
To: Collections.SubW
Subject: FW: Subpart W package and routing

From: Lee, Raymond
Sent: Tuesday, November 15, 2016 2:50 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Subpart W package and routing

Hi Dan,

Yes, essentially the new process means we submit everything electronically at first, but once that is approved by OP we put together a hard copy package that goes back to RMD/OAR (but with a lot less bells and whistles). Once it gets approved electronically, the hope is that the final hard copy package goes through much more smoothly. Also, once the Administrator signs it, they forward it automatically to the FR folks for publication. If we need a pdf of the signed FR OEX can send that to us immediately as well.

Hope this helps.

Thanks,

Ray

Sent by EPA Wireless E-mail Services

From: Schultheisz, Daniel

Sent: Monday, November 14, 2016 4:27:41 PM
To: Lee, Raymond
Subject: RE: Subpart W package and routing

Okay, so the FR forms need to go to OP with the signature package. That means they should go to OAR, because OAR (Ruth/Wendy) will send the package to OP for its review. Is that correct?

And it looks like there is another step. After OP completes its review, it does not forward the package directly to the Administrator for signature. Instead, OAR (we) send the *full* package (including paper copies) to OP *again* (with any changes requested by OP), and OP then forwards *that* package to the Administrator for signature. Is that correct? And then we get it back to prepare for FR publication? Or does OP send it directly to the FR after signature?

From: Lee, Raymond
Sent: Monday, November 14, 2016 3:23 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Subpart W package and routing

Hi Dan,

Here is actually what I sent to Sara for PAGs regarding what you need to send now electronically:

Currently effective, when an ADP action is ready for the Administrator to sign, the lead office may initially submit material electronically to the regulatory management division (RMD). This includes:

- The document for Administrator's signature.
- Signed and dated Action Memorandum.
- For economically significant rules, the Regulatory Impact Assessment.
- Communications materials/fact sheet, if your office or region requires you to do so.
- FR Cover Sheet form and Typesetting Request form, if the action will be published in the FR (don't forget this needs to be filled out and approved accordingly by the budget folks, i.e. Beth and then Angela Lawson/someone in DCN).

And this is just FYI, once it does get approved by OP (we will need to do this later):

Once approved for the Administrator's signature by OP management, the lead office then submits the following to RMD:

- The original, single-sided document for the Administrator's signature plus three copies (can be double-sided).
- Signed and dated Action Memorandum.

- Electronic copy of your document on a ***rewritable*** compact disc (CD-RW). Please note that each document (proposal, direct final, etc.) should have its own CD-RW. The CD-RW should also contain a copy of the Typesetting Request form.
- One Federal Register Typesetting Request form (original or copy), if the action will be published in the FR.
- One FR Cover Sheet form (original or copy).
- One copy of the communications plan, if your office or region requires you to do so.
- One copy of the fact sheet, if your office or region requires you to do so.
- One double-sided copy of your Regulatory Impact Assessment (RIA) for final rules that are economically significant.

So once you're ready to submit the package and we have ORIA sign-off, **I would put all the pertinent docs in an e-mail and send it to Ruth Morgan (morgan.ruthw@epa.gov) and cc Wendy McQuilkin (mcquilkin.wendy@epa.gov). I would maybe even cc Carissa Cyran (cyran.carissa@epa.gov), one of OAR's special assistants, to give her a heads-up.** Let them know this package has been cleared by ORIA management and is ready to move through RMD/OAR and OP.

As far as Step 1 goes, you have everything you need as far as I'm concerned. Just don't forget the typesetting request and generic FR letter (Sara has examples if you need, or I can send you some as well). But yes, after OP clears it we will need to follow these steps and get the hard copies back to RMD/OAR once OP clears it.

This process is still relatively new, but this pretty much covers our bases. If by chance they need something else, I'm sure they'll let us know.

Let me know if you have any questions!

Thanks,

Ray

From: Schultheisz, Daniel
Sent: Monday, November 14, 2016 11:53:41 AM
To: Lee, Raymond
Subject: Subpart W package and routing

Ray:

I am hoping to get the signature package moving this week. Here's the process as I understand it. Let

me know if I have something off. I am particularly interested in Steps 4-6. This provides an opportunity to swap out pages that need updating (e.g., inserting docket references or correcting typos). Thanks.

Step 1: Signature package to OAR (Ruth/Wendy) (after ORIA review)

- Package includes (based on OMB submittal package and other requirements)
  - Rule/preamble
  - Action Memo (for Janet's signature)
  - Action Information (new requirement)
  - Transmittal note from Jon to Janet
  - Communications materials (fact sheet, Qs and As, desk statement/press release)
  - Response to Comments and BID/EIA (not required, but I would like to include for completeness)
  - Anything else?
  - Is a desk statement/press release still required (we did not send one with the OMB submittal)?
  - How many copies?
  - CD required?
  - Does everything go electronically now, with no paper copies?

Step 2: Signature package to OP (transmitted by OAR after Janet signs the Action Memo)

Step 3: Signature package to Administrator (transmitted by OP after review/processing)

Step 4: Signature package returned to ORIA to prepare for Federal Register (after Administrator signature)

- Docket must be complete by midnight on day of signature

Step 5: Post electronic version of signed rule on website (not required)

Step 6: Publication package to OP

- Package includes
  - Electronic version of rule/preamble
  - Printed copy of rule/preamble
  - Federal Register typesetting request
  - Memo to FR attesting that the electronic version is a true copy of the printed version
  - Anything else?

Step 7: Publication package to the FR (transmitted by OP)

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Cabinet Summary Report?
Date: Monday, January 09, 2017 11:21:55 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:20 PM
To: Collections.SubW
Subject: FW: Cabinet Summary Report?

From: Schultheisz, Daniel
Sent: Wednesday, November 16, 2016 8:56 AM
To: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Cabinet Summary Report?

Ray:

In the Action Memo list of attachments, something called the “Cabinet Summary Report” is listed. Do you know what that is? Thanks.

Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Cabinet Summary Report?
Date: Monday, January 09, 2017 11:21:39 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:22 PM
To: Collections.SubW
Subject: FW: Cabinet Summary Report?

From: Lee, Raymond
Sent: Wednesday, November 16, 2016 10:22 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Cabinet Summary Report?

Hi Dan,

Hrmm, where was this exactly? I took a look at some recent action memos OAR has circulated and I don't see a reference to the cabinet summary report (though based on its title, I'm thinking it's something similar or could be the same thing as the White House Weekly, where the Agency puts out short blurbs/summaries of things that could be coming down the pike in 2-3 weeks time).

Thanks,

Ray

From: Schultheisz, Daniel
Sent: Wednesday, November 16, 2016 8:56 AM
To: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Cabinet Summary Report?

Ray:

In the Action Memo list of attachments, something called the "Cabinet Summary Report" is listed. Do you know what that is? Thanks.

Dan

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: EO12866_NESHAP Subpart W 2060 AP26 Final Rule BID-EIA_20160607.docx
Date:	Monday, January 09, 2017 11:21:21 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:22 PM
To: Collections.SubW
Subject: FW: EO12866_NESHAP Subpart W 2060 AP26 Final Rule BID-EIA_20160607.docx

---

From: Stephen Marschke [mailto:smarschke@scainc.com]
Sent: Wednesday, November 16, 2016 10:36 AM
To: Egidi, Philip <Egidi.Philip@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: Abe Zeitoun <azeitoun@scainc.com>
Subject: RE: EO12866_NESHAP Subpart W 2060 AP26 Final Rule BID-EIA_20160607.docx

Phil, thanks for the heads up. We look forward to receiving the TD,
Steve

From: Egidi, Philip [mailto:Egidi.Philip@epa.gov]
Sent: Wednesday, November 16, 2016 9:57 AM
To: Stephen Marschke <smarschke@scainc.com>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: EO12866_NESHAP Subpart W 2060 AP26 Final Rule BID-EIA_20160607.docx

Steve,
I talked with Dan this morning. We have a few items that need updating for the BID for Subpart W. Want to give you a heads up that a technical direction memo will be coming your way. This is all very minor stuff to finish the updates to the BID after the last exchange circa June.
Thank you,

PVE

Philip Egidi
Environmental Scientist
U.S. Environmental Protection Agency
Radiation Protection Division
Washington, DC
(202) 343-9186 (work)

(970) 209-2885 (Cell)

“The health of the people is the highest law.”
Cicero (106 - 43 BC)

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Cabinet Summary Report?
Date:	Monday, January 09, 2017 11:21:10 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:22 PM
To: Collections.SubW
Subject: FW: Cabinet Summary Report?

From: Schultheisz, Daniel
Sent: Wednesday, November 16, 2016 11:12 AM
To: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: RE: Cabinet Summary Report?

It was on the Action Memo Reid prepared for the proposal, which I used as the basis for the final (that went with the OMB package). His may not have actually been the final version, but it was the latest I could find. If you tell me it is unnecessary or doesn't exist, I will take it off the list of attachments. Thanks.

From: Lee, Raymond
Sent: Wednesday, November 16, 2016 10:22 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Cabinet Summary Report?

Hi Dan,

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Thanks,

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Sent: Wednesday, November 16, 2016 8:56 AM

To: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Cabinet Summary Report?

Ray:

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Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Cabinet Summary Report?
Date: Monday, January 09, 2017 11:20:48 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:22 PM
To: Collections.SubW
Subject: FW: Cabinet Summary Report?

From: Lee, Raymond
Sent: Wednesday, November 16, 2016 11:16 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Cabinet Summary Report?

Given that I don't see it on the latest instructions from OAR/RMD, I would say you can leave it out. I think we're already going above and beyond in including all of the additional outreach materials we've prepared as well as the Response to Comments/BID/EIA.

But at least we have the version from the OMB package to work off of in case they ask for it later!

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Sent: Wednesday, November 16, 2016 11:12 AM
To: Lee, Raymond <Lee.Raymond@epa.gov>
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Dan

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Cabinet Summary Report?
Date:	Monday, January 09, 2017 11:20:35 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:22 PM
To: Collections.SubW
Subject: FW: Cabinet Summary Report?

From: Lee, Raymond
Sent: Wednesday, November 16, 2016 11:16 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Cabinet Summary Report?

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But at least we have the version from the OMB package to work off of in case they ask for it later!

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To: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: RE: Cabinet Summary Report?

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From: Lee, Raymond
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To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Cabinet Summary Report?

Hi Dan,

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don't see a reference to the cabinet summary report (though based on its title, I'm thinking it's something similar or could be the same thing as the White House Weekly, where the Agency puts out short blurbs/summaries of things that could be coming down the pike in 2-3 weeks time).

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Subject: Cabinet Summary Report?

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In the Action Memo list of attachments, something called the "Cabinet Summary Report" is listed. Do you know what that is? Thanks.

Dan

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Just in case...
Date: Monday, January 09, 2017 11:20:11 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:23 PM
To: Collections.SubW
Subject: FW: Just in case...

From: Schultheisz, Daniel
Sent: Wednesday, November 16, 2016 5:04 PM
To: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: RE: Just in case...

One thing: does the FRL number stay the same as in the proposal? Sara thought it did. Thanks.

From: Lee, Raymond
Sent: Wednesday, November 16, 2016 3:51 PM
To: DeCair, Sara <DeCair.Sara@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Just in case...

Hi guys,

I'm going to be out of the office tomorrow on leave and then on Friday (compressed), but if there's any type of fire that needs to be put out for your rule packages feel free to call me on my cell (703-725-8367). I know I sent those verbatim instructions from OAR on submitting things electronically, but given that Sara and I heard back from Ruthie on some kinks I wanted to make sure I was available.

Dan, the only other thing you need to do when you submit is to get a CMS # from Rafie, Patricia or Candace. Once you're ready to send everything over to OAR/RMD, e-mail all the docs in the package to one of those three and they will upload everything into CMS and get a # to assign to the package.

Thanks and good luck!

Ray

Ray Lee | Center for Radiation Information and Outreach (CRIO) | US EPA | Phone 202.343.9463 | Fax 202.343.2305 | lee.raymond@epa.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Just in case...
Date: Monday, January 09, 2017 11:19:58 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:24 PM
To: Collections.SubW
Subject: FW: Just in case...

From: Schultheisz, Daniel
Sent: Thursday, November 17, 2016 8:00 AM
To: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: RE: Just in case...

On closer inspection, I see the instructions for the typesetting form do not require that to be filled in by the requestor. I started with a completed version that Sara had done for the PAGs back in February.

Also, I found newer (March) guidance on calculating typesetting cost. The formula is # pages (double-spaced, 12 point Times New Roman) divided by 4 times 3. Round up to the next whole number. That is the number of columns. Multiply that by $159.

The exception is if there are equations or images. Those pages would need to be calculated separately, depending on whether they are likely to spread over more than one column.

I saved and posted this document on the g: drive in the FR and correspondence folder.

From: Lee, Raymond
Sent: Wednesday, November 16, 2016 9:06 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Just in case...

Actually, I'm pretty sure the FRL # does not stay the same from proposed to final. That is something that the OFR puts in once it goes to them for publication. As long as you put in "FRL-XXXX-XX" the FR folks will fill in that number for you.

Thanks!

Ray

From: Schultheisz, Daniel
Sent: Wednesday, November 16, 2016 5:04:02 PM
To: Lee, Raymond
Subject: RE: Just in case...

One thing: does the FRL number stay the same as in the proposal? Sara thought it did. Thanks.

From: Lee, Raymond
Sent: Wednesday, November 16, 2016 3:51 PM

To: DeCair, Sara <DeCair.Sara@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Just in case...

Hi guys,

I'm going to be out of the office tomorrow on leave and then on Friday (compressed), but if there's any type of fire that needs to be put out for your rule packages feel free to call me on my cell (703-725-8367). I know I sent those verbatim instructions from OAR on submitting things electronically, but given that Sara and I heard back from Ruthie on some kinks I wanted to make sure I was available.

Dan, the only other thing you need to do when you submit is to get a CMS # from Rafie, Patricia or Candace. Once you're ready to send everything over to OAR/RMD, e-mail all the docs in the package to one of those three and they will upload everything into CMS and get a # to assign to the package.

Thanks and good luck!

Ray

Ray Lee | Center for Radiation Information and Outreach (CRIO) | US EPA | Phone 202.343.9463 | Fax 202.343.2305 | lee.raymond@epa.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Final Rule Package Submittal Question
Date: Monday, January 09, 2017 11:19:40 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:24 PM
To: Collections.SubW
Subject: FW: Final Rule Package Submittal Question

From: Schultheisz, Daniel
Sent: Thursday, November 17, 2016 8:22 AM
To: Morgan, Ruthw <morgan.ruthw@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
Subject: Final Rule Package Submittal Question

Ruth and Wendy:

I am hoping to get the final rule package for the Subpart W NESHAP submitted to OAR on Friday. Ray Lee is out today and tomorrow, so I wanted to check a couple of things based on our recent experience with the PAG package.

I will send everything to you electronically. Do you also want a hardcopy? We may provide one separately to Carissa so that Janet can have it on the weekend.

At the same time, my understanding is that we need to enter the package into CMS. Then we get a CMS number. Do I need to send that number to you after we get it?

Does the package still need to include a letter/memo to the FR certifying that the electronic version is a true copy of the printed version? The ADP Library says "Please note that a certification memo is no longer necessary, and we discourage programs, offices, and regions from sending materials other than what is required." I believe the FR Cover Form may have supplanted this memo.

Thanks very much for your assistance.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: got your message
Date: Monday, January 09, 2017 11:19:26 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:24 PM
To: Collections.SubW
Subject: FW: got your message

From: Seidman, Emily
Sent: Thursday, November 17, 2016 8:34 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: got your message

Thanks for the update. Keep me posted on progress and anything I can review to help with the package.

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: DRAFT 2016-11-17 Technical Direction.doc
Date:	Monday, January 09, 2017 11:19:16 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:25 PM
To: Collections.SubW
Subject: FW: DRAFT 2016-11-17 Technical Direction.doc

From: Egidi, Philip
Sent: Thursday, November 17, 2016 9:39 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: DRAFT 2016-11-17 Technical Direction.doc

You mention an attachment from the Preamble. Do you know what pages I should pull and attach?
PVE

Philip Egidi
Environmental Scientist
U.S. Environmental Protection Agency
Radiation Protection Division
Washington, DC
(202) 343-9186 (work)
(970) 209-2885 (Cell)

"The health of the people is the highest law."
Cicero (106 - 43 BC)

From: Schultheisz, Daniel
Sent: Thursday, November 17, 2016 9:32 AM
To: Egidi, Philip <Egidi.Philip@epa.gov>
Subject: RE: DRAFT 2016-11-17 Technical Direction.doc

Revisions attached. Thanks.

From: Egidi, Philip
Sent: Wednesday, November 16, 2016 5:13 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: DRAFT 2016-11-17 Technical Direction.doc

Please look this over and add necessary detail as you see fit.
We can transmit on Thursday…
PVE

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: DRAFT 2016-11-17 Technical Direction.doc
Date:	Monday, January 09, 2017 11:19:05 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:25 PM
To: Collections.SubW
Subject: FW: DRAFT 2016-11-17 Technical Direction.doc

From: Schultheisz, Daniel
Sent: Thursday, November 17, 2016 9:40 AM
To: Egidi, Philip <Egidi.Philip@epa.gov>
Subject: RE: DRAFT 2016-11-17 Technical Direction.doc

What I sent you yesterday in the email. That is from the preamble section on impacts.

From: Egidi, Philip
Sent: Thursday, November 17, 2016 9:39 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: DRAFT 2016-11-17 Technical Direction.doc

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Philip Egidi
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U.S. Environmental Protection Agency
Radiation Protection Division
Washington, DC
(202) 343-9186 (work)
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To:	Thornton, Marisa
Subject:	Fw: DRAFT 2016-11-17 Technical Direction.doc
Date:	Monday, January 09, 2017 11:18:48 AM

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Sent: Thursday, December 22, 2016 3:25 PM
To: Collections.SubW
Subject: FW: DRAFT 2016-11-17 Technical Direction.doc

From: Egidi, Philip
Sent: Thursday, November 17, 2016 9:41 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: DRAFT 2016-11-17 Technical Direction.doc

I knew that; was just checking up on you…not
PVE

Philip Egidi
Environmental Scientist
U.S. Environmental Protection Agency
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Washington, DC
(202) 343-9186 (work)
(970) 209-2885 (Cell)

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To: Egidi, Philip <Egidi.Philip@epa.gov>
Subject: RE: DRAFT 2016-11-17 Technical Direction.doc

Our secret.

From: Egidi, Philip
Sent: Thursday, November 17, 2016 9:41 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: DRAFT 2016-11-17 Technical Direction.doc

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Please look this over and add necessary detail as you see fit.
We can transmit on Thursday…
PVE

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Communications Plan
Date: Monday, January 09, 2017 11:18:26 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:29 PM
To: Collections.SubW
Subject: FW: Communications Plan

From: Nesky, Anthony
Sent: Thursday, November 17, 2016 6:41 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Communications Plan

I couldn't find it in the Docket. I know I never put it in there.

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov

From: Schultheisz, Daniel
Sent: Tuesday, November 15, 2016 10:04 AM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Subject: Fwd: Communications Plan

Can you also search the docket to see if it includes the draft Information Collection Request? I have a listing you sent me a while back, but I truncated and deleted columns to print it. I don't see it, but can't be sure. Thanks.

Sent from my iPhone

Begin forwarded message:

> **From:** "Schultheisz, Daniel" <Schultheisz.Daniel@epa.gov>
> **Date:** November 15, 2016 at 9:39:49 AM EST
> **To:** "Nesky, Anthony" <Nesky.Tony@epa.gov>
> **Subject: Fwd: Communications Plan**
>
> Please also see if we have a draft desk statement/press release. Thanks.
>
> Sent from my iPhone

Begin forwarded message:

From: <Schultheisz.Daniel@epa.gov>
Date: November 15, 2016 at 8:11:30 AM EST
To: <Nesky.Tony@epa.gov>
Subject: Communications Plan

Tony:

Can you take a look at the Subpart W communications plan and see what needs updating? The version that went with the proposal is probably on the G: drive, but I'm not sure where. You may also have that version. Thanks.

Dan

Sent from my iPhone

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.
Date:	Monday, January 09, 2017 11:18:09 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:30 PM
To: Collections.SubW
Subject: FW: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

From: Cyran, Carissa
Sent: Friday, November 18, 2016 1:33 PM
To: Perrin, Alan <Perrin.Alan@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Adding Daniel

On Nov 18, 2016, at 11:54 AM, Cyran, Carissa <Cyran.Carissa@epa.gov> wrote:

> Just an FYI. I believe ORIA is sending Subpart W up today. Please make sure to send all material to Ruth and Wendy for the formal package.
>
> ---
>
> **From:** Cyran, Carissa
> **Sent:** Friday, November 18, 2016 9:42 AM
> **To:** Koerber, Mike <Koerber.Mike@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Rush, Alan <Rush.Alan@epa.gov>; Krieger, Jackie <Krieger.Jackie@epa.gov>; Clarke, Deirdre <clarke.deirdre@epa.gov>; VonDemHagen, Rebecca <VonDemHagen.Rebecca@epa.gov>; White, Rick <White.Rick@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Walters, Margaret <Walters.Margaret@epa.gov>; Saltman, Tamara <Saltman.Tamara@epa.gov>; South, Peter <South.Peter@epa.gov>; Millett, John <Millett.John@epa.gov>; Drinkard, Andrea <Drinkard.Andrea@epa.gov>; McMichael, Nate <McMichael.Nate@epa.gov>; Henigin, Mary <Henigin.Mary@epa.gov>; DeMocker, Jim <DeMocker.Jim@epa.gov>; Hyde, Courtney <Hyde.Courtney@epa.gov>
> **Cc:** Lewis, Josh <Lewis.Josh@epa.gov>; Washington, Yvette <Washington.Yvette@epa.gov>

Subject: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Good morning and happy Friday!

Please send all reading and Monday briefing material by **3:00 today**. Janet currently has the following meeting scheduled tomorrow –

10:00 am RFS Hearing Prep **(OTAQ)**
11:00 am Conference Call with United Steel Workers re: RINS **(OTAQ)**
1:00 pm CSAPR Update **(OAP)**
3:00 pm Conference Call with State Commissioners re: Proposed Refinements to CAA Section 105 Grant Allocation Methodology

As I mentioned earlier this week Janet will be working from home all of next week. We will do nightly e-folders for any additional reading and briefing material.

Thank you,

Carissa

Carissa Cyran
Office of Air and Radiation
U.S. Environmental Protection Agency
Phone: (202) 564-5437

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.
Date:	Monday, January 09, 2017 11:17:48 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:30 PM
To: Collections.SubW
Subject: FW: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

From: Schultheisz, Daniel
Sent: Friday, November 18, 2016 1:43 PM
To: Cyran, Carissa <Cyran.Carissa@epa.gov>
Subject: RE: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Carissa:

I have the package ready to go, including a hardcopy that I was planning to drop off with you. It includes the original Action Memo on letterhead for Janet's signature. Does that work for you? If so, I will send the electronic versions to Ruth and Wendy, and walk over the package to you (and one for them as well, since we've been getting some mixed messages about whether they want one).

Let me know. Thanks.

Dan

From: Cyran, Carissa
Sent: Friday, November 18, 2016 1:33 PM
To: Perrin, Alan <Perrin.Alan@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Adding Daniel

On Nov 18, 2016, at 11:54 AM, Cyran, Carissa <Cyran.Carissa@epa.gov> wrote:

Just an FYI. I believe ORIA is sending Subpart W up today. Please make sure to send all material to Ruth and Wendy for the formal package.

From: Cyran, Carissa
Sent: Friday, November 18, 2016 9:42 AM
To: Koerber, Mike <Koerber.Mike@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Rush, Alan <Rush.Alan@epa.gov>; Krieger, Jackie <Krieger.Jackie@epa.gov>; Clarke, Deirdre <clarke.deirdre@epa.gov>; VonDemHagen, Rebecca <VonDemHagen.Rebecca@epa.gov>; White, Rick <White.Rick@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Walters, Margaret <Walters.Margaret@epa.gov>; Saltman, Tamara <Saltman.Tamara@epa.gov>; South, Peter <South.Peter@epa.gov>; Millett, John <Millett.John@epa.gov>; Drinkard, Andrea <Drinkard.Andrea@epa.gov>; McMichael, Nate <McMichael.Nate@epa.gov>; Henigin, Mary <Henigin.Mary@epa.gov>; DeMocker, Jim <DeMocker.Jim@epa.gov>; Hyde, Courtney <Hyde.Courtney@epa.gov>
Cc: Lewis, Josh <Lewis.Josh@epa.gov>; Washington, Yvette <Washington.Yvette@epa.gov>
Subject: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Good morning and happy Friday!

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Carissa

Carissa Cyran
Office of Air and Radiation
U.S. Environmental Protection Agency
Phone: (202) 564-5437

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.
Date:	Monday, January 09, 2017 11:17:28 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:31 PM
To: Collections.SubW
Subject: FW: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

From: Cyran, Carissa
Sent: Friday, November 18, 2016 1:49 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Thank you Dan!

You can give them the package and they will pull together the routing slip. Can you make sure to send the files to Josh and I? We will send Janet the files electronically since she is working from home next week.

On Nov 18, 2016, at 1:42 PM, Schultheisz, Daniel <Schultheisz.Daniel@epa.gov> wrote:

> Carissa:
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> I have the package ready to go, including a hardcopy that I was planning to drop off with you. It includes the original Action Memo on letterhead for Janet's signature. Does that work for you? If so, I will send the electronic versions to Ruth and Wendy, and walk over the package to you (and one for them as well, since we've been getting some mixed messages about whether they want one).
>
> Let me know. Thanks.
>
> Dan
>
> ---
>
> **From:** Cyran, Carissa
> **Sent:** Friday, November 18, 2016 1:33 PM

To: Perrin, Alan <Perrin.Alan@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Adding Daniel

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> **Sent:** Friday, November 18, 2016 9:42 AM
> **To:** Koerber, Mike <Koerber.Mike@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Rush, Alan <Rush.Alan@epa.gov>; Krieger, Jackie <Krieger.Jackie@epa.gov>; Clarke, Deirdre <clarke.deirdre@epa.gov>; VonDemHagen, Rebecca <VonDemHagen.Rebecca@epa.gov>; White, Rick <White.Rick@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Walters, Margaret <Walters.Margaret@epa.gov>; Saltman, Tamara <Saltman.Tamara@epa.gov>; South, Peter <South.Peter@epa.gov>; Millett, John <Millett.John@epa.gov>; Drinkard, Andrea <Drinkard.Andrea@epa.gov>; McMichael, Nate <McMichael.Nate@epa.gov>; Henigin, Mary <Henigin.Mary@epa.gov>; DeMocker, Jim <DeMocker.Jim@epa.gov>; Hyde, Courtney <Hyde.Courtney@epa.gov>
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Carissa Cyran
Office of Air and Radiation
U.S. Environmental Protection Agency
Phone: (202) 564-5437

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To:	Thornton, Marisa
Subject:	Fw: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.
Date:	Monday, January 09, 2017 11:17:14 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:31 PM
To: Collections.SubW
Subject: FW: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

From: Schultheisz, Daniel
Sent: Friday, November 18, 2016 1:50 PM
To: Cyran, Carissa <Cyran.Carissa@epa.gov>
Subject: RE: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Will do.

From: Cyran, Carissa
Sent: Friday, November 18, 2016 1:49 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

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> **Cc:** Lewis, Josh <Lewis.Josh@epa.gov>; Washington, Yvette <Washington.Yvette@epa.gov>
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Thank you,

Carissa

Carissa Cyran
Office of Air and Radiation
U.S. Environmental Protection Agency
Phone: (202) 564-5437

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Final Rule Package for NESHAP Subpart W - SAN 5281RIN 2060 AP26
Date: Monday, January 09, 2017 11:17:00 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:32 PM
To: Collections.SubW
Subject: FW: Final Rule Package for NESHAP Subpart W - SAN 5281RIN 2060 AP26

From: Morgan, Ruthw
Sent: Friday, November 18, 2016 2:01 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Final Rule Package for NESHAP Subpart W - SAN 5281RIN 2060 AP26

Thanks!!! We are here to accept the package and cms number when you bring it over. Have a great day!!! Ruthw Morgan – 202 564-1326

From: Schultheisz, Daniel
Sent: Friday, November 18, 2016 1:54 PM
To: Morgan, Ruthw <morgan.ruthw@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Holden, Patricia <Holden.Patricia@epa.gov>; Marbury, Candice <Marbury.Candice@epa.gov>; Cyran, Carissa <Cyran.Carissa@epa.gov>; Lewis, Josh <Lewis.Josh@epa.gov>
Subject: Final Rule Package for NESHAP Subpart W - SAN 5281RIN 2060 AP26

Ruth and Wendy:

Attached are the files for the Subpart W final rule package. The files include:

- Transmittal memo from ORIA to OAR, recommending Janet's signature on the Action Memo;
- Action Memo for Janet's signature, with attachments;
  - Final preamble/rule
  - Background Information Document/Economic Impact Analysis
  - Fact Sheet
  - Questions and Answers
  - Action Information
  - Desk Statement
  - Information Collection Request (Supporting Statement and Submission Worksheet)

- Federal Register Typesetting Request and Cover Form

I also have a hardcopy that I will bring over. It includes the original signed transmittal memo and the Action Memo on letterhead.

We will also have the files entered into CMS and get you the CMS number.

Please let me know if you need anything else. Thanks.

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.
Date:	Monday, January 09, 2017 11:16:47 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:32 PM
To: Collections.SubW
Subject: FW: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

From: Schultheisz, Daniel
Sent: Friday, November 18, 2016 2:31 PM
To: Cyran, Carissa <Cyran.Carissa@epa.gov>
Subject: RE: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Ruth has the hardcopy package.

From: Cyran, Carissa
Sent: Friday, November 18, 2016 1:49 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Thank you Dan!

You can give them the package and they will pull together the routing slip. Can you make sure to send the files to Josh and I? We will send Janet the files electronically since she is working from home next week.

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Let me know. Thanks.

Dan

From: Cyran, Carissa
Sent: Friday, November 18, 2016 1:33 PM
To: Perrin, Alan <Perrin.Alan@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Re: Please send all reading and Monday briefing material by 3:00 today. FYI Janet will be working from all of next week.

Adding Daniel

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> **From:** Cyran, Carissa
> **Sent:** Friday, November 18, 2016 9:42 AM
> **To:** Koerber, Mike <Koerber.Mike@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Rush, Alan <Rush.Alan@epa.gov>; Krieger, Jackie <Krieger.Jackie@epa.gov>; Clarke, Deirdre <clarke.deirdre@epa.gov>; VonDemHagen, Rebecca <VonDemHagen.Rebecca@epa.gov>; White, Rick <White.Rick@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Walters, Margaret <Walters.Margaret@epa.gov>; Saltman, Tamara <Saltman.Tamara@epa.gov>; South, Peter <South.Peter@epa.gov>; Millett, John <Millett.John@epa.gov>; Drinkard, Andrea <Drinkard.Andrea@epa.gov>; McMichael, Nate <McMichael.Nate@epa.gov>; Henigin, Mary <Henigin.Mary@epa.gov>; DeMocker, Jim <DeMocker.Jim@epa.gov>; Hyde, Courtney <Hyde.Courtney@epa.gov>
> **Cc:** Lewis, Josh <Lewis.Josh@epa.gov>; Washington, Yvette <Washington.Yvette@epa.gov>
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Thank you,

Carissa

Carissa Cyran
Office of Air and Radiation
U.S. Environmental Protection Agency
Phone: (202) 564-5437

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Fact sheet attached
Date: Monday, January 09, 2017 11:16:31 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:32 PM
To: Collections.SubW
Subject: FW: Fact sheet attached

From: Schultheisz, Daniel
Sent: Friday, November 18, 2016 2:38 PM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Cc: White, Rick <White.Rick@epa.gov>
Subject: RE: Fact sheet attached

Great. Thanks. The package has gone!

From: Nesky, Anthony
Sent: Friday, November 18, 2016 12:58 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Cc: White, Rick <White.Rick@epa.gov>
Subject: Fact sheet attached

Here's the final fact sheet.

Sent from my iPhone

Begin forwarded message:

> **From:** Ray Bowman <rbowman@scgcorp.com>
> **Date:** November 18, 2016 at 12:29:42 PM EST
> **To:** "Nesky, Anthony" <Nesky.Tony@epa.gov>
> **Cc:** Marisa Thornton <Thornton.Marisa@epa.gov>, Joanna Mandecki <jmandecki@scgcorp.com>
> **Subject: RE: Another Fast Turnaround TD: Finalize previously delivered Subpart W Fact Sheet**
>
> Hi Tony,
>
> Attached, please find the updated Subpart W factsheet in pdf form. If there are no

further changes to this factsheet, we can also provide you with the editable InDesign files for your records.

Thanks,
Ray

From: Nesky, Anthony [mailto:Nesky.Tony@epa.gov]
Sent: Thursday, November 17, 2016 3:56 PM
To: Ray Bowman <rbowman@scgcorp.com>
Cc: Marisa Thornton <Thornton.Marisa@epa.gov>
Subject: RE: Another Fast Turnaround TD: Finalize previously delivered Subpart W Fact Sheet

Thanks—I appreciate your effort on this.

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov

From: Ray Bowman [mailto:rbowman@scgcorp.com]
Sent: Thursday, November 17, 2016 3:55 PM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Cc: Thornton, Marisa <Thornton.Marisa@epa.gov>
Subject: RE: Another Fast Turnaround TD: Finalize previously delivered Subpart W Fact Sheet

Hi Tony,

Thank you for sending over these edits to the Subpart W Factsheet. We will make these changes and send a final PDF to you for review tomorrow.

Thanks,
Ray

From: Nesky, Anthony [mailto:Nesky.Tony@epa.gov]
Sent: Thursday, November 17, 2016 1:26 PM
To: Ray Bowman <rbowman@scgcorp.com>
Cc: Marisa Thornton <Thornton.Marisa@epa.gov>
Subject: Another Fast Turnaround TD: Finalize previously delivered Subpart W Fact Sheet
Importance: High

Dear Ray:

We are ready to finalize the Subpart W Fact Sheet on a fast turnaround. We would like to get it as soon as possible tomorrow. If you need to push the due date back on the other fact sheet (the one with the figures), we can do that.

I would greatly appreciate any effort you can make to deliver the final Subpart W fact sheet tomorrow, but if I am not giving you enough lead time, just let me know what date you can make. There will be no negative reaction from me.

TD and mark-up of previously delivered fact sheet are attached.

Please feel free to call me if you need clarification on the edits.

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W signature package went to OAR
Date: Monday, January 09, 2017 11:16:20 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:32 PM
To: Collections.SubW
Subject: FW: Subpart W signature package went to OAR

From: Schultheisz, Daniel
Sent: Friday, November 18, 2016 2:46 PM
To: Johnson, Ann <Johnson.Ann@epa.gov>
Subject: Subpart W signature package went to OAR

It may get to OP next week, but given holiday and other things going on, I cannot guarantee it. Janet will be working remotely next week but we expect her to have the package for review. Thanks.

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W signature package went to OAR
Date: Monday, January 09, 2017 11:16:04 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:32 PM
To: Collections.SubW
Subject: FW: Subpart W signature package went to OAR

From: Johnson, Ann
Sent: Friday, November 18, 2016 2:53 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Subpart W signature package went to OAR

I very much appreciate your keeping me up to date.

From: Schultheisz, Daniel
Sent: Friday, November 18, 2016 2:46 PM
To: Johnson, Ann <Johnson.Ann@epa.gov>
Subject: Subpart W signature package went to OAR

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From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Final Rule Package for NESHAP Subpart W - SAN 5281RIN 2060 AP26
Date:	Monday, January 09, 2017 11:15:50 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:33 PM
To: Collections.SubW
Subject: FW: Final Rule Package for NESHAP Subpart W - SAN 5281RIN 2060 AP26

From: Schultheisz, Daniel
Sent: Friday, November 18, 2016 4:02 PM
To: Morgan, Ruthw <morgan.ruthw@epa.gov>
Cc: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Subject: RE: Final Rule Package for NESHAP Subpart W - SAN 5281RIN 2060 AP26

We're having some trouble loading the documents into CMS. Rafie may end up calling the help desk. We'll let you know when it is done. Thanks.

From: Morgan, Ruthw
Sent: Friday, November 18, 2016 2:01 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Final Rule Package for NESHAP Subpart W - SAN 5281RIN 2060 AP26

Thanks!!! We are here to accept the package and cms number when you bring it over. Have a great day!!! Ruthw Morgan – 202 564-1326

From: Schultheisz, Daniel
Sent: Friday, November 18, 2016 1:54 PM
To: Morgan, Ruthw <morgan.ruthw@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Holden, Patricia <Holden.Patricia@epa.gov>; Marbury, Candice <Marbury.Candice@epa.gov>; Cyran, Carissa <Cyran.Carissa@epa.gov>; Lewis, Josh <Lewis.Josh@epa.gov>
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Ruth and Wendy:

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U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Subpart W comments doc
Date: Monday, January 09, 2017 11:15:33 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:34 PM
To: Collections.SubW
Subject: FW: Subpart W comments doc

From: Shogren, Angela
Sent: Monday, November 21, 2016 12:19 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Subpart W comments doc

Hi Dan,
Can you please send me all of the sections for the Subpart W comments document that you referenced last week? I'd like to get started on a draft for you to look at...

Thanks!

Angela Shogren
Public Affairs Specialist
Radiation Protection Division
U.S. Environmental Protection Agency Tel (202) 343-9761
Shogren.Angela@epa.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: SAN#5281 Final Rule Package for NESHAP Subpart W
Date: Monday, January 09, 2017 11:15:23 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:35 PM
To: Collections.SubW
Subject: FW: SAN#5281 Final Rule Package for NESHAP Subpart W

From: Cyran, Carissa
Sent: Monday, November 21, 2016 4:04 PM
To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
Cc: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>; Perrin, Alan <Perrin.Alan@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

I have the hard copies. This package was pulled together on Friday.

From: Mcquilkin, Wendy
Sent: Monday, November 21, 2016 3:56 PM
To: Cyran, Carissa <Cyran.Carissa@epa.gov>
Cc: Shaw, Betsy <Shaw.Betsy@epa.gov>; Goffman, Joseph <Goffman.Joseph@epa.gov>; Knapp, Kristien <Knapp.Kristien@epa.gov>; Lewis, Josh <Lewis.Josh@epa.gov>; Owens, Nicole <Owens.Nicole@epa.gov>; Adams, Darryl <Adams.Darryl@epa.gov>; Jutras, Nathaniel <Jutras.Nathaniel@epa.gov>; Muellerleile, Caryn <Muellerleile.Caryn@epa.gov>; Pritchard, Eileen <Pritchard.Eileen@epa.gov>; Saltman, Tamara <Saltman.Tamara@epa.gov>; Eagles, Tom <Eagles.Tom@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>; Millett, John <Millett.John@epa.gov>; Drinkard, Andrea <Drinkard.Andrea@epa.gov>; Gaines, Cynthia <Gaines.Cynthia@epa.gov>; Hamilton, Sabrina <Hamilton.Sabrina@epa.gov>; Faulkner, Martha <Faulkner.Martha@epa.gov>; Matthews, Barbara <Matthews.Barbara@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Morris, Joseph <Morris.Joseph@epa.gov>; Morris, Stephanie <Morris.Stephanie@epa.gov>; Brooks, Patricia <Brooks.Patricia@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Holden, Patricia <Holden.Patricia@epa.gov>; Marbury, Candice <Marbury.Candice@epa.gov>
Subject: SAN#5281 Final Rule Package for NESHAP Subpart W

OOPS! QUICK FINGERS – The previous email was not sent to all the individuals. Still awaiting the hardcopies and CMS#

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

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: SAN#5281 Final Rule Package for NESHAP Subpart W
Date: Monday, January 09, 2017 11:15:06 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:35 PM
To: Collections.SubW
Subject: FW: SAN#5281 Final Rule Package for NESHAP Subpart W

-----Original Message-----
From: Schultheisz, Daniel
Sent: Monday, November 21, 2016 4:07 PM
To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
Cc: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W

Wendy:

I dropped off a hard copy with Ruth on Friday. Do you need another? The CMS number also went on Friday, although the files did not get loaded until this morning. Rafie?

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349
Sent from my iPhone

> On Nov 21, 2016, at 3:56 PM, Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov> wrote:
>
> OOPS! QUICK FINGERS – The previous email was not sent to all the
> individuals. Still awaiting the hardcopies and CMS# TO THE IMMEDIATE OFFICE FOR REVIEW AND CONCURRENCE ON THE ADMINISTRATOR'S SIGNATURE PACKAGE.
>
> <Factsheet_Subpart W_Nov_P9.pdf>
> <fr cover form Subpart W 11172016.pdf> <FR Typesetting Request.pdf>
> <NESHAP Subpart W 2060 AP26 Final Rule BID-EIA_20160607.docx> <NESHAP
> Subpart W 2060 AP26 Final Rule FRN_20161116.docx> <Qs And As for
> Subpart W--final.docx> <Subpart W Action Information 11-16-2016.doc>
> <Subpart W icr-submission-worksheet 11182016.xlsx> <SubpartW-Desk
> Statement-final..docx> <Support Stm Final Subpart W draft
> 11172016.docx> <Transmittal memo ORIA to OAR.pdf>

> <W_action-memo_draft_11172016_clean.docx>

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: NESHAP Pkg
Date: Monday, January 09, 2017 11:14:53 AM
Importance: High

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:35 PM
To: Collections.SubW
Subject: FW: NESHAP Pkg

From: Ferguson, Rafaela
Sent: Monday, November 21, 2016 4:12 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: NESHAP Pkg
Importance: High

Dan,

I was on the phone with Wendy when you sent your email. I gave her all of the info re CMS # and SAN #. Ruth is not in the office today but Carissa just confirmed that she has the hardcopy package you delivered to her on Friday. Everything is good.

Rafie

Rafaela Ferguson
Special Assistant/Regional Coordinator
Radiation Protection Division
Office of Radiation and Indoor Air
Tel: 202-343-9362
Email: ferguson.rafaela@epa.gov
Fax: 202-343-2304

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: SAN#5281 Final Rule Package for NESHAP Subpart W
Date: Monday, January 09, 2017 11:14:41 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:35 PM
To: Collections.SubW
Subject: FW: SAN#5281 Final Rule Package for NESHAP Subpart W

-----Original Message-----
From: Ferguson, Rafaela
Sent: Monday, November 21, 2016 4:14 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

Dan,

Everything's OK See my email message. I think your message crossed paths with mine to you.

Rafie

-----Original Message-----
From: Schultheisz, Daniel
Sent: Monday, November 21, 2016 4:07 PM
To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
Cc: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W

Wendy:

I dropped off a hard copy with Ruth on Friday. Do you need another? The CMS number also went on Friday, although the files did not get loaded until this morning. Rafie?

Dan Schultheisz
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Protection Division
(202) 343-9349
Sent from my iPhone

> On Nov 21, 2016, at 3:56 PM, Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov> wrote:

>
> OOPS! QUICK FINGERS – The previous email was not sent to all the
> individuals. Still awaiting the hardcopies and CMS# TO THE IMMEDIATE OFFICE FOR REVIEW AND CONCURRENCE ON THE ADMINISTRATOR'S SIGNATURE PACKAGE.
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> Subpart W 2060 AP26 Final Rule FRN_20161116.docx> <Qs And As for
> Subpart W--final.docx> <Subpart W Action Information 11-16-2016.doc>
> <Subpart W icr-submission-worksheet 11182016.xlsx> <SubpartW-Desk
> Statement-final..docx> <Support Stm Final Subpart W draft
> 11172016.docx> <Transmittal memo ORIA to OAR.pdf>
> <W_action-memo_draft_11172016_clean.docx>

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: SAN#5281 Final Rule Package for NESHAP Subpart W
Date: Monday, January 09, 2017 11:14:27 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:35 PM
To: Collections.SubW
Subject: FW: SAN#5281 Final Rule Package for NESHAP Subpart W

-----Original Message-----
From: Schultheisz, Daniel
Sent: Monday, November 21, 2016 4:15 PM
To: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W

Got it. Thanks.

Sent from my iPhone

> On Nov 21, 2016, at 4:14 PM, Ferguson, Rafaela <Ferguson.Rafaela@epa.gov> wrote:
>
> Dan,
>
> Everything's OK See my email message. I think your message crossed paths with mine to you.
>
> Rafie
>
> -----Original Message-----
> From: Schultheisz, Daniel
> Sent: Monday, November 21, 2016 4:07 PM
> To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
> Cc: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Lee, Raymond
> <Lee.Raymond@epa.gov>
> Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W
>
> Wendy:
>
> I dropped off a hard copy with Ruth on Friday. Do you need another? The CMS number also went on Friday, although the files did not get loaded until this morning. Rafie?
>
> Dan Schultheisz

> U.S. Environmental Protection Agency
> Office of Radiation and Indoor Air
> Radiation Protection Division
> (202) 343-9349
> Sent from my iPhone
>
>> On Nov 21, 2016, at 3:56 PM, Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov> wrote:
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>> Statement-final..docx> <Support Stm Final Subpart W draft
>> 11172016.docx> <Transmittal memo ORIA to OAR.pdf>
>> <W_action-memo_draft_11172016_clean.docx>

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: SAN#5281 Final Rule Package for NESHAP Subpart W
Date: Monday, January 09, 2017 11:14:14 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:36 PM
To: Collections.SubW
Subject: FW: SAN#5281 Final Rule Package for NESHAP Subpart W

-----Original Message-----
From: Mcquilkin, Wendy
Sent: Monday, November 21, 2016 4:16 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

It's all sorted out now. I heard from Carissa. I am out on Friday's and Ruth is out on Monday's. Cross communication.

-----Original Message-----
From: Schultheisz, Daniel
Sent: Monday, November 21, 2016 4:15 PM
To: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W

Got it. Thanks.

Sent from my iPhone

> On Nov 21, 2016, at 4:14 PM, Ferguson, Rafaela <Ferguson.Rafaela@epa.gov> wrote:
>
> Dan,
>
> Everything's OK See my email message. I think your message crossed paths with mine to you.
>
> Rafie
>
> -----Original Message-----
> From: Schultheisz, Daniel
> Sent: Monday, November 21, 2016 4:07 PM
> To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>

> Cc: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Lee, Raymond
> <Lee.Raymond@epa.gov>
> Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W
>
> Wendy:
>
> I dropped off a hard copy with Ruth on Friday. Do you need another? The CMS number also went on Friday, although the files did not get loaded until this morning. Rafie?
>
> Dan Schultheisz
> U.S. Environmental Protection Agency
> Office of Radiation and Indoor Air
> Radiation Protection Division
> (202) 343-9349
> Sent from my iPhone
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>> On Nov 21, 2016, at 3:56 PM, Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov> wrote:
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>> individuals. Still awaiting the hardcopies and CMS# TO THE IMMEDIATE OFFICE FOR REVIEW AND CONCURRENCE ON THE ADMINISTRATOR'S SIGNATURE PACKAGE.
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>> 11172016.docx> <Transmittal memo ORIA to OAR.pdf>
>> <W_action-memo_draft_11172016_clean.docx>

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: RTC Section 12 (General)
Date: Monday, January 09, 2017 11:14:02 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:36 PM
To: Collections.SubW
Subject: FW: RTC Section 12 (General)

From: Seidman, Emily
Sent: Monday, November 21, 2016 4:38 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: RTC Section 12 (General)

Thanks for sending this over. I'll try to get this back to you tomorrow. I'll be in the office tomorrow. On Wednesday, I'll be working remotely and can be reached at 646-354-9254.

Emily Seidman | US EPA | Office of General Counsel | Air and Radiation Law Office | Mail Code 2344A | WJCN 7502A | phone: (202) 564-0906

From: Schultheisz, Daniel
Sent: Monday, November 21, 2016 4:36 PM
To: Seidman, Emily <seidman.emily@epa.gov>
Subject: RTC Section 12 (General)

This one was a real grind. Only the out of scope left. Thanks.

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: SAN#5281 Final Rule Package for NESHAP Subpart W
Date: Monday, January 09, 2017 11:13:50 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:36 PM
To: Collections.SubW
Subject: FW: SAN#5281 Final Rule Package for NESHAP Subpart W

-----Original Message-----
From: Morgan, Ruthw
Sent: Tuesday, November 22, 2016 8:53 AM
To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Cyran, Carissa <Cyran.Carissa@epa.gov>; Morris, Joseph <Morris.Joseph@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

11/22/16
Dan,

Your package did go forward for review by the Immediate office on Friday, we took care of it then, Friday at 4:49pm, under Joseph Morris. See email on that day from him to Caressa.. Thanks!!!

Ruthw Morgan - 202 564-1326

-----Original Message-----
From: Mcquilkin, Wendy
Sent: Monday, November 21, 2016 4:16 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

It's all sorted out now. I heard from Carissa. I am out on Friday's and Ruth is out on Monday's. Cross communication.

-----Original Message-----
From: Schultheisz, Daniel
Sent: Monday, November 21, 2016 4:15 PM
To: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W

Got it. Thanks.

Sent from my iPhone

> On Nov 21, 2016, at 4:14 PM, Ferguson, Rafaela <Ferguson.Rafaela@epa.gov> wrote:
>
> Dan,
>
> Everything's OK See my email message. I think your message crossed paths with mine to you.
>
> Rafie
>
> -----Original Message-----
> From: Schultheisz, Daniel
> Sent: Monday, November 21, 2016 4:07 PM
> To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
> Cc: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Lee, Raymond
> <Lee.Raymond@epa.gov>
> Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W
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> Wendy:
>
> I dropped off a hard copy with Ruth on Friday. Do you need another? The CMS number also went on Friday, although the files did not get loaded until this morning. Rafie?
>
> Dan Schultheisz
> U.S. Environmental Protection Agency
> Office of Radiation and Indoor Air
> Radiation Protection Division
> (202) 343-9349
> Sent from my iPhone
>
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>> 11172016.docx> <Transmittal memo ORIA to OAR.pdf>
>> <W_action-memo_draft_11172016_clean.docx>

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: SAN#5281 Final Rule Package for NESHAP Subpart W
Date: Monday, January 09, 2017 11:13:38 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:36 PM
To: Collections.SubW
Subject: FW: SAN#5281 Final Rule Package for NESHAP Subpart W

-----Original Message-----
From: Schultheisz, Daniel
Sent: Tuesday, November 22, 2016 9:05 AM
To: Morgan, Ruthw <morgan.ruthw@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Cyran, Carissa <Cyran.Carissa@epa.gov>; Morris, Joseph <Morris.Joseph@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

Yes, I did see that. Let me know if you need anything else. Thanks.

-----Original Message-----
From: Morgan, Ruthw
Sent: Tuesday, November 22, 2016 8:53 AM
To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Cyran, Carissa <Cyran.Carissa@epa.gov>; Morris, Joseph <Morris.Joseph@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

11/22/16
Dan,

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Ruthw Morgan - 202 564-1326

-----Original Message-----
From: Mcquilkin, Wendy
Sent: Monday, November 21, 2016 4:16 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>

Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

It's all sorted out now. I heard from Carissa. I am out on Friday's and Ruth is out on Monday's. Cross communication.

-----Original Message-----
From: Schultheisz, Daniel
Sent: Monday, November 21, 2016 4:15 PM
To: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W

Got it. Thanks.

Sent from my iPhone

> On Nov 21, 2016, at 4:14 PM, Ferguson, Rafaela <Ferguson.Rafaela@epa.gov> wrote:
>
> Dan,
>
> Everything's OK See my email message. I think your message crossed paths with mine to you.
>
> Rafie
>
> -----Original Message-----
> From: Schultheisz, Daniel
> Sent: Monday, November 21, 2016 4:07 PM
> To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
> Cc: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Lee, Raymond
> <Lee.Raymond@epa.gov>
> Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W
>
> Wendy:
>
> I dropped off a hard copy with Ruth on Friday. Do you need another? The CMS number also went on Friday, although the files did not get loaded until this morning. Rafie?
>
> Dan Schultheisz
> U.S. Environmental Protection Agency
> Office of Radiation and Indoor Air
> Radiation Protection Division
> (202) 343-9349
> Sent from my iPhone
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>> On Nov 21, 2016, at 3:56 PM, Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov> wrote:
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>> OOPS! QUICK FINGERS - The previous email was not sent to all the
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From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: SAN#5281 Final Rule Package for NESHAP Subpart W
Date: Monday, January 09, 2017 11:13:28 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:36 PM
To: Collections.SubW
Subject: FW: SAN#5281 Final Rule Package for NESHAP Subpart W

-----Original Message-----
From: Morgan, Ruthw
Sent: Tuesday, November 22, 2016 9:08 AM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Cyran, Carissa <Cyran.Carissa@epa.gov>; Morris, Joseph <Morris.Joseph@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

Nothing is needed. Thank!

-----Original Message-----
From: Schultheisz, Daniel
Sent: Tuesday, November 22, 2016 9:05 AM
To: Morgan, Ruthw <morgan.ruthw@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Cyran, Carissa <Cyran.Carissa@epa.gov>; Morris, Joseph <Morris.Joseph@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

Yes, I did see that. Let me know if you need anything else. Thanks.

-----Original Message-----
From: Morgan, Ruthw
Sent: Tuesday, November 22, 2016 8:53 AM
To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Cyran, Carissa <Cyran.Carissa@epa.gov>; Morris, Joseph <Morris.Joseph@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

11/22/16
Dan,

Your package did go forward for review by the Immediate office on Friday, we took care of it then, Friday at 4:49pm, under Joseph Morris. See email on that day from him to Caressa.. Thanks!!!

Ruthw Morgan - 202 564-1326

-----Original Message-----
From: Mcquilkin, Wendy
Sent: Monday, November 21, 2016 4:16 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>; Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Lee, Raymond <Lee.Raymond@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>
Subject: RE: SAN#5281 Final Rule Package for NESHAP Subpart W

It's all sorted out now. I heard from Carissa. I am out on Friday's and Ruth is out on Monday's. Cross communication.

-----Original Message-----
From: Schultheisz, Daniel
Sent: Monday, November 21, 2016 4:15 PM
To: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>
Cc: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Lee, Raymond <Lee.Raymond@epa.gov>
Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W

Got it. Thanks.

Sent from my iPhone

> On Nov 21, 2016, at 4:14 PM, Ferguson, Rafaela <Ferguson.Rafaela@epa.gov> wrote:
>
> Dan,
>
> Everything's OK See my email message. I think your message crossed paths with mine to you.
>
> Rafie
>
> -----Original Message-----
> From: Schultheisz, Daniel
> Sent: Monday, November 21, 2016 4:07 PM
> To: Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>
> Cc: Ferguson, Rafaela <Ferguson.Rafaela@epa.gov>; Lee, Raymond
> <Lee.Raymond@epa.gov>
> Subject: Re: SAN#5281 Final Rule Package for NESHAP Subpart W
>
> Wendy:
>
> I dropped off a hard copy with Ruth on Friday. Do you need another? The CMS number also went on Friday, although the files did not get loaded until this morning. Rafie?
>
> Dan Schultheisz
> U.S. Environmental Protection Agency
> Office of Radiation and Indoor Air

> Radiation Protection Division
> (202) 343-9349
> Sent from my iPhone
>
>> On Nov 21, 2016, at 3:56 PM, Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov> wrote:
>>
>> OOPS! QUICK FINGERS - The previous email was not sent to all the
>> individuals. Still awaiting the hardcopies and CMS# TO THE IMMEDIATE OFFICE FOR REVIEW AND
CONCURRENCE ON THE ADMINISTRATOR'S SIGNATURE PACKAGE.
>>
>> <Factsheet_Subpart W_Nov_P9.pdf>
>> <fr cover form Subpart W 11172016.pdf> <FR Typesetting Request.pdf>
>> <NESHAP Subpart W 2060 AP26 Final Rule BID-EIA_20160607.docx> <NESHAP
>> Subpart W 2060 AP26 Final Rule FRN_20161116.docx> <Qs And As for
>> Subpart W--final.docx> <Subpart W Action Information 11-16-2016.doc>
>> <Subpart W icr-submission-worksheet 11182016.xlsx> <SubpartW-Desk
>> Statement-final..docx> <Support Stm Final Subpart W draft
>> 11172016.docx> <Transmittal memo ORIA to OAR.pdf>
>> <W_action-memo_draft_11172016_clean.docx>

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents
Date: Monday, January 09, 2017 11:13:17 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:37 PM
To: Collections.SubW
Subject: FW: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

---

From: Nesky, Anthony
Sent: Tuesday, November 22, 2016 3:51 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

This is a good time for me to maintain the Docket. Please send me the other two documents that you wanted posted there.

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents
Date:	Monday, January 09, 2017 11:13:09 AM
Attachments:	1986 Subpart W RTC.pdf 1986 Subpart W BID.pdf

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:37 PM
To: Collections.SubW
Subject: FW: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

---

From: Schultheisz, Daniel
Sent: Tuesday, November 22, 2016 4:28 PM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Subject: RE: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

Here are the response to comments document and the BID from the 1986 rulemaking. I guess I don't have the 1989 RTC saved, but did have it open online. It's in NEPIS. I can find it along with the 1989 risk assessment (BID Volume 2) if you don't want to look.

The link to the White Mesa reports on the State of Utah website is http://www.deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm. Look under "Reports" and select "Annual Tailings Wastewater Sampling Report." The 2014 and 2015 reports are the ones to put in the docket.

Utah DEQ: Businesses: Energy Fuels Resources: White Mesa

www.deq.utah.gov

Utah DEQ: Businesses: Businesses: Energy Fuels Resources (USA) Inc.: White Mesa Uranium Mill

---

From: Nesky, Anthony
Sent: Tuesday, November 22, 2016 3:51 PM

To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

This is a good time for me to maintain the Docket. Please send me the other two documents that you wanted posted there.

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov

United States
Environmental Protection
Agency

Office of
Radiation Programs
Washington, D.C. 20460

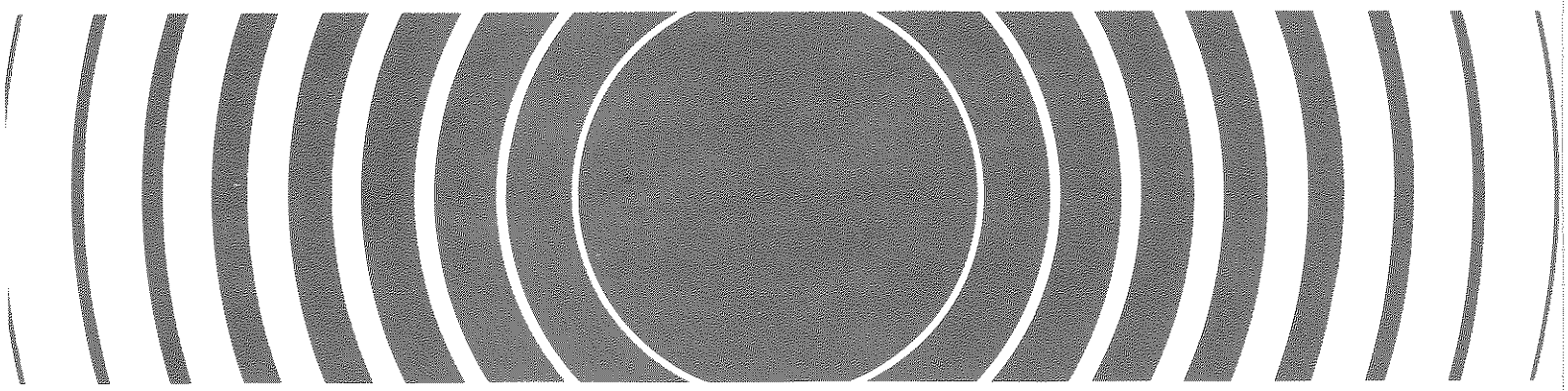
EPA 520/1-86-009
August 1986

Radiation

EPA

Final Rule for Radon - 222 Emissions from Licensed Uranium Mill Tailings

Background Information Document



40 CFR Part 61
National Emission Standards
for Harzardous Air Pollutants

EPA 520/1-86-009

BACKGROUND INFORMATION DOCUMENT

STANDARD FOR RADON-222 EMISSIONS FROM LICENSED URANIUM MILL TAILINGS

August 15, 1986

U.S. Environmental Protection Agency
Office of Radiation Programs
Washington, D.C. 20460

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Chapter 1: INTRODUCTION

This Background Information Document supports the Agency's final rule on radon-222 emissions from licensed uranium milling activities. It is an integrated risk assessment that provides the scientific basis for this action. Although the U.S. Environmental Protection Agency (EPA) has considered radon-222 in several regulatory actions, no specific emission standard for this radionuclide has yet been promulgated for operating licensed uranium mills.

1.1 History of Standard Development

On January 13, 1977 (42 FR 2858), EPA issued Environmental Radiation Protection Standards for Nuclear Power Operations. These standards, promulgated in Title 40, Code of Federal Regulations Part 190 (40 CFR 190), limit the total individual radiation dose due to emissions from uranium fuel-cycle facilities, including licensed uranium mills. At the time 40 CFR 190 was promulgated, considerable uncertainty existed regarding the public health impact of levels of radon-222 in the air and the best method for managing new man-made sources of this radionuclide. Therefore, the Agency exempted radon-222 from control under 40 CFR 190.

On September 30, 1983, the Agency issued standards under the Uranium Mill Tailings Radiation Control Act (UMTRCA) (40 CFR 192, Subparts D and E) for the management of tailings at locations licensed by the Nuclear Regulatory Commission (NRC) or the States under Title II of the UMTRCA. These standards do not specifically limit radon-222 emissions until after closure of a facility; however, they require as low as reasonably achievable (ALARA) procedures for radon-222 control, and the NRC does consider ALARA procedures in licensing a mill. When the UMTRCA standards were promulgated, the Agency stated that it would issue an Advance Notice of Proposed Rulemaking with respect to control of radon-222 emissions from uranium tailings piles during the operational period of a uranium mill.

On April 6, 1983, standards for NRC licensees were proposed under the Clean Air Act (48 FR 15076, April 6, 1983); however, uranium fuel-cycle facilities, which included operating uranium mills, were excluded because these sources are subject to EPA's 40 CFR Part 190 standard.

During the comment period for the Clean Air Act standards, it was noted that radon-222 emitted from operating uranium mills and their actively used tailings piles were not subject to any current or proposed EPA standards, and that such emissions could pose significant risks.

On October 31, 1984, EPA published an Advance Notice of Proposed Rulemaking in the Federal Register, 49 FR 43916, for radon-222 emissions from licensed uranium mills. The notice stated that the Agency is considering emissions standards for licensed uranium mills and solicited information in the following areas:

- Radon-222 emission rates from uranium mills and associated tailings piles
- Local and regional impacts due to emissions of radon-222 from uranium mills and associated tailings piles prior to permanent disposal
- Applicable radon-222 control options and strategies, including work practices
- Feasibility and cost of radon-222 control options and strategies
- Methods of determining compliance with a work practice type of standard to control radon-222 emissions
- Impact of radon-222 controls on the uranium industry

Pursuant to the citizens' suit provision of the Act, the U.S. District Court for the Northern District of California directed EPA to promulgate standards for other sources of radionuclide emissions, which could include radon-222 emissions from licensed uranium mills. Thus, discussions between EPA and the Sierra Club regarding a schedule for developing a standard led to an agreement to submit a schedule for the promulgation of a standard in one year rather than having the Court establish a schedule. This motion was submitted to the Court on August 5, 1985, and the Court ordered the EPA to issue final standards for radon-222 emissions from licensed uranium mills and mill tailings impoundments by May 1, 1986. This date was later moved to August 15, 1986 to allow additional time for public comment.

The EPA then issued the proposed rulemaking for "National Emission Standards for Hazardous Air Pollutants; Standards for Radon-222 Emissions from Licensed Uranium Mill Tailings," on February 21, 1986 (51 FR 6382-6387). Subsequent to the announcement of the proposed rule, a public hearing was held on March 25, 1986 in Denver, Colorado (51 FR 8205) and a second comment period was held open until April 28, 1986.

1.2 Content

The health effects of radon-222 and the risk assessment procedure are summarized in Chapter 2. The incidence of lung cancer and resulting deaths among miners exposed to radon-222 are described, and the range of risk factors is presented.

The sources of radon-222 in uranium milling and the factors affecting the rate of radon-222 emissions are described in Chapter 3. This chapter also includes a general description of EPA's risk-estimating procedure, along with the methods of measuring radon-222.

A description of each licensed mill, its associated tailings impoundments, and its estimated milling production rates are contained in Chapter 4. Estimates of radon-222 emissions from the existing tailings impoundments are presented in Chapter 5.

The baseline industry risk assessment for individuals and regional and national populations and the control techniques and work practices that can be used to reduce radon-222 emissions are described in Chapters 6 and 7 respectively. The resulting emissions after application of these control methods are estimated. A comparison of work practices, costs, and effectiveness is presented in Chapter 8.

Information for this study was compiled from the technical literature, previous studies by EPA and the Nuclear Regulatory Commission, comments resulting from rulemaking notices, and discussions with industry representatives. Comments received during the public comment period were incorporated into this final document as appropriate. No significant change in the technical information was made except for the Agency's revision of the risk factors associated with radon-222 exposure. These risk factors were increased from a range of 250-1000 deaths per million person working level months to a range of 380-1520 deaths per million person working level month. In addition, mill site-specific information was corrected and the discussion of interim cover was revised.

1.3 Other EPA Standards Affecting Uranium Mills

On December 3, 1982, EPA issued guidelines under the Clean Water Act for effluent limitations for New Source Performance Standards for wastewater discharges from the mining and dressing of uranium, radium, and vanadium ores (40 CFR Part 440, 47 FR 54598). These effluent guidelines cover discharges of both radioactive and nonradioactive materials to surface waters from uranium byproduct materials.

The EPA promulgated 40 CFR Part 261, Subpart F --Groundwater Protection--on July 26, 1982 (47 FR 32274) under the Solid Waste Disposal Act (SWDA) as amended by the Resource Recovery and Conservation Act. This Act requires that standards for nonradioactive hazards from uranium byproduct materials be consistent with standards promulgated under SWDA for such hazards. The Act also requires that the NRC establish general requirements that are, insofar as possible, at least comparable to requirements applying to the possession, transfer, and disposal of similar hazardous material regulated by EPA under the SWDA.

The EPA issued standards for cleanup of contaminated open lands and buildings and for disposal of tailings at inactive uranium processing sites on January 5, 1983 (48 FR 590) under UMTRCA. For inactive mills, the standard specified in 40 CFR 192.02 requires that controls:

> "(a) Be effective for up to one thousand years, to the extent reasonably achievable, and, in any case, for at least 200 years, and,
>
> (b) Provide reasonable assurance that releases of radon-222 from residual radioactive material to the atmosphere will not:
>
> (1) Exceed an average release rate of 20 picocuries per square meter per second, or
>
> (2) Increase the annual average concentration of radon-222 in air at or above any location outside the disposal site by more than one-half picocurie per liter."

This standard was later amended under Section 84 of the Atomic Energy Act of 1954 to include standards for radionuclides during and after processing of uranium ore sites (48 FR 45946, October 7, 1983). These regulations in 40 CFR 192.30 specify concentration limits and construction standards for surface impoundments to ensure ground-water protection. In addition, Part 192.32 addresses radon-222 at active mills in a generic manner by requiring the mill owner to "make every effort to maintain radiation doses from radon-222 emissions from surface impoundments of uranium byproduct materials as far below the Federal Radiation Protection Guides as is practicable at each licensed site."

This standard also specifies that radon-222 emissions are limited to 20 picocuries per square meter per second (pCi/m s) after mill closure. This limitation does not apply to sites that contain a radium-226 concentration from mill tailings that does not exceed the background level by more than 5 pCi per gram over the top 15 cm of soil and 15 pCi per gram over each successive 15-cm layer of soil below the top 15 cm.

1.4 Other Regulations Affecting Uranium Mills

All uranium mills are licensed by the NRC or by States that enforce the NRC regulations, and are subject to the regulations contained in 10 CFR 20. Specific standards pertaining to radon-222 limit atmospheric radon-222 concentrations to 3×10^{-8} pCi/ml (30 pCi/liter) in restricted areas (i.e., areas within the mill property) and 3×10^{-9} pCi/ml (3 pCi/liter) in unrestricted areas. These concentrations are approximately equivalent to one-third and one-thirtieth of a working level,[a] respectively. The NRC has also recently issued amendments to its regulations governing uranium mill tailings disposal (100 CFR Part 40) as published on October 16, 1985 (50 FR 41852). These amendments conform to the EPA regulations for tailings disposal.

The NRC has entered into agreement with a number of States to provide enforcement of the NRC regulations. These States are referred to as "Agreement States." The Agreement States that have uranium mills are Colorado, New Mexico, Texas, and Washington[b].

State regulations pertain to the construction of tailings impoundments to minimize ground-water contamination. In addition, States inspect tailing impoundment dams to ensure that they are built and maintained to minimize safety problems.

(a) A working level is defined in Chapter 2. The relationship between radon-222 and working levels depends on the degree of equilibrium between radon-222 and its decay products.

(b) Utah also is an Agreement State in nuclear licensing areas other than uranium milling. New Mexico returned licensing authority to the NRC on May 1, 1986.

Chapter 2: ESTIMATING THE RISK DUE TO EXPOSURE TO RADON-222 DECAY PRODUCTS

2.1 Introduction

The methodology the EPA uses to estimate the exposure and the health detriment (i.e., lung cancer) due to radon-222 in the general environment is described in this chapter. Radon-222 exposure pathways are explained, the EPA risk model is described, estimates of risks due to radon-222 progeny (radon-222 decay products) made by various scientific groups are compared, and the risk coefficients to be used in this risk assessment are selected. Earlier studies have shown that a degree of uncertainty exists in all risk estimates (EPA84); therefore, EPA uses more than a single coefficient to indicate the range of this uncertainty.

The occurrence of radiation-induced cancer is infrequent compared with the current incidence of all cancers. Even among heavily irradiated populations (e.g., some of the uranium mine workers in epidemiologic studies), the precision and accuracy of the estimate of the number of lung cancers resulting from radiation is uncertain because of the small sampling segment and because the data vary greatly. Also, the small sampling of exposed populations has not been followed for their full lifetime; therefore, information on the ultimate effects of their exposure is limited.

Only human epidemiological data are used to derive risk estimates for effects of exposure to radon-222 progeny, but animal studies support the risk estimates. In a series of studies performed with rats, French investigators have shown a dose-effect relationship similar to that obtained in surveys of uranium miners (Ch84, 85). In these studies, the risk per working level month at 20 cumulative working level months (CWLM) is about four times greater than at 3000 or more CWLM (Ch84, 85). The lowest exposure studied to date, 20 CWLM, which is about 10 times the background exposure, doubled the incidence of lung cancer in the rats (Ch84, 85).

When considered in light of experiments with animals and various theories of carcinogenesis and mutagenesis, the observational data on cancers related to human exposure to radiation are subject to a number of interpretations. These various interpretations lead to differing estimates of radiation risks by both individual radiation scientists and expert advisory groups. Readers should bear in mind that estimating radiation risks is not a mature science and that the evaluation of the risk due to radon-222 decay products (progeny) will change as additional information becomes available.

Nevertheless, a substantial data base is available for use in developing risk estimates, and the Agency believes these estimates can be used in the development of regulatory requirements.

2.2 Radon-222 Exposure Pathways

2.2.1 Physical Considerations

Radon-222 from uranium milling operations enters the general environment from stockpiled ore and mill exhaust systems and through waste materials from milling operations. The half-life of radon-222 is 3.8 days; therefore, when it is released into the atmosphere, some atoms of gaseous radon-222 can travel thousands of miles through the atmosphere before they decay. As shown in Figure 2-1, the radon-222 decay process involves seven principal decay products before the radon-222 becomes nonradioactive lead. The first four short-half-life radioactive decay products of radon-222 are the most important sources of cancer risk. Members of the decay chain with relatively long half-lives (beginning with lead-210, which has a 22-year half-life) are more likely to be ingested than inhaled and generally present much smaller risks.

The principal short-half-life products of radon-222 are polonium- 218, lead-214, bismuth-214, and polonium-214. Polonium-218, the first decay product, has a half-life of just over 3 minutes. This is long enough for most of the electrically charged polonium atoms to attach themselves to microscopic airborne dust particles that are typically less than a millionth of a meter in diameter. When inhaled, these small particles have a good chance of sticking to the moist epithelial lining of the bronchi. Most inhaled particles are eventually cleared (removed) from the bronchi by mucus, but not quickly enough to keep the bronchial epithelium from being exposed to alpha particles from the decay of polonium-218 and polonium-214. This highly ionizing radiation passes through and delivers radiation doses to several types of lung cells.

Adequate characterization cannot be made of the exact doses delivered to cells that eventually become cancerous. Knowledge of the deposition pattern of the radioactive particles in the lung is based on theoretical models, and the distances from the radioactive particles to cells that are susceptible can only be assumed. Further, some disagreement exists about the types of bronchial cells in which cancer originates. Therefore, EPA estimates of lung cancer risk are based on the amount of inhaled radon-222 decay products to which people are exposed rather than on the dose absorbed by the lung.

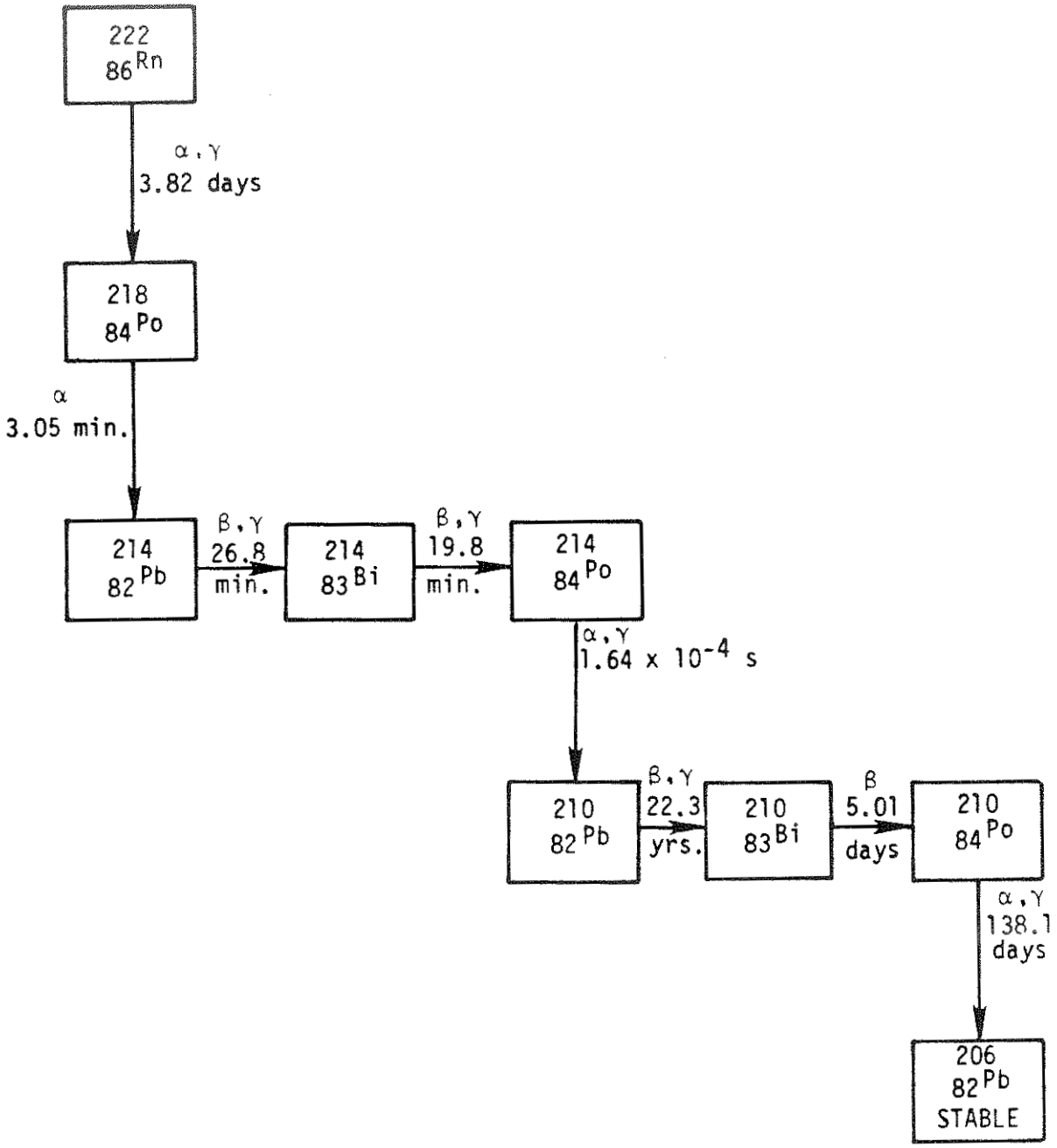

Figure 2-1. Radon-222 decay series.

Ingrowth of Radon-222 Decay Products

At the point where radon-222 diffuses out of the tailings pile surface, the concentration of associated radon-222 decay products is zero because those decay products generated prior to diffusion from the surface have been captured in the tailings or cover. As soon as radon-222 is airborne, ingrowth of decay products commences and secular equilibrium between the radon-222 and the short half-life decay products is eventually obtained. At secular equilibrium, the activities of radon-222 and of all its short-half-life decay products are equal, and the alpha activity per unit of radon-222 concentration is at its maximum. As a means of accounting for the incomplete equilibrium before this state is reached, the "equilibrium fraction" is defined as the ratio of the potential alpha energy from those decay products actually present to the potential alpha energy that would be present at complete equilibrium. As radon-222 and its decay products are transported by the wind, the equilibrium fraction increases with distance from the tailings pile, and at great distances, approaches the theoretical maximum value of one; however, depletion processes, such as dry deposition and precipitation scavenging, selectively remove decay products (but not radon), so complete equilibrium of the short-lived decay products with the radon-222 is seldom, if ever, reached.

When radon-222 and its decay products enter a structure, the building ventilation rate is the principal factor affecting the indoor equilibrium fraction. The equilibrium fraction can also be affected by other considerations, however, such as the indoor surface-to-volume ratio and the dust loading in indoor air (Po78).

In estimating the exposures of nearby individuals to radon-222 decay products (in Chapter 6), the model uses the calculated effective equilibrium fraction at selected distances from a tailings pile (see Table 2-4 presented later in this chapter). For estimating population exposures, a population-distance weighted effective equilibrium fraction would be appropriate, but it is impractical to calculate this fraction. Indoor exposure is the dominant form of exposure due to radon-222 [Americans spend about 75 percent of their time indoors (Mo76, Oa72)], and the indoor effective equilibrium fraction does not depend greatly on the distance from the tailings pile. In this assessment, an effective equilibrium fraction of 70 percent is assumed for calculating the exposure of populations because most of the affected individuals are at some distance from the tailings pile (see Section 2.4.1).

2.2.2 Characterizing Exposures to the General Population Vis-a-vis Underground Miners

Although considerable progress has been made in modeling the deposition of particulate material in the lung (Ha82, Ja80, Ja81), adequate characterization of the bronchial dose delivered by alpha particles from inhaled radon-222 progeny attached to dust particles is not yet possible. Knowledge is still lacking concerning the kinds of cells in which bronchial cancer is initiated (Mc78, Mc83) and the depth of these cells in the bronchial epithelium. Current estimates of the exposure dose of inhaled radon-222 progeny actually causing radiogenic cancer are based on average doses, which may or may not be relevant (E185). Until more reliable estimates of the bronchial dose become available, following the precedents set in the 1972 and 1980 National Academy of Sciences reports appears to be a prudent approach (NAS72, NAS80). Therefore, the EPA estimates the risk due to radon-222 progeny on the basis of exposure rather than dose per se. This is called the epidemiological approach; i.e., risk is estimated on the basis of observed cancers after occupational exposure to radon-222 progeny.

Exposures to radon-222 decay products under working conditions are commonly reported in a special unit called the working level (WL). One working level is any concentration of short half-life radon-222 progeny having 1.3 x 105 MeV per liter of potential alpha energy (FRC67). (A WL is also equivalent to approximately 100 pCi/liter of radon-222 in secular equilibrium with its short-lived decay products.) This unit was developed because the concentration of specific radon-222 progeny depends on ventilation rates and other factors. A working level month (WLM) is the unit used to characterize a mine worker's exposure to one working level of radon-222 progeny for a working month of 170 hours. Inasmuch as the results of epidemiological studies are expressed in units of WL and WLM, comparable estimates of exposure were developed for members of the general population exposed to radon-222 progeny, as explained in the following paragraphs.

For a given concentration of radon-222 progeny, the amount of potential alpha energy a member of the general population inhales in a month is more than the amount a mine worker receives in a working month. Although members of the general population are exposed longer (up to 24 hours per day, 7 days a week), the average amount of air inhaled per minute (minute volume) is less in this group than that for a mine worker when periods of

sleeping and resting are taken into account (EPA79, Th82). The radon-222 progeny exposure of a mine worker can be compared with that of a member of the general population by considering the amount of potential alpha energy each inhales per year (Ev69). That radon daughter deposition (and dose) in the conducting airways of the lung is proportional to ventilation rate (quantity inhaled) has also been recommended by other investigators (Ra85, Ho82).

The EPA assumes that a mine worker inhales 30 liters per minute (averaged over a work day). This average corresponds to about 4 hours of light activity and 4 hours of moderately heavy work per day (ICRP75). The new ICRP radon-222 model, however, assumes an inhalation rate of 20 liters per minute for mine workers, which corresponds to 8 hours of light activity per day (ICRP81). This may be appropriate for nuclear workers; however, studies of the metabolic rate of mine workers clearly show that they are not engaged in light activity only (Sp56, ICRP75, NASA73). Therefore, 30 liters appears to be a more realistic estimate of the average minute volume for this group. Based on this minute volume, a mine worker inhales 3.6×10^{3} cubic meters in a working year of 2000 hours (ICRP79). One working level of radon-222 progeny is 2.08×10^{-5} joules per cubic meter (1.3×10^{5} MeV per liter); therefore, in a working year, the potential alpha energy inhaled by a mine worker exposed to one working level is 7.5×10^{-2} joules.

According to the ICRP Task Group report on reference man (ICRP75), an inhaled air volume of 2.3×10^{4} liters per day is assumed for adult males in the general population and 2.1×10^{4} liters per day for adult females, or an average of 2.2×10^{4} liters per day for members of the adult population. This average volume results in an intake of 8.04×10^{3} cubic meters of air and 1.67×10^{-1} joules per year of inhaled potential alpha energy from a continuous exposure of an adult member of the population to one working level of radon-222 progeny for 365.25 days.

Although it may be technically inappropriate to quantify the amount of potential alpha particle energy inhaled by a member of the general population in working level months, continuous exposure to 1 WL corresponds to about the same inhaled potential alpha energy as 27 WLM would to a miner. Hence, for an adult member of the general population, a one working level concentration of radon progeny results in a 27 WLM annual exposure equivalent (see Table 2-1). As stated earlier, an occupancy factor of 0.75 is assumed for indoor exposure; thus, an indoor exposure to one WL results in an annual exposure equivalent of 20 WLM (EPA79) in terms of the amount of potential alpha energy actually inhaled.

The smaller bronchial area of children as compared with that of adults more than offsets their lower per-minute volume; therefore, for a given concentration of radon-222 progeny, the dose to children's bronchi is greater. This problem has been addressed in a paper by Hofmann and Steinhausler (Ho77), in which they estimate that doses received during childhood are about 50 percent greater than adult doses. This information was used to prepare Table 2-1, which lists the age-dependent potential exposure equivalent used in the risk assessment described in the next subsection.[a] The larger effective exposure to children relative to that to adults increases the estimated mortality due to lifetime exposure from birth by about 20 percent.

Table 2-1. Annual exposure equivalent (WLM) as a function of age for members of the general public continuously exposed to radon progeny at one working level (2.08×10^{-5} joules per cubic meter)

Age of general population (years)	Exposure Equivalent (WLM)
0-2	35
3-5	43
6-11	49
12-15	43
16-19	38
20-22	32
23 or more	27
Lifetime Average	31

2.3 Health Risk From Exposure to Radon-222 Decay Products

2.3.1 Risk Models

A wealth of data indicates that radon-222 exposure of the bronchial epithelium of underground mine workers causes an increase in bronchial lung cancer among both smokers and nonsmokers. Among recent reviews (ICRP81, NA580, NCRP84, N105H85, Th82), two are of particular interest.

(a) The assumptions on minute volume, etc., for mine workers and the general population just described are the same as those used in the preparation of the EPA report entitled "Indoor Radiation Exposure Due to Radium-226 in Florida Phosphate Lands" (EPA79) and Final Environmental Impact Statements (EPA82, 83a).

The 1980 NAS BEIR-3 Report (NAS80) contains a review of epidemiological studies on mine workers and develops an age specific absolute risk model. A lengthy report entitled "Risk Estimates for the Health Effects of Alpha Radiation," which was prepared by D. C. Thomas and K. C. McNeil for the Atomic Energy Control Board (AECB) of Canada, reanalyzes many of these epidemiological studies in a consistent fashion so that the modeling assumptions are the same for all of the data sets and develops a relative risk coefficient which fits most studies (Th82).

The manner in which radiogenic lung cancers are distributed in time, after a minimum induction period, is a crucial factor in numerical risk estimates. For radiation-induced leukemia and bone cancer, the period of risk expression is relatively brief; most occur within 25 years of exposure. For other radiation-induced cancers (including lung cancer), however, it appears that people are at risk for the remainder of their lives (NAS80). None of the epidemiological studies of underground mine workers provides information on lifetime expression; indeed, most of the study populations are still alive and still at risk. Lifetime risks cannot be estimated only on the basis of observations to date; therefore, a model is needed to project the risk beyond the period of direct observation. As discussed in the 1980 NAS BEIR report, there are two basic models of risk projection: (1) the absolute risk projection model, in which it is assumed that the observed annual numerical excess cancer risk per unit exposure (or dose) continues throughout life; and (2) the relative risk projection model, in which it is assumed that the observed percent age increase of the baseline cancer risk per unit exposure (or dose) is constant with time (NAS80).

In the case of lung cancer and most other solid cancers, a relative risk model leads to larger estimated risks than the absolute risk model because of the generally increasing incidence of such cancers with increasing age. The number of lung cancer deaths that occurred in the U.S. population as a function of age in 1970 and in 1980 is shown in Figure 2-2. The decrease in the number of deaths for ages greater than 65 years is due in part to depletion of the population by competing risks, and in part to a decrease in the age-specific incidence of lung cancer mortality, which peaks in males at about age 75 but is relatively constant in females until age 95 (NCHS73, NCHS83) (see Figure 2-3). The age-specific mortality of underground mine workers dying of radiogenic lung cancer shows the same pattern of death as a function of age as the general male population (Ra84, E185). In a recent review (E185), it was shown that a relative risk model can adequately account for the temporal pattern of cancer deaths observed in underground mine workers, whereas absolute risk projection models fail to do so.

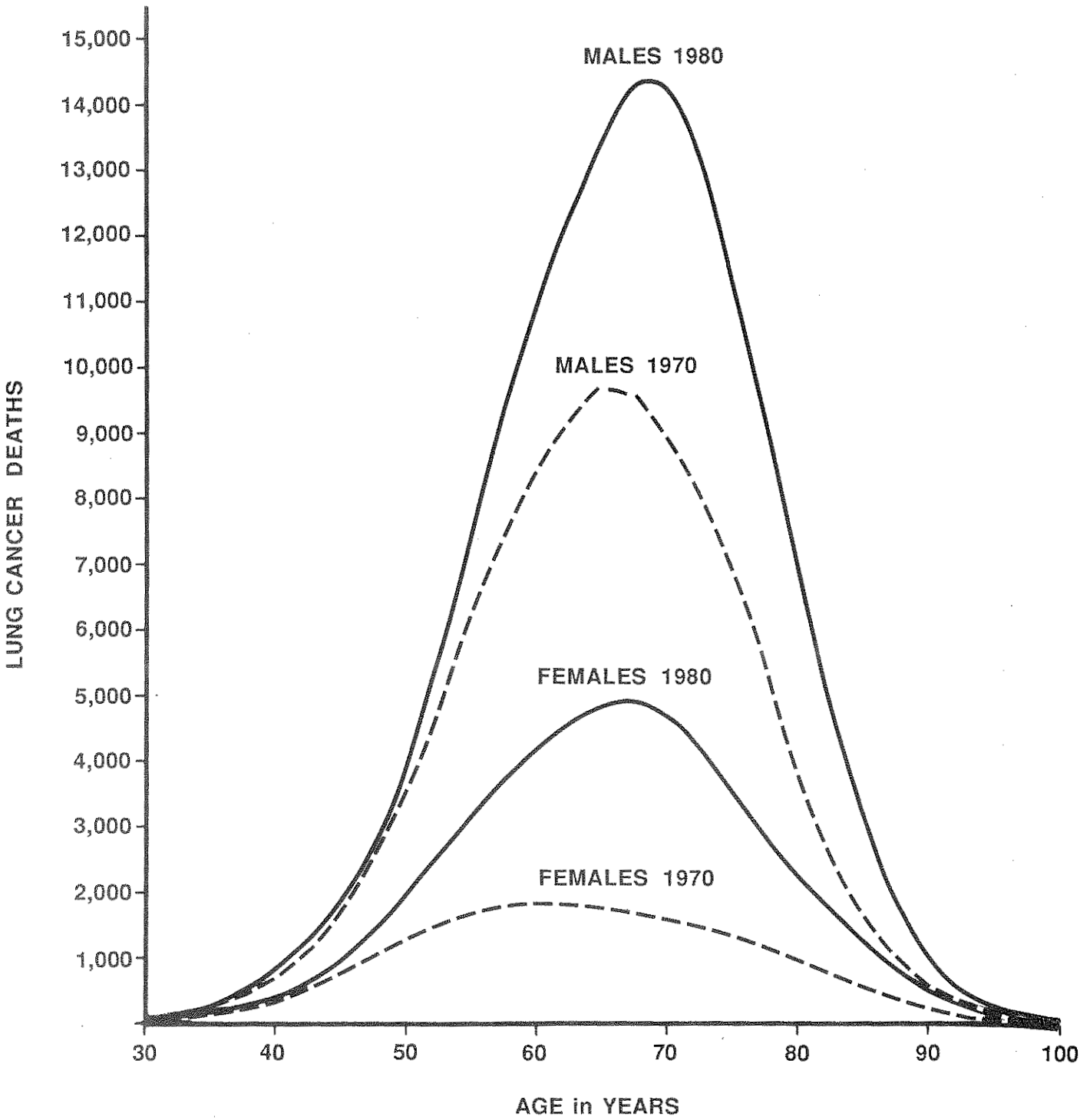

Figure 2-2. U.S. lung cancer mortality by age--1970 and 1980.

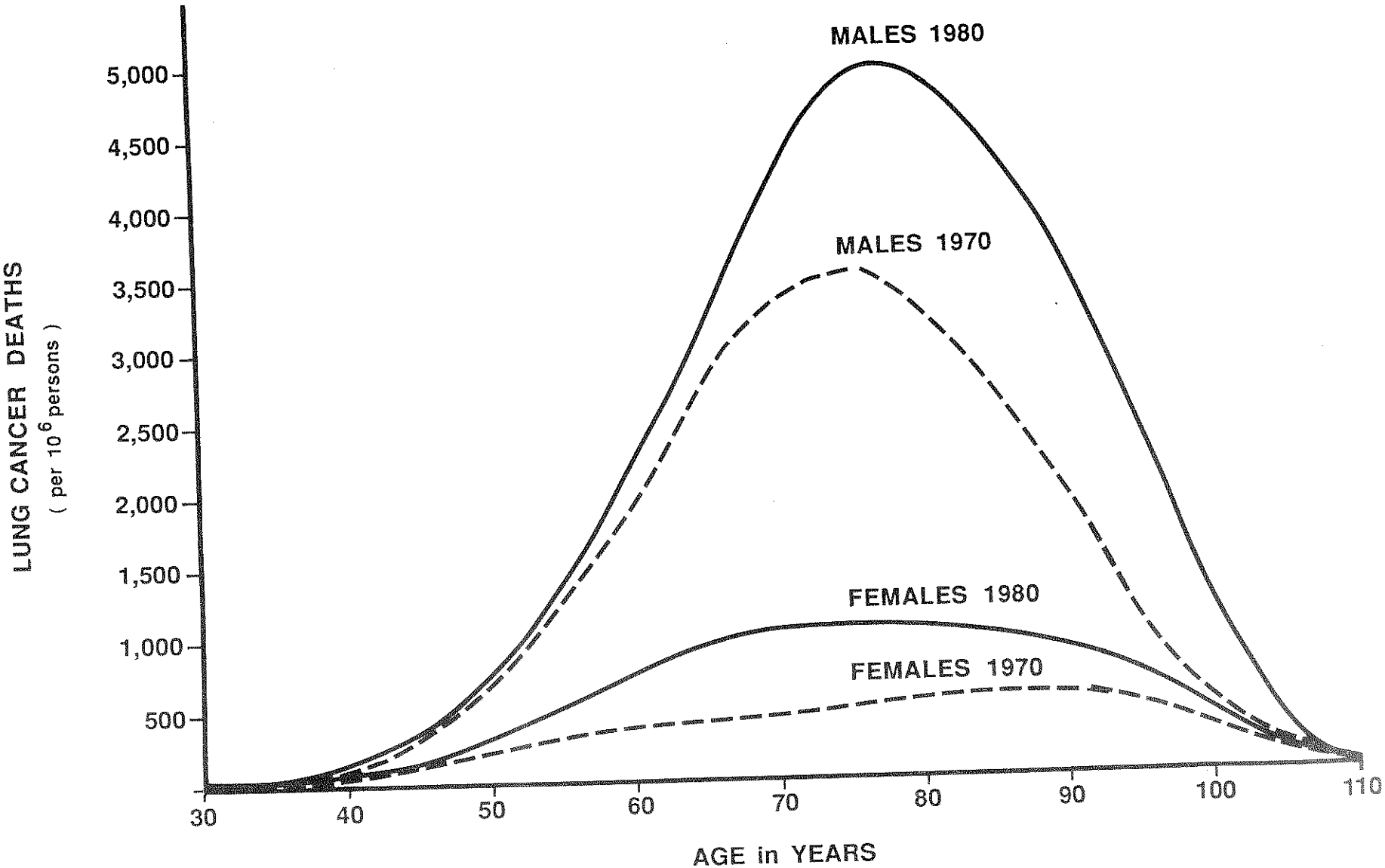

Figure 2-3. Age-specific U.S. lung cancer mortality rates--1970 and 1980

2.3.2 The EPA Relative Risk Model

Since 1978, the Agency has based risk estimates due to inhaled radon-222 progeny on a linear dose-response function, a relative risk projection model, and a minimum induction period of 10 years. Lifetime risks are projected on the assumption that exposure to 1 WLM increases the age-specific risk of lung cancer by 3 percent over the age-specific rate in the U.S. population as a whole (EPA79). The life table analysis described in Bu81 and EPA84 is used to project this risk over a full life span.

The EPA model has been described in detail (EPA79, E179). A review of this model in light of the more recent information described herein revealed that the major assumptions, linear response, and relative risk projection have been affirmed. The A-bomb survivor data clearly indicate that the absolute risk of radiogenic lung cancer has continued to increase among these survivors, whereas their relative risk has remained reasonably constant (Ka82). The UNSCEAR, the ICRP, and the 1980 NAS Committee have continued to use a linear dose response to estimate the risk of lung cancer due to inhaled radon-222 progeny. Thomas and McNeill's analysis (Th82) indicates that the use of linearity is not unduly conservative and actually may underestimate the risk at low doses. The 1980 NAS BEIR Committee reached a similar conclusion (NAS80).

A major limitation of earlier EPA risk estimates is the uncertainty in the relative risk coefficient used, 3 percent increase in the age-specific lung cancer mortality rate per WLM. This value is based on the excess mortality caused by lung cancer among exposed mine workers of various ages, many of whom smoked. Therefore, it represents an average value for a mixed population of smokers, former smokers, and nonsmokers. This assumption may tend to inflate the risk estimate (as discussed herein) because smoking was more prevalent among some groups of mine workers studied than it is among the U.S. general population today.

In a recent paper, Radford and Renard (Ra84) reported on the results of a long-term study of Swedish iron miners who were exposed to radon-222 progeny. This study is unique in that most of the miners were exposed to less than 100 WLM and the risks to smokers and nonsmokers were considered separately. The absolute risks of the two groups were similar, 20 fatalities per 10^6 person-year WLM for smokers compared with 16 fatalities for nonsmokers. The total number of lung cancer fatalities for nonsmokers is small; therefore, the estimate of 16 fatalities is not too reliable. Although absolute risks were comparable for

the smoking and nonsmoking miners, relative risks were not. Nonsmokers have a much lower baseline incidence of lung cancer mortality than smokers. This resulted in a relative risk coefficient for nonsmoking exposed miners relative to unexposed nonsmokers that was about four times larger than the relative risk coefficient for exposed smokers. This larger relative risk does not, however, fully compensate for the lower baseline incidence of lung cancer mortality among nonsmokers. Therefore, this study indicates that a relative risk coefficient derived from data on miners maybe biased high when applied to the population as a whole. Further follow-up of this and other groups of mine workers may provide more reliable data on the risk to nonsmokers, and EPA expects to incorporate separate consideration of smokers and nonsmokers into its analyses as more data become available.

Although occupational exposures to pollutants other than radon-222 progeny are probably not important factors in the observed lung cancer risk for underground mine workers (El79, Th82, Mu83, Ra84), the use of occupational risk data to estimate the risk of a general population is far from optimal, as it provides no information on the effect of radon-222 progeny exposures to children and women. Although the assumption has continued that the risk per unit exposure during childhood is no more effective than that occurring to adults, this assumption may not be correct. The A-bomb survivor data indicate that, in general, the risk resulting from childhood exposure to low linear energy transfer (LET) radiation is greater than that resulting from adult exposure, and this greater risk continues for at least 33 years (Ka82). As yet, however, no specific data pertaining to the effect of age at irradiation on lung cancer have been published (Ka82). Another limitation of the data for underground mine workers is the absence of women in the studied populations. The A-bomb survivor data indicate that women are about as sensitive as men to radiogenic lung cancer, even though they tend to smoke less as a group (Pr83). These data are not conclusive, however.

2.3.3 Comparison of Risk Estimates

National Academy of Sciences BEIR-3

Several estimates of the risk due to radon-222 progeny have been published since the EPA model was developed. One of particular interest was developed by the National Academy of Sciences BEIR Committee (NAS80). The BEIR-3 Committee formulated an age-dependent absolute risk model with increasing risk for older age groups. Estimates of the risk per WLM for various ages and the estimated minimum induction period for lung cancer after exposure (NAS80, pp. 325 and 327, respectively) are summarized in Table 2-2. These have been used to calculate the lifetime risk of lung cancer mortality due to lifetime exposure of persons in the general population.

Table 2-2. Age-dependent risk coefficients and minimum induction period for lung cancer due to inhaling radon-222 progeny (NAS80)

Age at diagnosis (years)	Excess lung cancers (cases per 10^6 person-year WLM)	Minimum induction period (years)
0-15	0	25
16-36	0	25-15
36-50	10	10
51-64	20	10
65 or more	50	10

This was done by means of the same life table analysis that was used to calculate other EPA risk estimates (Bu81).

The zero risk shown in Table 2-2 for those under 35 years of age at diagnosis does not mean that no harm occurs; rather, it means that the risk is not expressed until the person is more than 35 years old, i.e., only after the minimum induction period. The sequence of increasing risk with age shown in this table is not unlike the increase in lung cancer with age observed in unexposed populations; therefore, the pattern of excess risk over time is similar to that found by the use of a relative risk projection model.

Atomic Energy Control Board of Canada

In their recently conducted thorough analysis of the incidence of lung cancer among uranium mine workers for the Atomic Energy Control Board (AECB) of Canada, Thomas and McNeill tested a number of risk models on all of the epidemiological studies that contained enough data to define a dose-response function (Th82). They concluded that lung cancer per WLM among males increased 2.3 percent and that a relative risk projection model was more consistent with the incidence of excess lung cancer observed in groups of underground mine workers than any of the other models they tested. This is the only analysis that treated each data set in consistent fashion and used, to the extent possible, modern epidemiological techniques such as controlling for age at exposure and duration of followup.

The estimate for lifetime exposure to Canadian males is 830 fatalities per million person WLM (Th82). For presentation in Table 2-3, this estimate has been adjusted to 600 fatalities per million person WLM (which would be the appropriate estimate for the U.S. 1970 general population) by determining the "best estimate" risk (see p. 114 in Th82). This estimate was then multiplied by the ratio of lung cancers caused by radon-222 in the U.S. 1970 general population to lung cancers in the U.S. 1970 male population as calculated in the EPA model. The 1978 reference life tables for Canadian males and U.S. males are quite similar; therefore, the simple proportional relationship of general population deaths to male deaths should give a reasonable estimate.

International Commission on Radiological Protection

The International Commission on Radiological Protection (ICRP) has made risk estimates for occupational exposure of working adults (ICRP81). The larger ICRP estimate (shown in Table 2-3) is based on an epidemiological approach; i.e., the exposure to mine workers in WLM and the risk per WLM observed in epidemiological studies of underground mine workers. The ICRP epidemiological approach assumes an average expression period of 30 years for lung cancer. Children, who have a much longer average expression period, are excluded from this estimate. The ICRP has not explicitly projected the risk to mine workers beyond the years of observation, even though most of the mine workers on whom these estimates are based are still alive and continue to die of lung cancer.

The smaller of the two ICRP estimates listed in Table 2-3 is based on their dosimetric approach. These estimates are in the lower part of the range shown for the ICRP estimate in Table 2-3. In the dosimetric approach, the ICRP assumes that the risk per rad for lung tissue is 0.12 of the risk of cancer and genetic damage after whole-body exposure (ICRP77). For exposure to radon-222 progeny, the ICRP divides this factor of 0.12 into two equal parts. A weighting factor of 0.06 is used to assess the risk from a high dose to bronchial tissue, where radiogenic lung cancer is observed in exposed underground mine workers. The other half of the lung cancer weighting factor, another 0.06 of the total body risk, is used to assess the risk to the pulmonary region, which receives a comparatively small dose from radon-222 progeny and where human lung cancer is seldom, if ever, observed.

UNSCEAR

The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) estimate shown in Table 2-3 is for a general population and assumes an expression time of 40 years (UNSCEAR77). Like the ICRP, UNSCEAR did not make use of an explicit projection of risk of fatal lung cancer over a full lifetime.

Table 2-3. Estimated risk from exposures to radon-222 progeny

Organization	Fatalities per 10^6 person WLM	Exposure period	Expression period	Reference
EPA(a)	760 (460)[b]	Lifetime	Lifetime	EPA84
NAS BEIR-3[a]	730 (440)[b]	Lifetime	Lifetime	NAS80
AECB[c]	600 (300)[b]	Lifetime	Lifetime	Th82
ICRP	150-450	Working lifetime	30 years	ICRP81
UNSCEAR	200-450	Lifetime	40 years	UNSCEAR77
NCRP[d]	130	Lifetime	Lifetime	NCRP84

(a) The number of fatalities per million-person WLM listed for EPA and NAS BEIR-3 differs from those previously published by EPA [860 fatalities per 10^6 PWLM and 850 fatalities per 10^6 PWLM, respectively (EPA83a) because the increased exposure equivalent applicable to childhood has now been included. Risk estimates for various sources of radon-222 in the environment have not changed because all were calculated in a life table analysis yielding deaths per 100,000 exposed rather than deaths per 10^6 PWLM.

(b) The EPA and AECB estimates of risk for the general population are based on an exposure equivalent, corrected for breathing rate (and other factors). For comparison purposes, the values in parentheses express the risk in more customary form, in which a continuous exposure to 1 WL for a year corresponds to 51.6 WLM.

(c) Adjusted for the 1970 U.S. general population; see text.

(d) Assumes risk diminishes exponentially with a 20-year halftime.

National Council on Radiation Protection and Measurements

The National Council on Radiation Protection and Measurements (NCRP) risk estimate in Table 2-3 is based on an analysis by Harley and Pasternack (Ha82). This estimate is of particular interest because, like the EPA and AECB estimates, it is based on a life table analysis of the lifetime risk from lifetime exposure (NCRP84). This estimate uses an absolute risk projection model with a relatively low risk coefficient, 10 cases per 10^6 person WLM per year at risk, which is the smallest of those listed by the NAS BEIR-3 Committee (cf. Table 2-2). Moreover, they have assumed that the risk of lung cancer after irradiation decreases exponentially with a 20-year half-life and, therefore, exposures occurring early in life present very little risk.

The NCRP assumption of a 20-year half-life for radiation injury reduces the estimated lifetime risk by about a factor of 2.5. Without this assumption, the NCRP risk estimate would be the same as the midpoint of the UNSCEAR estimate (325 fatalities per million person WLM). The assumed decrease in risk used by NCRP is questionable. If lung cancer risk decreased over time with a 20-year half-life, the excess lung cancer observed in Japanese A-bomb survivors (following the minimum latent period) would have decreased during the period this group has been followed (1950-1982); but to the contrary, their absolute lung cancer risk has increased markedly (Ka82).

Comparison of Estimates

Good agreement exists among the EPA, NAS (BEIR-3), and the AECB estimates listed in Table 2-3. Each of these estimates is based on lifetime exposure and lifetime expression of the incurred risk. Conversely, the three lower risk estimates shown in Table 2-3 either do not explicitly include these conditions or they include other modifying factors. Nevertheless, Table 2-3 indicates a divergence, by a factor of about 6, in risk estimates for exposure to radon-222 progeny. Thus, the use of a single risk coefficient may not be appropriate, as it could give the impression that the risk is well known when obviously it is not. The EPA, BEIR-3, and AECB estimates may be slightly high because they represent relative risks based on adult males, many of whom smoked. The actual risk may be smaller for a population that includes adult females, children, and nonsmokers. The UNSCEAR and ICRP estimates are probably low because they represent absolute risk estimates that do not completely take into account the duration of the exposure and/or the duration of the risk during a lifetime. The NCRP estimate is likely to be very low, as a low risk coefficient was used in an absolute risk model, and it was assumed that the risk decreases exponentially after the exposure.

2.3.4 Selection of Risk Coefficients

To estimate the range of reasonable risks from exposure to radon-222 progeny for use in the Background Information Document for Underground Uranium Mines (EPA85), EPA averaged the estimates of BEIR-3, the EPA model, and the AECB to establish an upper bound of the range. The lower bound of the range was established by averaging the UNSCEAR and ICRP estimates. The Agency chose not to include the NCRP estimate in its determination of the lower bound because this estimate used an absolute risk projection model with a relatively low-risk coefficient. Therefore, the EPA chose relative risk coefficients of 1.2 percent per WLM and 2.8 percent per WLM (300 to 700 fatalities per million-person WLM) as reasonable estimates for the possible range of effects from inhaling radon-222 progeny for a full life time. Although these two risk estimates do not encompass the full range of uncertainty, they appeared to illustrate the breadth of much of current scientific opinion.

The lower limit of the range of relative risk coefficients, 1.2 percent per WLM, is similar to that derived by the Ad Hoc Working Group to Develop Radioepidemiological Tables, which also used 1.2 percent per WLM (NIH85). Some other estimates based only on U.S. and Czech miner data average 1 percent per WLM (Ja85) or 1.1 percent per WLM (St85).

A possible 0.5 percent per WLM lower bound of risk mentioned by the Environmental Protection Agency Radiation Advisory Committee (SAB85) appears too low. Estimates of this magnitude of risk are usually based on data from the entire cohort of U.S. white uranium miners (Th82, Wh83, Ja85, St85). The risk of exposure of 600 cumulative WLM or less, however, is usually 2.4 times or more higher than the risk for the entire cohort (Lu71, Ar79, Th82). For this reason, the 0.5 percent per WLM relative risk coefficient was not used.

The upper limit is lower than what might be justified by some current reports. Although the Swedish iron miners study (Ra84) suggested a rather high relative risk coefficient, this is a comparatively small study. In 1985, the National Institute of Occupational Safety and Health estimated the relative risk coefficient in these Swedish miners was 3.6 percent per WLM (NIOSH85). In the same year, a report on 8500 Saskatchewan uranium miners (Ho85) estimated a relative risk of 3.3 percent per WLM. In addition, a small study was made of persons exposed to different levels of radon-222 daughters and smoking in

dwellings on the Swedish island of Oeland (Ed83, 84). Data from this study could justify a relative risk coefficient of about 3.6 percent per WLM.

These three studies indicate a relative risk coefficient greater than 3 percent per WLM; therefore, the EPA is increasing the upper limit of its estimated range of relative risk coefficients. To estimate the risk due to exposure to radon-222 progeny, the EPA will use the range of relative risk coefficients of 1 to 4 percent per WLM. These risk coefficients were obtained by rounding off the coefficients listed above to the nearest whole number.

These changes are in agreement with the recommendations of the Radiation Advisory Committee of the Science Advisory Board of EPA (SAB85) which recommended that EPA use a risk coefficient range of 1 to 4 percent per WLM, as they believed that both overestimations of exposure and the effect of random error could have biased the risk coefficients downward, and a risk coefficient of 4% was recommended as an upper bound. The Committee also recommended use of single-digit risk coefficients to avoid the suggestion of a precision that does not exist. In response to these recommendations, EPA used risk coefficients of 1 to 4 percent per WLM. These risk coefficients were obtained by rounding off the coefficients discussed above. The basis for these relative risk coefficients was reviewed for this final report, but no changes were made and the risk estimates are based on 1 and 4 percent per WLM.

It may be noted here that using a 1% to 4% relative risk per WLM with the WLM Exposure Equivalent defined earlier is numerically the same as using a 0.6% to 2.4% relative risk per WLM with the conventional WLM, (see table 2-3).

2.4 Estimating the Risks

2.4.1 Exposure

The exposure to radon-222 progeny at a site of interest is based on the calculated radon-222 concentration and the calculated radon-222 progeny equilibrium fraction:

$$\begin{array}{l}\text{Radon progeny} \\ \text{concentration} \\ \text{(WL)}\end{array} = \begin{array}{c}\text{Radon} \\ \text{conc.} \\ \text{pCi/l)}\end{array} \times \begin{array}{c}\text{Radon progeny} \\ \text{equil. fraction} \\ (f_{e}^{\text{eff}})\end{array} \times \begin{array}{c}9.84 \times 10^{-3} \\ \text{(WL per pCi/liter)}\end{array}$$

For individuals and regional populations, emission data and meteorological data are used with the AIRDOS-EPA model (Mo79) to calculate air concentrations of radon-222; for national populations, emission data and meteorological data are used with the NOAA Trajectory Dispersion Model (NRC79).

Calculations of radon-222 progeny equilibrium fractions are based on distance from a source and the time required to reach the exposure site. By using the ingrowth model of Evans (Ev69) and the potential alpha energy data of UNSCEAR (UNSCEAR77), the outdoor equilibrium fraction can be calculated by the expression:

$$f_e^{out} = 1.0 - 0.0479e^{-t/4.39} - 2.1963e^{-t/38.6} + 1.2442e^{-t/28.4}$$

where t is the travel time in minutes (distance/transport velocity).

The indoor equilibrium fraction presumes that those decay products associated with the radon-222 release also enter the building and that a ventilation rate of 1 h^{-1} (one air change per hour) in combination with indoor removal processes (e.g., deposition onto room surfaces) produces an indoor equilibrium fraction of 0.35 when there are no decay products in the ventilation air and 0.70 when the decay products are in equilibrium with the radon-222 in the ventilation air (EPA83b). A simple linear interpolation is used to obtain the indoor equilibrium fraction:

$$f_e^{in} = 0.35\ (1 + f_e^{out}).$$

If one further assumes that a person spends 75 percent of his or her time indoors and the remaining 25 percent outdoors at the same location, the effective equilibrium fraction is given by:

$$f_e^{eff} = 0.75\ f_e^{in} + 0.25\ f_e^{out} = 0.2625 + 0.5125\ f_e^{out}$$

An example of the case for a 3.5 m/s windspeed and various distances from the source is given in Table 2-4. Removal processes outdoors were assumed to limit the equilibrium fraction to 0.85, which corresponds to an indoor equilibrium fraction of 0.65 and an effective fraction of 0.70. Table 2-4 shows that this limit is reached at a distance of 19,550 meters.

2.4.2 Risk Estimation

After the exposure equivalent has been calculated, the risk can be estimated for an individual or a population.

Individual

Individual risks are calculated by using the life table methodology described by Bunger et al. (Bu81). Relative risk

Table 2-4. Radon-222 decay product equilibrium fraction at selected distances from the center of a 80 ha. tailings impoundment[a]

Distance (m)	f_e^{out}	f_e^{in}	f_e^{eff}
0	0.008[b]	0.353	0.267
100	0.009	0.353	0.267
150	0.013	0.355	0.269
200	0.020	0.357	0.273
250	0.026	0.359	0.276
300	0.031	0.361	0.278
400	0.041	0.364	0.284
500	0.051	0.368	0.289
600	0.060	0.371	0.293
800	0.078	0.377	0.302
1,000	0.094	0.383	0.311
1,500	0.133	0.397	0.331
2,000	0.168	0.409	0.349
2,500	0.201	0.421	0.366
3,000	0.234	0.432	0.382
4,000	0.295	0.453	0.414
5,000	0.353	0.473	0.443
6,000	0.407	0.493	0.471
8,000	0.507	0.527	0.522
10,000	0.593	0.558	0.566
15,000	0.755	0.614	0.650
19,550	0.850	0.648	0.698

(a) Calculations (tabulated to 3 decimal places to facilitate comparisons) presume: a 3.5 m/s windspeed for the outdoor equilibrium fraction; an indoor equilibrium fraction of 0.35 for no radon-222 decay products in the ventilation air and 0.70 for ventilation air with 100 percent equilibrium between radon-222 and its decay products; and an effective equilibrium fraction based on 75 percent of time indoors and 25 percent of time outdoors.

projections for lifetime exposure based on coefficients of 1.0 percent and 4.0 percent per WLM for the radiation-induced increase in lung cancer yield rounded-off estimates of 380 deaths/10^6 person WLM and 1520 deaths/10^6 person WLM, respectively when using updated age specific mortality and the 1980 life table data. These risk projections compare to the estimate of 250 and 1000 deaths/10^6 person WLM used in the Draft Background Information Document which were based on the 1970 life tables. The updated estimates used in this final document are based on the same risk coefficients but yield higher death rates since there are more people in each age category and there is a higher total incidence of lung cancer.

These risk coefficients can be used in the CAIRD Code (Co78) to calculate the risk from any exposure to radon-222 progeny across any time period. Usually, the lifetime risk from lifetime exposure at a constant level is calculated. The age-specific differences in exposure equivalent listed in Table 2-1 are included in calculations of the lifetime risk.

One of the characteristics of the life table based calculations is that the same risk coefficients will yield different estimates of life time risk when different life tables are used. This is particularly true of relative risk projections when both the life table and the age-specific mortality data in the calculation may be changed. Prior ORP relative risk estimates were based on the 1970 life table (NCHS75) and the 1970 mortality data (NCHS73). For this document the basis for calculation has been changed to the recently available 1980 life table (NCHS85) and 1980 mortality data (NCHS83).

Although this change provides risk estimates more appropriate for the 1980s, the increase in the life span reflected in the life table and, more significantly, the increase in lung cancer mortality (Figures 2-2 and 2-3) have caused an appreciable upward change in the risk estimate. Lifetime risk estimates made using the relative risk projection with 1980 vital statistics are about 50% greater than those made earlier using the 1970 vital statistics. Thus, the updated estimates used in this final document are based on the same risk coefficients (1% and 4% increase per WLM), but yield highter numerical risks since there are more people in each age catagory and there is a higher rate of lund cancer mortality for each age.

Results of representative calculations of lifetime risk using 1980 data are given in Table 2-5.

Table 2-5. Lifetime risk for lifetime exposure to a given level of radon-222 progeny (1980 Life Table, 1980 Mortality Data)

Radon-222 progeny concentration (WL)	Lifetime risk of lung cancer: 4 percent increase per WLM	Lifetime risk of lung cancer: 1 percent increase per WLM
0.0001	3.5×10^{-4}	8.8×10^{-5}
0.001	3.5×10^{-3}	8.8×10^{-4}
0.01	3.4×10^{-2}	8.8×10^{-3}
0.1	2.8×10^{-1}	8.3×10^{-2}
0.2	4.5×10^{-1}	1.6×10^{-1}

The lifetime risk estimates shown in Table 2-5 are for lifetime exposure at a constant level of radon-222 progeny. These risk estimates were used with WL exposures that were calculated by using radon-222 concentrations and an f_{eff} determined as shown in Table 2-4 to estimate the risks of fatal lung cancer due to maximum exposure of individuals living nearest the tailings impoundments (Table 6-1).

Lifetime risk factors for selected concentrations of radon-222 in air with relative risk coefficients of 1 percent and 4 percent per WLM are shown in Table 2-6 in a manner similar to Table 2-5.

Table 2-6. Lifetime risk for lifetime exposure to a given level of radon-222 in air

Radon-222 concentrations (pCi/l)	(WL)[a]	Lifetime risk of lung cancer: 4 percent increase per WLM	Lifetime risk of lung cancer: 1 percent increase per WLM
10	6.9×10^{-2}	2.1×10^{-1}	5.9×10^{-2}
3	2.1×10^{-2}	7.1×10^{-2}	1.8×10^{-2}
1	6.9×10^{-3}	2.4×10^{-2}	6.1×10^{-3}
0.3	2.1×10^{-3}	7.4×10^{-3}	1.8×10^{-3}
0.1	6.9×10^{-4}	2.4×10^{-3}	6.1×10^{-4}

(a) At equilibrium fraction of 0.7.

Regional

Collective (population) risks for the region are calculated from the annual collective exposure (person WLM) for the population in the assessment area by a computerized methodology known as AIRDOS-EPA (Mo79). An effective equilibrium fraction of 0.7 is presumed because little collective exposure takes place near the source.

Formally, the annual collective exposure, S_E, can be defined as:

$$S_E = \int_o^\infty E\ n(E)\ dE$$

where S_E is the collective exposure (person WLM), E is the exposure level (WLM), and n(E) is the population density at exposure level E (person/ WLM).

Practically, however, the collective exposure is calculated by dividing the assessment area into cells and then calculating the population, N_i (persons), and the annual exposure, E_i (WLM), for each one. The collective exposure is then calculated by the following expression:

$$S_E = \sum E_i N_i$$

where the summation is carried out over all the cells. Customarily, the regional population exposure is limited to persons within 80 km of the source.

The same risk factors used for the individual risk calculations (4 percent increase per WLM or 1 percent increase per WLM) are also used to calculate the population risk.

National

Radon-222 released from a source can be transported beyond the 80-km regional cutoff. A trajectory dispersion model developed by NOAA (NRC79) has been used to estimate the national impact of radon-222 releases from a source. This model calculates the average radon-222 exposure to the U.S. population from unit releases at four typical uranium mining and milling sites. The model yields radon-222 concentrations (in picocuries per liter) in air, which are then converted to decay product exposures by assuming an effective equilibrium fraction of 0.7. National annual collective exposures (person-WLM) are calculated for distances beyond the 80-km regional limit. The exposures and risks are calculated for a total population of 200 million persons.

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Chapter 3: RADON-222 SOURCES, ENVIRONMENTAL TRANSPORT, AND RISK ESTIMATES

3.1 Introduction

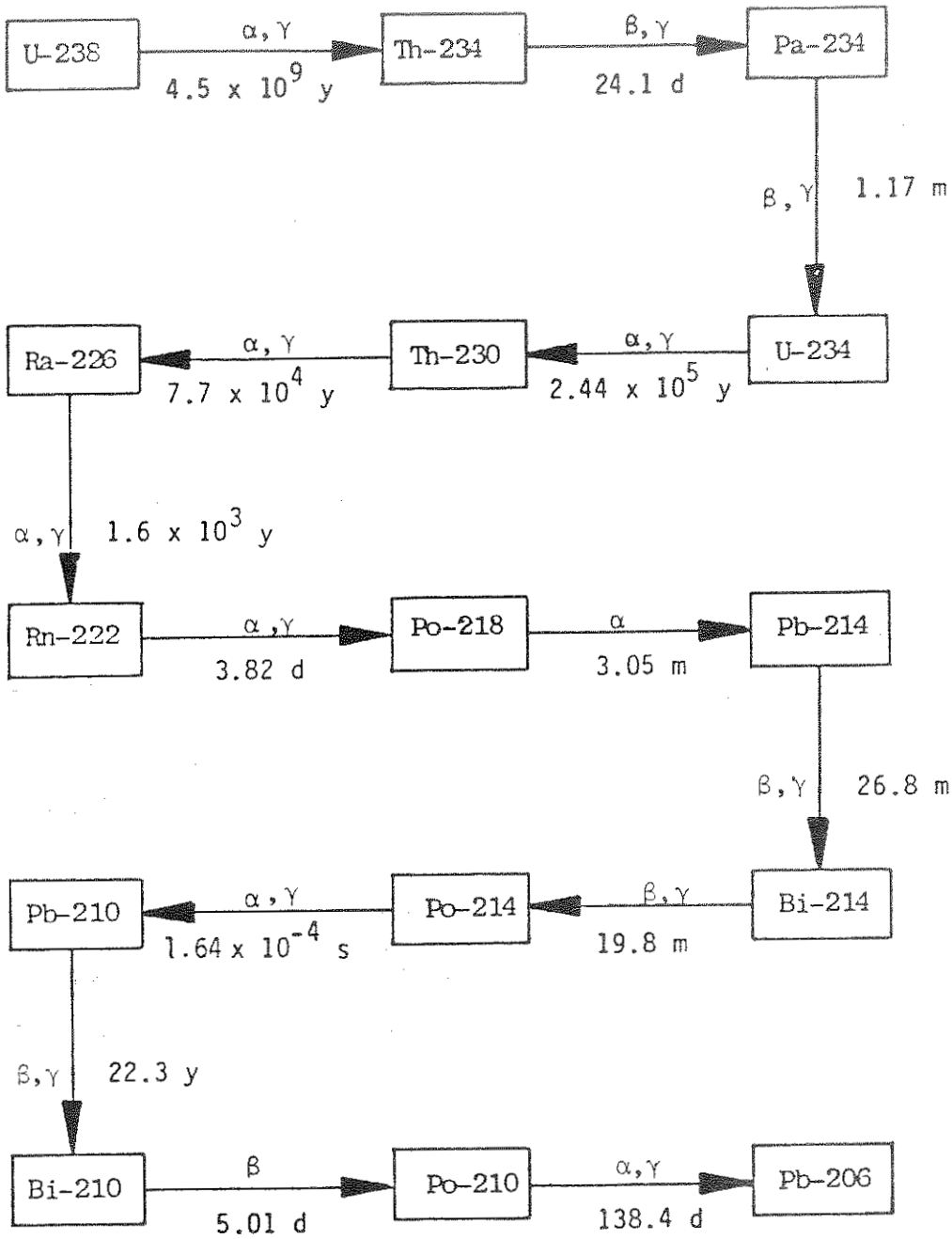
This chapter presents the physical and chemical properties of radon-222, where and how it is emitted from the uranium milling process, and how it is transported through the environment. Also presented are the methods used to model the dispersion of the radon-222 and a description of how the health risks associated with these emissions are estimated.

3.2 Origin and Properties of Radon-222

Uranium ore contains both uranium and its decay products, including significant concentrations of radium-226. Radon-222 is a naturally occurring radioactive gaseous element that is formed by the radioactive decay of radium-226. Radium-226 is a long-lived (1620-year half-life) decay product of the uranium-238 series. In nature, uranium is about 99.3 percent uranium-238; thus, it is the decay products of uranium-238 (shown in Figure 3-1) that govern the radioactive content of the ore (NRC81). Other isotopes of radon (radon-219 and radon-220) occur from the decay of uranium-235 and thorium-232, but these isotopes have short half-lives of 3.96 and 55.6 seconds, respectively, and have little environmental impact due to the short half-lives of the decay products. Important properties of radon-222 are presented in Table 3-1 for information purposes only.

Mined uranium ore is milled to extract the uranium-238. Milling removes about 90 percent of the uranium-238 from the ore. The remaining uranium-238 and essentially all other radioactive elements (including thorium-230) present in the ore are left behind and disposed of with the mill waste (tailings). These tailings will remain radioactive for hundreds of thousands of years.

Radon-222 is the only member of the decay chain that is a gas. It is a noble gas and therefore does not usually combine with other elements to form nongaseous compounds. As a gas, radon-222 is released to the atmosphere if it escapes (emanates from) the mineral matrix that contains its parent, radium-226. The subsequent radioactive decay of radon-222 produces a series of solid radioactive products called "radon progeny." If radon-222 is airborne at the time of its decay, these radon progeny become attached to dust particles in the air and can be inhaled and deposited in the lungs (NRC81).



y - years
d - days
m - minutes
s - seconds

Figure 3-1. Uranium-238 decay chain and half-lives of principal radionuclides.

Table 3-1. Properties of radon-222[a]

Property	Value
Atomic number	86
Atomic weight	222
Boiling point	-62°C
Melting point	-71°C
Density	9.73 grams/liter
Solubility in water	51 cm^3 in 100 grams at 0°C
	8.5 cm^3 in 100 grams at 60°C
Half-life	3.824 days
Decay modes and energy	
α	5.4897 MeV
γ	0.512 MeV

(a) Source: Chemical Engineer's Handbook, Perry, J. H. (editor), McGraw-Hill Book Co., New York, New York, 1983, and Chart of the Nuclides, Knolls Atomic Power Laboratory, Operated by General Electric Co. for U.S. Dept. of Energy, 12th Edition, April 1977.

Radon-222 that enters the atmosphere can be transported over great distances. At distances beyond about a mile, however, the contribution of radon-222 concentrations from the mills and tailings piles is indistinguishable from natural background (NRC81). Some uranium-238, 1-2 ppm, is present in most soils; therefore, radon-222 is emitted constantly from the Earth's surface (NRC81). It is estimated that 120 million Ci/y of radon-222 is emitted from undisturbed soil and an additional 3 million Ci/y is emitted from tilled soil (NRC81). In comparison, uranium tailings disposal at licensed mills currently contributes about 140,000 Ci/y (PEI85).

3.3 Sources of Radon-222 Emissions in the Milling Process

Uranium ore is processed in mills to recover and concentrate uranium to an intermediate, semirefined product often called "yellowcake." This yellowcake is sent to separate refining facilities that produce uranium metal, UO_2, or UF_6. Conventional uranium milling involves a series of unit operations, including ore handling and preparation, extraction, concentration and precipitation, product preparation, and tailings disposal.

Ore stockpiles, crushing and grinding operations, the extraction circuit, and tailings piles are sources of radon-222 at operational uranium mills, as illustrated in Figure 3-2. Other sources, such as contaminated former ore storage areas, also release radon-222. These sources, however, are comparatively small in comparison with tailings and of such uncertainty in size, source strength, and frequency of occurrence that they are omitted from the present analyses.

Radon-222 releases can be characterized as total-release events or continual, diffusion-limited releases. Thick or deep sources, such as ore storage piles and mill tailings impoundments, that remain undisturbed for extended periods of time release radon-222 by diffusive and advective mechanisms. Accordingly, the radon-222 emission is often characterized by a mathematical diffusion expression of the radon-222 flux. Conversely, sources that rapidly release radon-222 during a mechanical disturbance, such as the crushing and grinding operation, are best characterized by a radon-222 release per unit mass; e.g., picocuries of radon-222 per picocuries radium-226 present. This release can then be expressed in terms of the amount of U_3O_8 produced by the mill.

The domestic uranium ores currently mined contain an average of about 0.1 percent uranium. When uranium ore lies underground, only a very small fraction (if any) of the radon-222 it produces

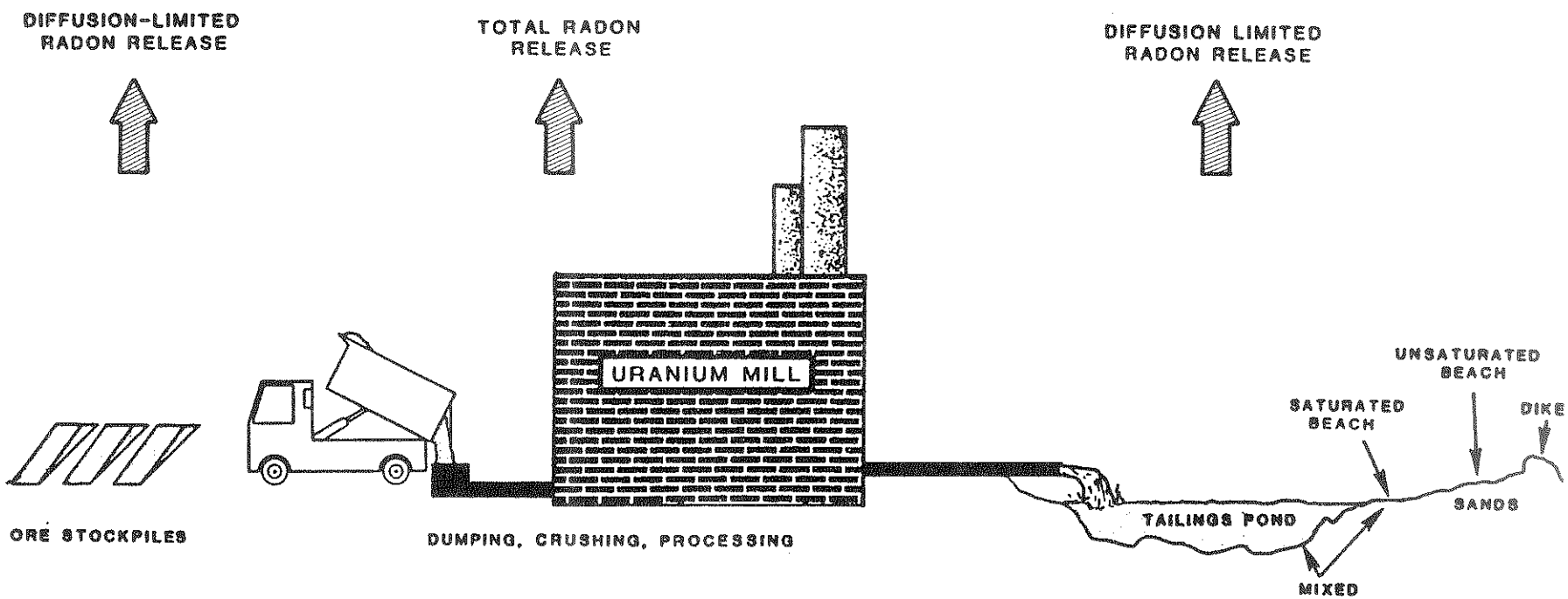


Figure 3-2. Schematic illustration of the radon sources at a uranium mill (PEI85).

escapes to the atmosphere. Radon-222 has a half-life of only 3.8 days; therefore, most of the radon-222 that is generated more than a few meters below the surface decays into nongaseous radionuclides before it can migrate through the soil pore space (the air space between soil particles) and escape into the atmosphere. When uranium ore is mined and milled, however, the handling and grinding operations liberate radon-222 contained in the pores in the ore. Milling of the ore to sand-sized particles also allows a greater portion of the radon-222 that forms in the tailings to be released into the atmosphere by diffusive and advective mechanisms. Both the increased surface area of the particles and increased porosity resulting from the milling process cause an increase in the portion of radon-222 that escapes to the atmosphere.

Ore Handling and Preparation

Ore handling and preparation include ore blending, storage, crushing, fine ore storage, and grinding. Ore blending ensures that the mill feed is of uniform grade, which is necessary to achieve maximum efficiency in the mill circuit. Blending may be performed at either the mine or the mill. Ore is stored in stockpiles on ore pads at the mill site. The stockpiles provide sufficient feed for a continuous supply to the mill. Ore received from the mine often has a high moisture content; however, the dry climate typical of the major uranium districts causes rapid drying. For this reason, some ore storage piles are sprayed with water to maintain their moisture content and to reduce dusting.

Storage pads typically cover several acres and provide enough ore storage to feed the mill for one or two months of operation. Ore usually is not kept on the storage pad when the mills are on standby status. Similarly, when operations are reduced because of a depressed economy, as they currently are, a lesser quantity of ore is stockpiled at the mill site than would be if the mill were operating at full capacity. The ore residence time in storage piles varied from 4 to 180 days, with a mean and standard deviation of 87 $\pm$ 72 days, at seven mills surveyed in Wyoming (Th82).

The number of piles can be estimated by the product of the mill feed rate (weight/day) and the stockpile residence time (days) divided by the mass of a pile. The piles vary in shape among different mills, but they are frequently conical, oblong, or wedge-shaped. A maximum height of 10 m (30 ft) and 45-degree sloping sides are common. The volume and surface area of a typical pile have been estimated to be 8000 m^3 and 2500 m^2, respectively (Th82). Emissions of radon-222 from stockpiles are

considered to emanate from an infinitely deep or thick source from all surfaces, even though some parts may be shallow or thin. The resulting high radon-222 emission estimate for some of the pile areas is justified by the variable sizes, shapes, and other characteristics of ore stockpiles.

Stockpiles initially emit no radon-222 because all of the emanated radon-222 stored in the pores of the ore was released as the ore was mined and transported to the stockpiles. As new radon-222 emanates into the pore space of the ore, the interstitial radon-222 levels and the escaping radon-222 flux increase. After several weeks, a nearly constant radon-222 flux (emission rate) is attained.

Crushing is the first stage of size reduction and involves the use of impact and/or gyratory crushers. Crushing typically reduces mine run ore to between minus 3/4 inch and minus 1-1/2 inch size (Me71). Fine ores (undersized material) bypass the crushing circuit and are conveyed directly to fine-ore storage bins. Air exhaust hoods with dust collectors are located on crushers and screens and at transfer points to minimize particulate emissions, and air is exhausted to the atmosphere via vents. The dust collectors do not capture radon-222 emanating from the ore during these processes, and it is vented to the atmosphere. Crushing plant capacities range from 70 to 320 tons per hour (NRC80).

Crushed and undersized ore is stored in cylindrical fine-ore bins about 7 to 10 m (25 to 35 feet) in diameter. These bins provide a fine-ore storage capacity up to double the rated daily milling capacity (NRC80). Radon-222 that emanates from the fine ore in storage is vented to the atmosphere.

Belt-type feeders convey the ore from the crushing circuit and fine-ore bins to the grinding circuit, where rod and ball mills or semiautogenous mills are used to reduce the ore size further. Occasionally, the ore is roasted before it is sent to the grinding circuit to reduce moisture before grinding, to increase the solubility of other valuable constituents (e.g., vanadium), or to improve the physical characteristics of the ore. The ores are ground dry and then slurried with water or wet-ground to yield a pulp density of 50 to 65 percent solids (NRC80). Classifiers, thickeners, cyclones, or screens are used to size the ore, and coarser particles are returned for further grinding. One mill uses an alkaline leaching process, which requires the ore be ground much finer (200-mesh) than for acid leaching (28-mesh).

Wet, semiautogenous grinding is being used increasingly in place of dry crushing or ball and rod mill grinding operations, which may be run wet or dry. The semiautogenous grinder performs the ore sizing function of these operations and reduces or eliminates dry ore handling.

The total release of radon-222 from the dumping, crushing, and extraction processes occurs mostly during the process of transferring and dumping the ore into the mill feed area. The ore is typically reduced to sizes of less than 40 cm, which is the relaxation diameter for radon-222 diffusion from ore pieces with diffusion coefficients of 10^{-3} cm^2/s; therefore, radon-222 escapes readily from the pores of the ore when it is handled and results in the total release of accumulated radon-222. During the remainder of the short milling process, little additional radon-222 escapes from the ore for release. Hard-rock uranium ores are an exception, in that they have very low diffusion coefficients for radon-222 (10^{-4} to 10^{-5} cm^2/s). The 4 to 14cm particles of these ores can significantly reduce radon-222 releases; hence, the sharp one-time release is less and is delayed until the ore is ground to smaller particle sizes during milling.

Extraction

Hydrometallurgical leaching techniques are used to recover uranium from the ground ore slurry. Little radon-222 is released from the extraction process because the radon-222 contained in the ore is released during initial ore handling and size reduction steps and the relatively short milling time (less than 24 hours) does not permit significant formation of new radon-222. The extraction process uses sulfuric acid or an alkaline carbonate solution for lixivation. Acid leaching is preferred for ores with low lime content (12 percent or less) (NRC80) and is the predominant leach process in the United States. A flow diagram of the acid leach/solvent extraction process is shown in Figure 3-3.

The leaching circuit consists of a series of mechanically agitated tanks having a total ore residence time of approximately 7 hours. The pH in the tanks is maintained between 0.5 and 2.0 by adding sulfuric acid. The free acid concentration is from 1 to 90 grams of acid per liter during the contact period (NRC80). Acid leaching is carried out at atmospheric pressure and slightly above room temperature.

After leaching, the pregnant leach solution is separated from the tailing solids in a countercurrent decantation (CCD) circuit. The sands and slimes are pumped to a tailings pond for disposal.

Alkaline leaching, which is best suited to ores with high lime content, may be used in combination with ion exchange or caustic precipitation to concentrate and purify uranium. A flow diagram of the alkaline leach/caustic precipitation process is shown in Figure 3-4.

The ore slurry is leached in a two-stage system (pressure leaching followed by atmospheric leaching). The leach solution contains sodium carbonate (40 to 50 grams per liter) and sodium bicarbonate (10 to 20 grams per liter). Circular tanks are used and air is added to oxidize the uranium to the hexavalent state. Residence time varies from 21 to 33 hours. The pregnant leach solution is separated from the tailings in a series of CCD filtrations.

Concentration and Precipitation

Three techniques are used to concentrate uranium from the pregnant leach solution: ion exchange, solvent extraction, and the Eluex process, which is a combination of ion exchange and solvent extraction. Uranium that has been concentrated by one of these methods is precipitated from the solution by the addition of gaseous ammonia (NH_3), sodium hydroxide (NaOH), hydrogen peroxide (H_2O_2), or magnesia (MgO) in several stages under controlled pH. Most mills use gaseous ammonia. The precipitated uranium is dewatered in thickeners and then filtered and washed in drum, plate, or frame filters. At this point, the resulting filter cake still contains considerable moisture.

Product Preparation

The uranium filter cake (yellowcake) is dried in a continuous steam-heated dryer or in a multiple-hearth dryer. The dried yellowcake is crushed and screened to the required size and packaged in 55-gallon drums for shipment. Some radon-222 emanates from this operation and is vented to the atmosphere.

Tailings Disposal

With the exception of the uranium extracted during milling, the dry weight of the tailings represents the total dry weight of the processed ore. Ore contains only about 0.1 percent uranium; therefore, the tailings consist of 99.9 percent of the ore, including all the radioactive decay products. The tailings discharge is composed of three fractions: (1) the sands, which consist of solids greater than 200 mesh (74 mm); (2) the slimes, which consist of solids less than 200-mesh; and (3) the liquid solution containing milling reagents and dissolved ore solids.

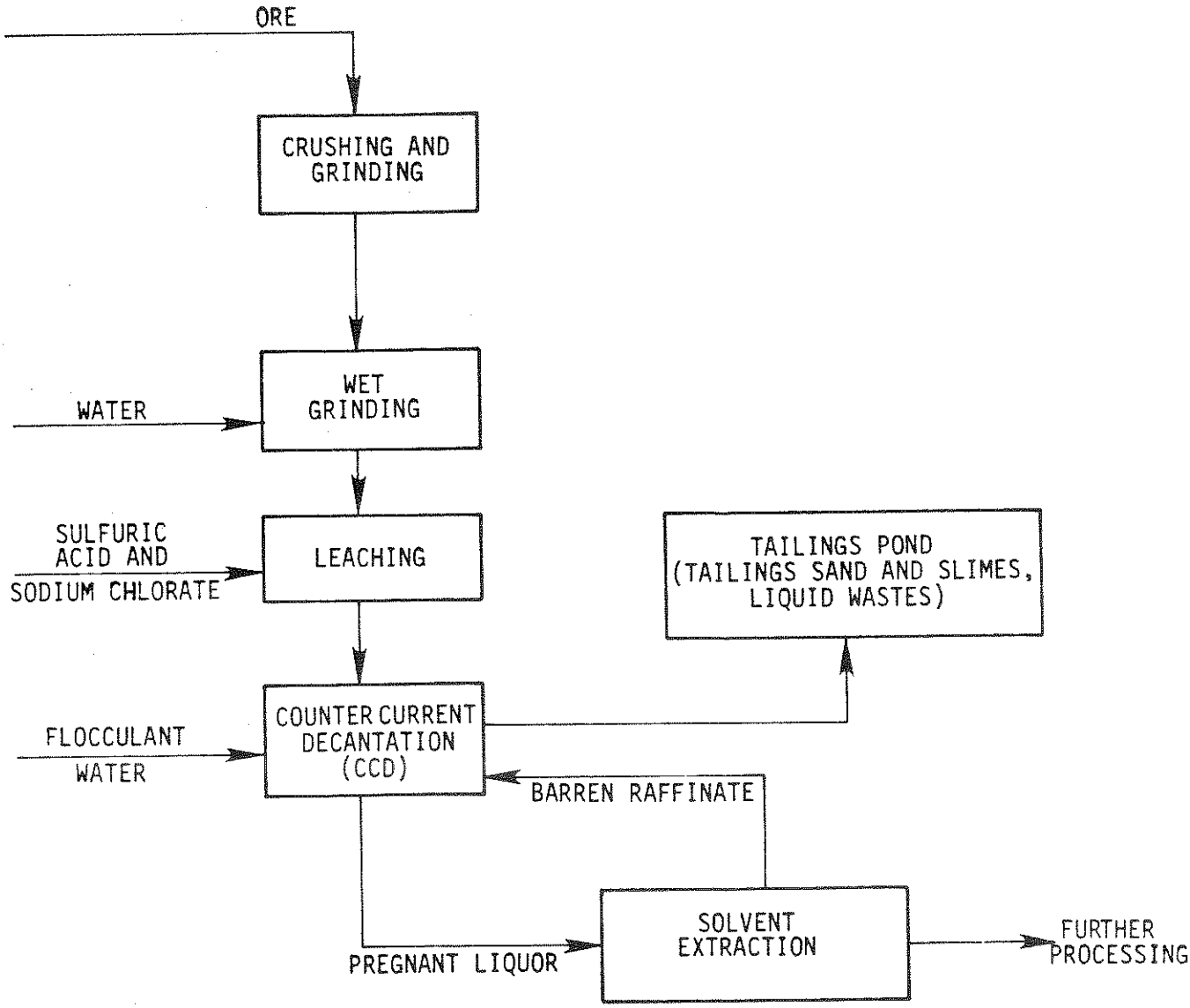


Figure 3-3. Simplified flow diagram of the acid leach process.

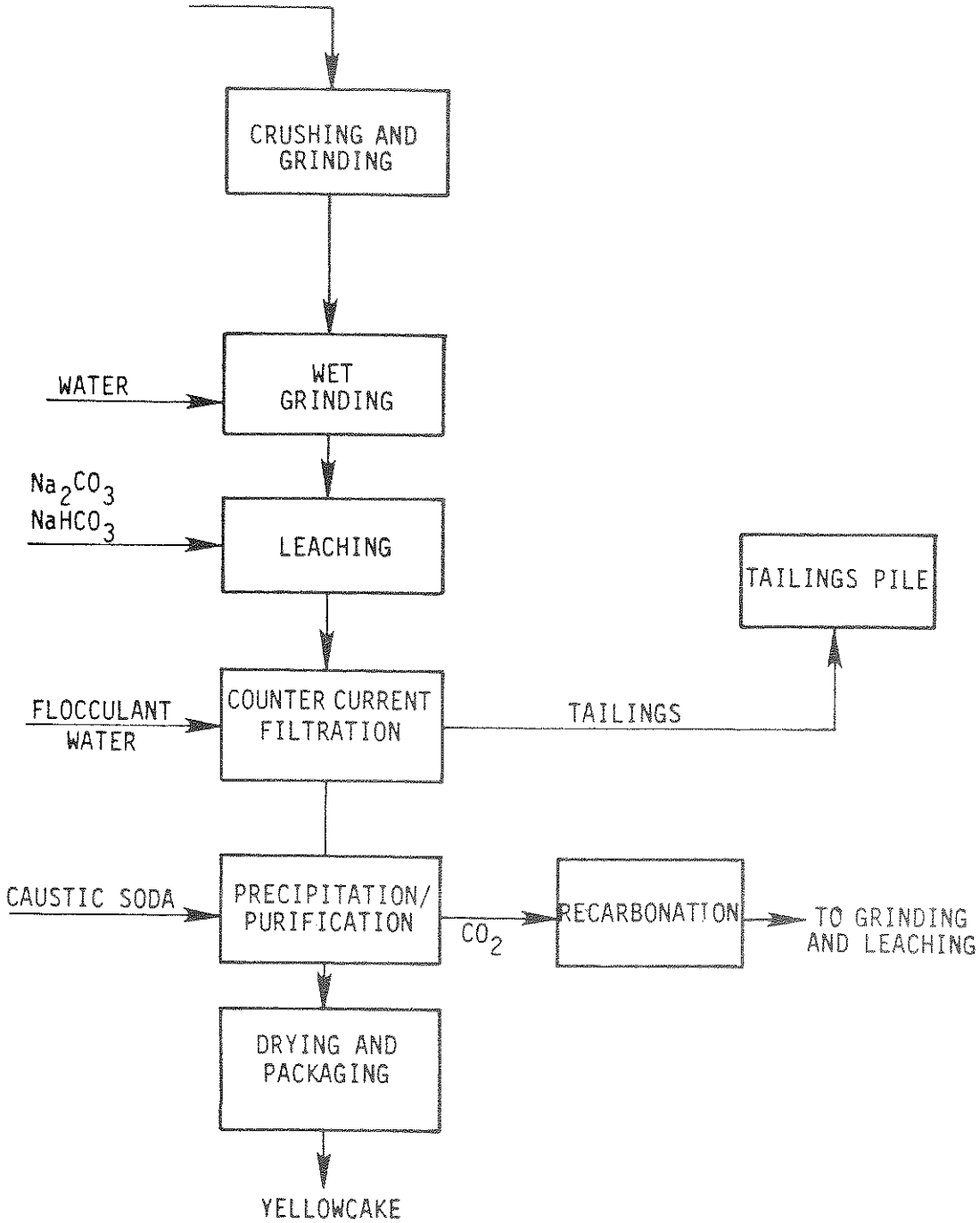


Figure 3-4. Simplified flow diagram of the alkaline leach-caustic precipitation process.

Dry tailings from an acid leach mill are typically composed of 20 to 37 percent slimes by weight (NRC80). Tailings are discharged from the mill as a slurry at an average ratio, by weight, of about 1:1 (solids to liquids) and are sent to an impoundment, where the tailings settle.

About 10 percent of the uranium-238 and virtually all of the other radionuclides in the ore are contained in the tailings. Tailings represent the largest and longest lasting source of radon-222 emissions from licensed conventional uranium mills because of the large exposed area and the significant concentrations of radium-226 present. The fine slimes fraction contains the majority of radium-226 in the tailings (up to 80 percent) (NRC80). The sands fraction contains radium-226 in concentrations ranging from 26 to 100 pCi/gram (NRC80), and the tailings liquid (raffinate) contains 1.7 to 35,000 pCi/liter of radium-226 and 50 to 250,000 pCi/liter of thorium-230 (EPA83).

The methods used to construct and fill tailings impoundments causes segregation of the slimes and sands. During spigoting, the sands are deposited on the perimeter of the impoundment and the slimes are carried to the central portions of the impoundment with the raffinate. The more porous sands are deposited away from the center of the pile and are therefore typically drier than the slimes, which are usually saturated with moisture of actually covered with standing process fluids.

Except for a small percentage used for backfill in underground mines, virtually all tailings are disposed of in impoundments. Disposal is below grade in mined-out or excavated pits and above grade behind dams. The majority of the tailing impoundments at licensed mills are above grade. Currently, new dams are constructed of earthen material, whereas in the past they were constructed of tailings sands. Impoundment sizes vary from 10 to about 121 ha (25 to 300 acres) (EPA85).

Site topography dictates the general shape of above-grade surface impoundments. One-sided, two-sided. and three-sided dams are constructed across valleys and along hillsides. Dams constructed on relatively flat terrain, where the tailings cannot be contained by the natural topography, are four-sided. Embankments are generally constructed of earthen material, but some (at six mills) are constructed of the snad fraction of the tailings.

The water level in a tailings impoundment is controlled through the use of decant towers, pumps, or siphons to recycle the water or to transfer it to evaporation ponds for proper maintenance of freeboard. Most mills operate with zero liquid discharge (40 CFR Part 440) and rely on evaporation.

Constructing impoundments with earthen embankments or below grade is the preferred method at new milling operations or for new impoundments at existing mills because they inherently have greater short-term and long-term stability. In addition, tailings disposed of below grade are typically covered with raffinate, which effectively controls dusting and reduces radon-222 emissions during the mill's active life.

Radon-222 is emitted from all exposed tailings in impoundments. Emission rates vary in different areas and over time. A qualitative illustration of the variation in radon-222 emissions over the life of a milling operation is shown in Figure 3-5. These emissions occur during the licensed phase of mill operations and continue for hundreds of thousands of years after closure of the mill. Radon-222 and radium-226 both have much shorter half-lives than their precursor thorium-230; therefore, their radioactivity remains the same as that for thorium-230 (EPA83). The radon-222 emissions decrease only as the thorium-230, which has a half life of 77,000 years, decreases (EPA83). It would require about 265,000 years for the radon-222 emissions to be reduced to 10 percent of its initial value (EPA83). If control techniques are not imposed, the radon-222 emissions will remain relatively constant, on a year-to-year basis for many tens of thousands of years.

3.4 Characterization of Emissions

The amount of radon-222 emitted from ore storage piles, milling circuits, evaporation ponds, and tailings impoundments depends on a number of highly variable factors, such as ore grade, emanation fraction, porosity, moisture, temperature, and barometric pressure. These factors, in turn, vary between milling sites, between locations on the same site, and with time (PEI85). These variations make it difficult to assess the radon-222 emission rate. For these reasons, mathematical models typically have been used to estimate average radon-222 emissions on a theoretical basis. A few systematic measurements have been made of radon-222 emissions from licensed uranium mills and tailings piles, and studies have demonstrated good agreement between actual measurements and estimates based on mathematical models (EPA83).

Considerable research has been conducted to develop and refine ways of calculating average radon-222 flux from infinitely thick or deep sources (i.e., at least 1 meter deep). This work has largely been carried out in support of the Uranium Mill Tailings Remedial Action Program (UMTRAP). Although these calculations were developed for inactive mill tailings piles, they are directly applicable to ore storage piles and tailings impoundments at licensed mills.

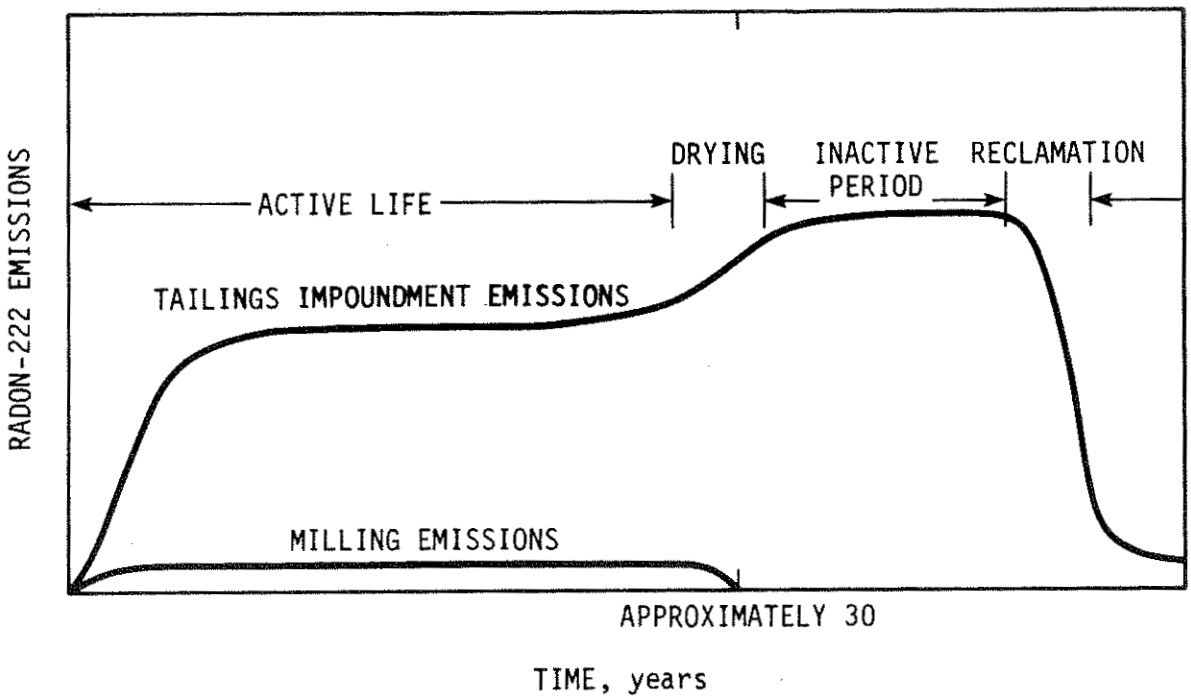


Figure 3-5. Qualitative illustration of radon-222 emissions from licensed uranium milling process.

A one-dimensional, steady-state, radon-222 diffusion equation has been developed for sources (e.g., ore piles and tailings) that are more than several meters thick (Ni82, Fr84). The equation is:

$$J_t = 10^4 \, R\rho E \, (\lambda D)^{1/2} \qquad (3\text{-}1)$$

where J_t is the radon-222 flux at the surface of the source (pCi/m^2s); R is the specific activity of radium-226 in ore or tailings equal to 2812 x uranium ore grade in percent (pCi/g); ρ is the bulk dry density of source (g/cm^3); E is the radon-222 emanating fraction of source, dimensionless; λ is the radon-222 decay constant ($2.1 \times 10^{-6}/s$); D is the effective diffusion coefficient for radon-222, equal to bulk radon diffusion coefficient/porosity De/ρ (cm^2/s); and ρ is the porosity, equal to 1-(bulk density/specific gravity).

For piles that are less than a few meters thick, Equation 3-1 should be multiplied by a hyperbolic tangent function that varies with depth or thickness (T), as shown in Figure 3-6. With the exception of the radon-222 decay constant, these parameters can vary significantly from location to location within the source, both horizontally and with depth, in a given ore pile or tailings impoundment. Except for the decay constant and bulk density, these parameters are difficult to measure. They are based on the physical characteristics of the source materials, which vary over time (e.g., radium-226 content may decrease over the life of the mill as ore grade declines), seasonally, or with changing mill operation (e.g., moisture content changes seasonally and with changes in mill operations and directly affects the emanation and diffusion coefficients).

A radon-222 release rate of 1 pCi Rn-222/m^2s per pCi of Ra-226 per gram of tailings is used in this background report because of emission rate variations and the lack of specific information required to use the more detailed mathematical equations (NRC80) (Ha85). Using an average, specific flux does not take into account site-specific conditions such as moisture, porosity, and emanation coefficients. It is useful for estimating industry-wide emissions, however, and is consistent with previous EPA studies (EPA83). In the following sections, a model mill handling 1800 t/day of ore with 0.1 percent U_3O_8 will be used to illustrate radon-222 emission calculations. Assumptions are made for the parameters required to calculate emissions with the diffusion equations, and for comparison a specific flux of 1 pCi Rn-222/m^2s per pCi of Ra-226/g is also used to estimate emissions.

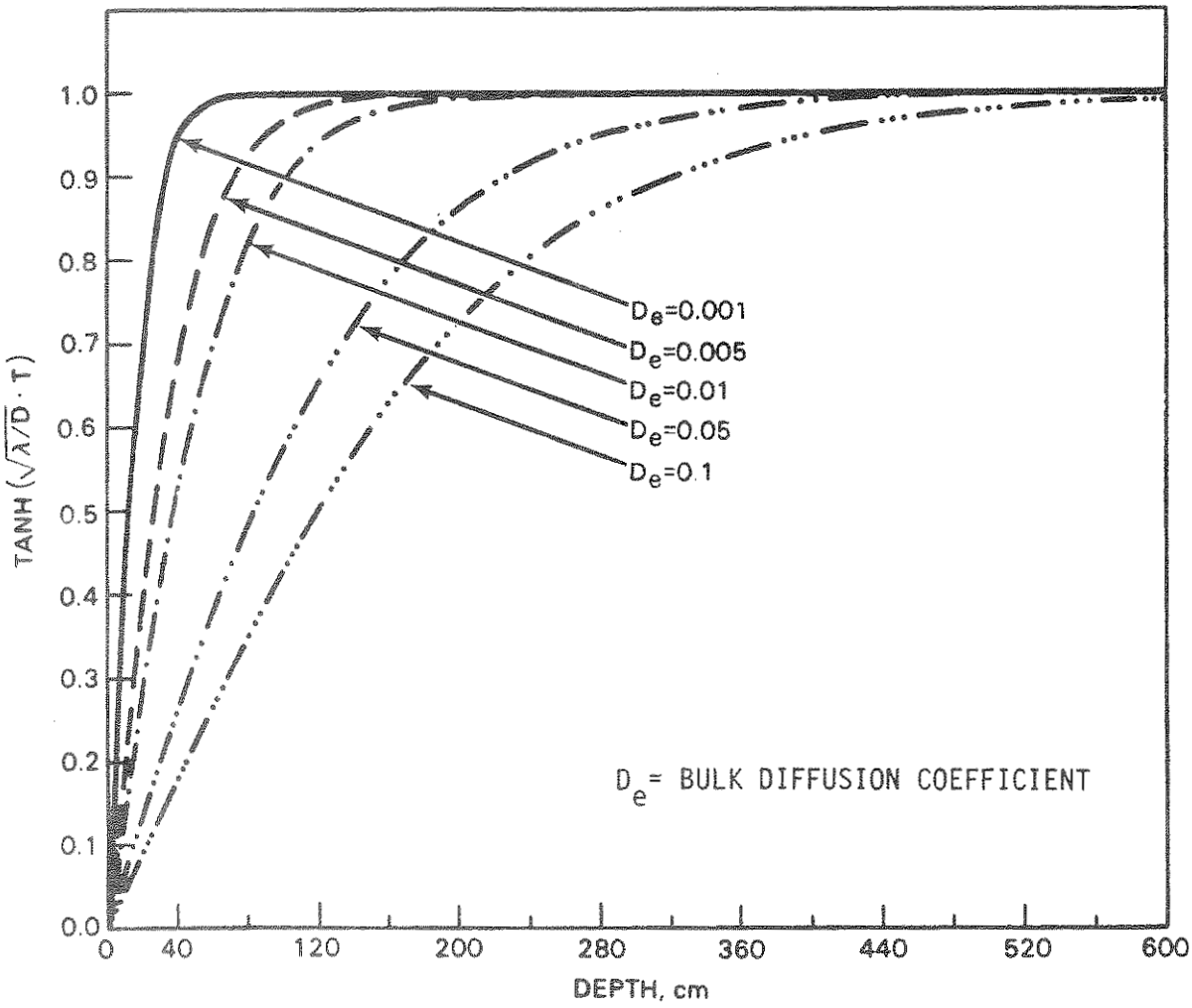


Figure 3-6. Effect of ore pile depth on hyperbolic tangent term in radon-222 flux equation (Ha85).

3.4.1 Ore Handling and Preparation

Stockpiles are blended to the average or optimum feed grade upon entry to the mill. Emissions can be based on the average radium-226 content, as both the initial total radon-222 release and the longer-term, diffusion-controlled radon-222 releases vary linearly with radium-226 content. The radium-226 content is typically estimated from ore grades, assuming secular equilibrium between the uranium-238 and the radium-226.

Ore storage piles are typically more than 3 meters deep. Thus, Equation 3-1 can be used to estimate radon-222 emissions if the various values are known, or a specific flux of 1 pCi Rn-222/m s per pCi Ra-226 per gram of ore can be used.

As an example, consider the ore pad at a hypothetical mill with the following parameters:

A = area of ore pile = 6 acres or $2.4 \times 10^4 m^2$

T = depth of ore pile = 3m minimum

R = Ra-226 concentration = $2812 \times 0.1\ U_3O_8$ = 281 pCi/g

E = emanating power of ore = 0.2

ρ = density = $1.6\ g/cm^3$

D = diffusion coefficient = $0.05\ cm^2/s$

$J = 10^4 R\rho E\ (\lambda D)^{1/2}$

$= 281 \times 0.2 \times 1.6\ (2.1 \times 10^{-6} \times \$\ 0.05)^{1/2} \times 10^4 cm^2/m^2$

$= 291$ pCi Rn-222/m^2s

The ore pad would have the following calculated radon-222 emissions:

291 pCi Rn-222/$m^2 \times 2.4 \times 10^4 m \times 3.156 \times 10^7$ s/y $\times\ 10^{-12}$ Ci/pCi = 221 Ci/y

Or if a specific flux of 1 pCi Rn-222/m^2s per pCi Ra-226 is assumed, the estimated emissions are:

1 pCi Rn-222/m^2s/pCi Ra-226/g x 281 pCi Ra-226/g x $2.4 \times 10^4 m^2$ x 3.156×10^7 s/y x 10^{-12} Ci/pCi = 213 Ci/y

3.4.2 Mill Emissions

The throughput is relatively large (several thousand tons per day); therefore, the residence time of ore in the mill is less than one day. This short residence time means that little new radon-222 is formed in the milling operation. Hence, the ore does not release large quantities of radon-222 in the mill circuit unless the radon-222 that previously emanated from the ore was not released completely during storage, handling, and crushing and grinding.

Most milling emissions of radon-222 occur during the transferring and dumping of the ore into the mill feed area because the ore has usually been reduced to sizes of less than 40 cm, which allow trapped radon-222 to escape. Emissions from dumping, crushing, and grinding can be estimated by assuming 10 percent of the radon is released, as shown here:

1800 t/day x 310 days/y x 281 pCi/g x 10^6 g/t x 10^{-12} Ci/pCi x 0.1 = 16 Ci/y

Alternatively, an average emission factor of 3.8×10^7 pCi/lb U_3O_8 may be used to estimate Rn-222 emissions from milling (PEI85).

1800 t/day x 310 days/y x 2200 lb/t x 0.001 lb U_3O_8/lb ore x 3.8×10^7 pCi/lb U_3O_8 x 10^{-12} Ci/pCi = 47 Ci/y

Radon-222 emissions from the leaching and extraction processes of the mill circuit are very low because these are wet processes and most of the radon-222 in the ore was already released during storage and handling prior to milling. Emissions from packaging the yellowcake product are also low, as very little (less than 0.1 percent) of the radium-226 that produces the radon-222 remains in the yellowcake.

3.4.3 Emissions From Tailings Disposal

The large area occupied by tailings impoundments and the extent of the exposed surface area make these impoundments the major potential source of radon-222. Tailings include the barren crushed ore material plus process solutions. These tailings consist of mixtures of sand and slimes (coarse and fine tailings). Evaporation ponds used to contain excess liquid from tailings impoundments also contain suspended and dissolved tailings and are included in this analysis. The size of these ponds was documented in a recent report (EPA85). Tailings solids are assumed to be carried with the process liquids and deposited on the bottoms of these ponds. If exposed, these solids are assumed to emit radon-222 at the same specific flux as tailings impoundments.

The procedure for estimating radon-222 emissions will depend on the amount of site-specific information available. If site-specific information on the radium-226 concentration, moisture content, porosity, density, and emanating power are known, the diffusion equation to estimate radon-222 flux may be used. Where specific information is not available, a simplified relationship of 1 pCi Rn-222/m s per pCi Ra-226/g of tailings may be used to estimate emissions from dry areas of tailings impoundments (wet and ponded areas are not assumed to emit radon-222). An example of the calculation used to estimate radon-222 emissions from tailings by both calculation procedures is presented here for a 50-ha (120-acre) impoundment. Of the total area, 50 percent consists of saturated or liquid-covered tailings and 50 percent is dry. The tailings solids in the impoundment are 10 m (30 ft) deep.

Emission estimates made by using diffusion Equation 3-1

$$\text{Radon-222 flux } J = 10^{4} R \rho E (\lambda D)^{1/2}$$

R = 281 pCi Ra-226/g of tailings
E = 0.2 (based on measurement; varies from ~0.1 to ~0.4)
ρ = density = 1.6 gm/cm^3
λ = 2.1 x 10^{-6}/s
D = diffusion coefficient for tailings
= 0.07 exp ($4mp^2 - 4m - 4m^5$)

where m is the moisture saturation fraction (~0.35), p is the porosity ($1-\rho/g$), and g is the specific gravity (~2.7 g/cm^3).

Thus:

$$p = 1 - 1.6/2.7 = 0.407$$

$$D = 0.07 \exp [4 \times 0.35 \times (0.407)^2 - 4 \times 0.35 - 4 \times (0.35)^5]$$

$$= 0.0213 \text{ cm}^2/\text{s}$$

$$J = 281 \times 0.2 \times 1.6 (2.1 \times 10^{-6} \times 0.0213)^{1/2} \times 10^4 \text{cm}^2/\text{m}^2$$

$$= 190 \text{ pCi/m}^2\text{s}$$

Total annual emissions are determined by multiplying J by the dry area and seconds per year.

$$\text{Rn-222} = 190 \text{ pCi/m}^2\text{s} \times 25 \times 10^4\text{m}^2 \times 3.156 \times 10^7\text{s/y} \times 10^{-12} \text{ Ci/pCi}$$

$$= 1505 \text{ Ci/y} = \sim 1.5 \text{ kCi/y}$$

Emissions estimate based on specific flux of 1 pCi Rn-222/m^2s per pCi Ra-226/g

$$\text{Rn-222} = 1 \text{ pCi Rn-222/m}^2\text{s/pCi Ra-226/g} \times 281 \text{ pCi Ra-226/g} \times 25 \times 10^4\text{m}^2 \times 3.156 \times 10^7\text{s/y} \times 10^{-12} \text{ Ci/pCi}$$

$$= 2223 \text{ Ci/y} = \sim 2.2 \text{ kCi/y}$$

The simplified calculation based on a specific flux of 1 pCi Rn-222/m s per pCi Ra-226/g yields a similar but higher emission estimate in this example case.

In almost all cases, the tailings impoundments are by far the largest source of radon-222 emissions. For mills on standby, the tailings impoundments account for practically all the radon-222 emissions. The tailings impoundment, which is the most significant source of radon-222 emissions from the mill site, accounts for about 80 percent of the total radon-222 emissions at an active licensed mill and practically 100 percent at an inactive or standby licensed mill.

3.5 Transport and Risk Assessment

Two separate steps are required to estimate the health impact of a specific source of radon-222: (1) determining its dispersion and estimating, at various locations, its concentration and the corresponding exposure to its decay products in units of WLM and (2) calculating the risk.

3.5.1 Air Dispersion Estimates

EPA uses the AIRDOS-EPA code (Mo79, Ba81) to analyze the transport of radionuclide emissions into air from a specific source. This analysis estimates radionuclide concentrations in air at various distances from the source.

The AIRDOS-EPA code uses a modified Gaussian plume equation to estimate airborne dispersion. Calculations are site-specific and require the joint frequency distribution of wind direction, windspeed, and atmospheric stability. The accuracy of these projections decreases with distance; therefore, calculations with this method are limited to regional areas (e.g., less than 80 km from the source). The values calculated represent annual averages because diurnal or seasonal variations are included in the joint frequency distribution. Calculations of working-level exposures for the inhalation of radon-222 progeny are then made based on estimates of radon-222 concentrations in air.

Radon-222 emitted from tailings impoundments can be transported beyond the 80-km regional area. Results from a trajectory dispersion model developed by the National Oceanic and Atmospheric Administration (Tr79) were used to estimate the national impact of radon-222 emissions. The model yields radon-222 concentrations in the air (in picocuries/ liter), which are converted to decay product concentrations and expressed in terms of working levels.

3.5.2 Risk Estimates

After the exposure to radon-222 decay products has been estimated in terms of working level months for a specific source by means of the environmental transport code, the risk of fatal lung cancer is calculated using the risk factors discussed in Chapter 2. The risk is scaled up to the total population risk by multiplying by the population exposed to that working level over a lifetime.

3.6 Measurement of Radon-222

Although all radon-222 emission levels in this report represent calculated estimates, it is possible to make direct measurements on specific sources. Radon-222 measurement methodologies are discussed in the following subsections. Ambient samplers are generally used to measure radon-222 emissions; however, some concentrating samplers are also used. The latter operate in a grab or continuous mode and sample radon-222 as it emanates from a source. Ambient gas samplers measure the accumulation of radon-222 present in the ambient air and typically have short sample collection periods (i.e., minutes). Concentrating samplers use a medium such as activated charcoal to adsorb radon-222. Sample collection periods for concentrating samplers are typically 24 to 72 hours.

3.6.1 Ambient Air Samplers

The most common type of ambient air sampler for the collection of radon-222 grab samples is the accumulator can. Accumulator can design and construction vary widely; however, all accumulator cans are constructed with an open-ended container fitted with a sampling port for periodic withdrawal of radon-222 air samples. During collection of a radon-222 sample, the open end of the container is sealed to the sample medium (e.g., tailings) by simple insertion, caulking, or the use of permanent fixtures. After an adequate length of time (on the order of minutes) has been allowed for the radon-222 to accumulate in the container, a fixed air volume is withdrawn from the container through the sampling port and the alpha activity is counted.

Another type of ambient sampler, which operates continuously rather than collecting grab samples, uses the same sampling procedure as the accumulator can except air is pumped through the can at a rate equivalent to one air volume per sampling period. The air is pumped through a filtered inlet to a calibrated scintillation cell and alpha activity is counted continuously.

3.6.2 Concentrating Samplers That Measure Radon-222 Emanation From Surfaces

There are two types of concentrating samplers equipped with activated charcoal to adsorb radon-222. These include the passive charcoal canister samplers and the active, circulating-air test sampler. The charcoal canisters, which are available in a variety of sizes, are placed directly on the soil or tailings surface, exposed for 24 to 72 hours, and use activated charcoal as the concentrating medium. Their physical dimensions and the quantity of charcoal used to collect a radon-222 sample vary widely (Ni84).

Selection of a specific charcoal sampler depends on the particular application. Large-area samplers (e.g., greater than 1000 cm^2) improve the representativeness of the sample by sampling a larger area, but small samplers are more economical and logistically simpler.

The circulating-pir test sampler covers a much larger area than the canisters (i.e., 9290 cm^2 (Ni84). It is a continuous, active sampler in which air is circulated across the soil or tailings surface enclosed by the sampler, and continues through a section of corrugated tubing containing the activated charcoal. The tubing is sectioned into two halves, which allows for the detection of any carryover. The sampler is typically operated for 24 hours at a flow rate of about 2 liters per minute. The circulating-air test sampler is a cumbersome technique and is less effective than charcoal canisters considering cost and labor (Yo83).

Activated charcoal used for the collection of radon-222 is sealed in an air-tight container and set aside for a few hours to allow the short-lived redon daughters to come to equilibrium (Yo83). The amount of radon adsorbed by the activated charcoal (no matter which concentrating sampler is used) is quantified by gamma-ray spectroscopy of the charcoal using a NaI(Tl) crystal or germanium diode and multichannel analyzer. Typically the Bismuth-214 609-keV peak is used to determine radon-222 activity, but other Bismuth-214 or Lead-214 peaks could by used.

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Chapter 4: INDUSTRY DESCRIPTION

4.1 Overview

In January 1986, the conventional uranium milling industry in the United States consisted of 26 licensed facilities. Three additional mills have been licensed, but either have never been constructed or have never operated. Only 4 of the 26 licensed facilities were operating; 16 were on standby status, and 6 were being or have been decommissioned. The mills on standby status are being maintained, but they are not processing uranium ore. When the demand for uranium increases, these standby mills could resume milling. The decommissioned mills have been dismantled and have been removed off site or disposed of on site; therefore, these mills will never resume operations. Their associated tailings impoundments are either being reclaimed or there are plans to reclaim them. The current operational status and capacity of each licensed conventional mill are shown in Table 4-1.

The Secretary of Energy has determined that the domestic uranium mining and milling industries were not viable in 1984 (ELP85). In 1984, the annual domestic uranium production was the lowest since the mid-1950's, and employment was down 75 percent from 1981 to 1984 (ELP85).

4.2 Site-Specific Characteristics

The licensed conventional uranium mills are in Colorado, New Mexico, South Dakota, Texas, Utah, Washington, and Wyoming. Their approximate locations are shown in Figure 4-1. Brief, site-specific summaries of all the active or standby conventional uranium mills were prepared as part of this document and are presented in this section. As described in Chapter 3, the tailings disposal operations represent the largest source of radon-222 emissions; therefore, the summaries focus largely on these operations.

The site summaries were compiled from data contained in other EPA, NRC, and DOE documents. A recent EPA report (EPA85) entitled "Estimates of Population Distributions and Tailings Areas Around Licensed Uranium Mill Sites" was the source of the measurements of the surface areas of impoundments. The populations in the 0- to 5-km range around the tailings impoundments were taken from a 1984 survey that Battelle

Table 4-1. Operating status and capacity of licensed conventional uranium mills as of August 4, 1986[a]

State	Mill	Owner	Operating status[b]	Operating capacity (tons/day)[c]
Colorado	Canon City	Cotter Corp.	Standby	1200
	Uravan	Umetco Minerals	Standby	1300
New Mexico	L-Bar	Sohio/Kennecott	Decommissioning[d]	1650
	Churchrock	United Nuclear	Decommissioning[d]	4000
	Bluewater	Anaconda	Decommissioning[d]	6000
	Quivira	Kerr-McGee	Standby	7000
	Grants	Homestake	Active[e]	3400
South Dakota	Edgemont	TVA	Decommissioned	--
Texas	Panna Maria	Chevron	Active	2600
	Conquista	Conoco/Pioneer	Decommissioned	--
	Ray Point	Exxon	Decommissioned	--
Utah	White Mesa	Umetco Minerals	Active[f]	2000
	La Sal	Rio Algom	Active[g]	750
	Moab	Atlas	Standby	1400
	Shootaring Canyon	Plateau Resources	Standby	800
Washington	Ford	Dawn Mining	Standby	600
	Sherwood	Western Nuclear	Standby	2000

Table 4-1. Operating status and capacity of licensed conventional uranium mills as of August 4, 1986[a] (continued)

State	Mill	Owner	Operating status[b]	Operating capacity (tons/day)[c]
Wyoming	Highland	Exxon	Decommissioned	--
	Gas Hills	American Nuclear Corp.	Decommissioned	--
	Shirley Basin	Petrotomics	Decommissioned	--
	Gas Hills	Pathfinder	Standby	2500
	Split Rock	Western Nuclear	Standby	1700
	Gas Hills	Umetco Minerals	Standby	1400
	Bear Creek	Rocky Mt. Energy	Decommissioning[d]	2000
	Shirley Basin	Pathfinder	Active	1800
	Sweetwater	Minerals Exploration	Standby	3000
Total			5 Active 11 Standby 10 Decommissioned or intend to decommission	

(a) Data obtained from conversations with Agreement States, NRC representatives, and mill operators.
(b) Does not include mills licensed but not constructed. Active mills are currently processing ore and producing yellowcake. Standby mills are not currently processing ore, but are capable of restarting. The mill structure has been dismantled at decommissioned mills and tailings piles are currently undergoing reclamation or will be.
(c) Tons indicates short tons equal to 2000 lbs.
(d) Submitted letter of intent to decommission.
(e) Operating only a few days each month.
(f) Current contract will allow operation for 12-18 months.
(g) Likely to go to standby status.

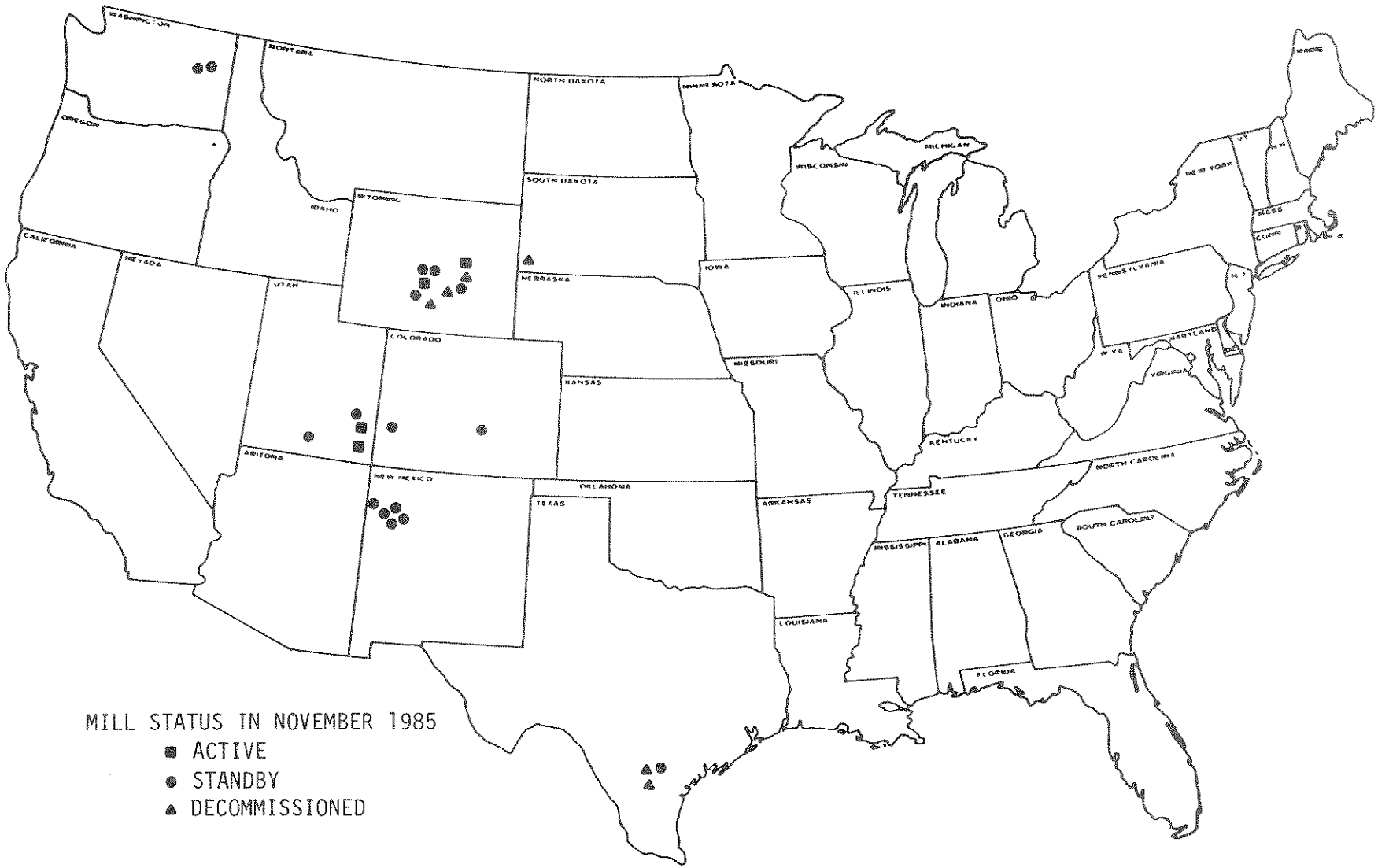


Figure 4-1. Approximate locations of licensed conventional uranium mills.

Memorial Institute conducted for the EPA (PNL84). In addition, color aerial photographs of each active and standby mill site were provided by the Office of Radiation Programs to augment the available data base (EPA85).

A summary of current conditions and the extent of tailings impoundments and evaporation ponds at these sites is presented in Table 4-2. Diagrams of each mill site are included in Appendix A. Additional details regarding these mills and the impoundments are provided in the following text under the appropriate state.

4.2.1 Colorado

The two licensed uranium mills located in Colorado are operated by Cotter Corporation and Umetco Minerals (Union Carbide) in Canon City and Uravan (see Figure 4-2). A third mill, Pioneer Nuclear's proposed San Miguel mill in San Miguel County, was licensed but never constructed. The license for this mill is under litigation (NRC84).

Canon City Mill

The Cotter Corporation, a subsidiary of Commonwealth Edison, operates a two-stage acid leach mill at Canon City, Colorado, which recovers uranium and vanadium. A small alkaline leach mill also was operated on this site from 1968 until its decommissioning in 1979. The existing mill, which began operations in September 1979, has a capacity of 1200 tons of ore per day. The ore grade ranges between 0.23 and 0.35 percent U_3O_8 (NRC84). The mill has been on standby status since February 1985.

Tailings generated since September 1979 have been placed in an above-grade clay- and membrane-lined impoundment that covers 34 ha (84 acres) and has earthen embankments (EPA85). Plans call for the dam to be raised to its ultimate height of 35 m (115 feet) in one additional stage. The tailings solution currently covers 31 ha (77 acres) and varies in depth from less than 0.3 to more than 6 m (<1 to >20 feet)(EPA85, Mc85). Currently, the area of exposed tailings beach covers 3 ha (7 acres), of which 1.8 ha (4.5 acres) is dry (EPA85). The tailings discharge into the pond is moved along the perimeter during operations to keep the tailings wet and evenly distributed. This impoundment now contains 0.9×10^6 tons of tailings and has a capacity of 14×10^6 tons (NRC84). The tailings are reported to contain 780 pCi/g of radium-226 (EPA83a).

Table 4-2. Summary of current uranium mill tailings impoundment areas and radium-226 content

Owner/Impoundment	Type of impoundment[a]	Status[b]	Surface area(acres)[c]				Average Ra-226[d] pCi/g)
			Total	Ponded	Wet	Dry	
Colorado							
Cotter Corp.							
Primary	2/SL	S	84	77	3	4	780
Secondary	2/SL	C	31	1	1	30	780
Umetco							
Uravan 1 & 2	1	C	66	0	4	62	480
Uravan 3	1	C	32	0	3	29	480
Sludge pile	1	C	20	0	1	19	480
Evap. pond	1	C	17	0	2	15	480
New Mexico							
Sohio							
L-Bar	1	S	128	28	55	45	500
United Nuclear							
Churchrock	1	S	148	7	76	65	290
Anaconda							
Bluewater 1	2	S	239	0	0	239	620
Bluewater 2	2	C	47	0	0	47	620
Bluewater 3	2	C	24	0	0	24	620
Evap. ponds	2	S	162	97	17	48	620
Kerr-McGee							
Quivira 1	1	S	269	14	64	191	620
Quivira 2a	1	S	105	10	35	60	620
Quivira 2b	1	S	28	0	3	25	620
Quivira 2c	1	S	30	0	4	26	620
Evap. ponds	2	S	372	268	10	95	620

Table 4-2. Summary of current uranium mill tailings impoundment areas and radium-226 content (continued)

Owner/Impoundment	Type of impoundment[a]	Status[b]	Surface area (acres)[c]				Average Ra-226[d] pCi/g)
			Total	Ponded	Wet	Dry	
Homestake							
Homestake 1	1	S	205	63	33	109	385
Homestake 2	2	C	44	4	0	36	385
Texas							
Chevron							
Panna Maria	2	S	124	68	20	36	196
Utah							
Umetco							
White Mesa 1	3/SL	A	48	7	7	34	350
White Mesa 2	3/SL	A	61	10	6	45	350
White Mesa 3	3/SL	A	53	39	0	14	350
Rio Algom							
Rio Algom 1	2	A	44	4	2	38	560
Rio Algom 2	2	A	32	12	5	15	560
Atlas							
Moab	1	S	147	54	4	90	540
Plateau Resources							
Shootaring	2	S	7	2	1	4	280
Washington							
Dawn Mining							
Ford 1,2,3	2	C	95	0	0	95	240[e]
Ford 4	3/SL	S	28	17	0	11	240[e]

Table 4-2. Summary of current uranium mill tailings impoundment areas and radium-226 content (continued)

Owner/Impoundment	Type of impoundment[a]	Status[b]	Surface area(acres)[c]				Average Ra-226[d] pCi/g)
			Total	Ponded	Wet	Dry	
Western Nuclear							
Sherwood	2/SL	S	94	18	7	70	200
Evap. pond	2/SL	S	16	16	0	0	200
Wyoming							
Pathfinder							
Gas Hills 1	2	S	124	2	3	119	420
Gas Hills 2	2	C	54	2	12	40	420
Gas Hills 3	2	S	22	19	2	2	420
Gas Hills 4	2	S	89	73	4	11	420
Western Nuclear							
Split Rock	2	S	156	94	19	43	430
Umetco							
Gas Hills	2	C	151	0	0	151	310
A-9 Pit	3/CL	S	25	2	9	14	310
Leach pile	2	S	22	0	0	22	310
Evap. ponds	2	S	20	20	0	0	310
Rocky Mountain Energy							
Bear Creek	2	A	121	45	23	53	420
Pathfinder							
Shirley Basin	2	A	261	179	22	60	540

Table 4-2. Summary of current uranium mill tailings impoundment areas and radium-226 content (continued)

Owner/Impoundment	Type of impoundment[a]	Status[b]	Surface area(acres)[c]				Average Ra-226[d] pCi/g)
			Total	Ponded	Wet	Dry	
Minerals Exploration Sweetwater	2/SL	S	37	30	0	7	280
Totals			3882	1282	457	2140	-

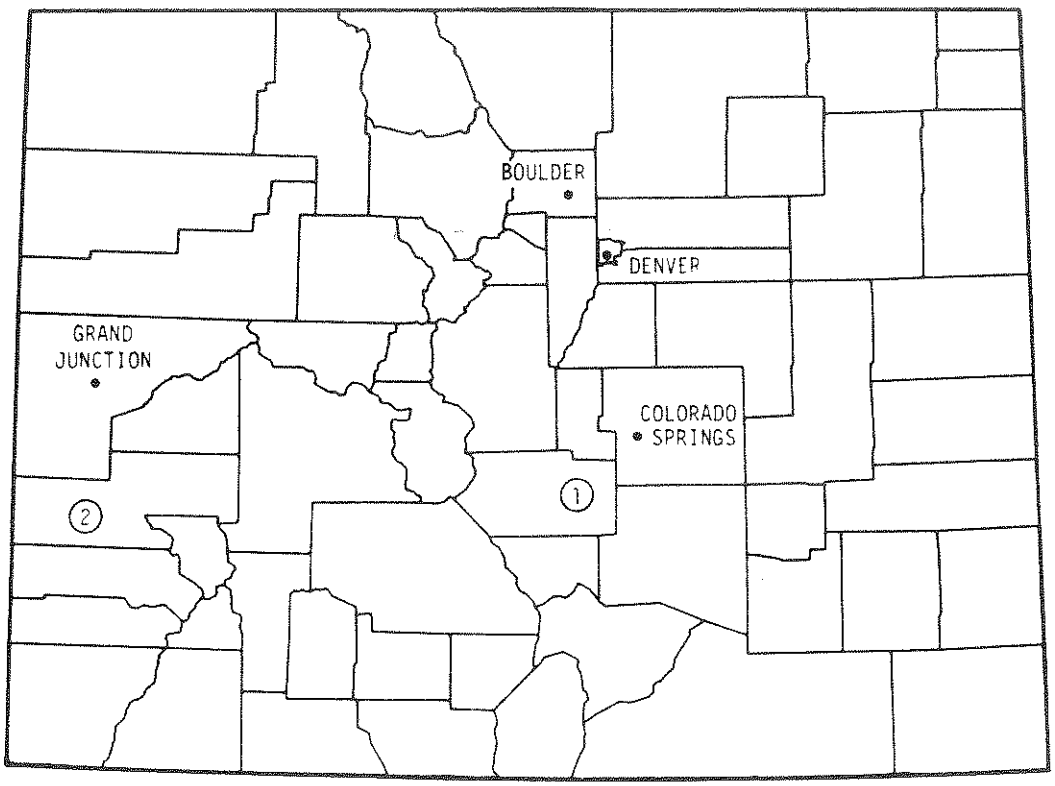
(a) Type of impoundment; 1 = dam constructed of coarse tailings; 2 = earthen dam; 3 = below grade; SL = synthetic liner; CL = clay liner.

(b) Status of impoundment; A = active; S = standby (will be used when operations resume); C = filled to capacity (will not be used again).

(c) Source: EPA85

(d) Source: EPA83

(e) Source: EPA86



(1) Cotter Corp.
Canon City Mill

(2) Umetco Minerals
Uravan Mill

Figure 4-2. Location of mills in Colorado.

A 12-ha (31-acre) secondary impoundment containing 1.5×10^6 tons commingled tailings (defense-related tailings generated under Atomic Energy Commission contracts commingled with tailings generated under commercial contracts) generated in pre-1979 operations has been constructed adjacent to the main impoundment. Approximately 0.4 ha (1 acre) is covered with ponded solution, 0.4 ha (1 acre) consists of exposed saturated tailings, and about 12 ha (30 acres) are dry (EPA85). These impoundments are actually two cells of one large impoundment. The secondary impoundment also is used for disposal of nontailings solid waste generated on site and will be used for disposal of decommissioning waste during closure operations (DOE82). The old tailings have not been covered, but they have been furrowed to control dusting. The costs for constructing the main and secondary impoundments were $15,800,000 and $7,200,000, respectively (DOE82).

Canon City is located about 3.2 km (2 mi) north of the mill site. The area immediately surrounding the mill site is unpopulated, and the land is used primarily for livestock grazing (DOE82). The nearest residents are 184 people who live between 2 and 3 km (1.2 and 1.9 mi) from the impoundment (PNL84). A 1983 survey indicated 5933 people lived within 5 km (3.1 mi) of the tailings impoundment (PNL84).

The climate in the area is semiarid and temperate; average annual precipitation is 30 cm (12 in.) (DOE82). Windspeeds are variable, with a mean of 13 km/h (8 mi/h) (DOE82).

Uravan Mill

Umetco Mineral's uranium mill in Uravan, Colorado, an area of rugged canyons and mesas, is 80 km (50 mi) south of Grand Junction. Uranium, vanadium, and radium-226 recovery operations were begun at this site in 1915. The mill has been on standby status since November 1984 and will likely be on standby for at least 2 years and possibly permanently (Kr85). The existing tailings disposal facilities have reached their maximum capacity, and a new disposal area must be planned and approved before mill operations are restarted (Kr85). The capacity of this mill is 1300 tons of ore per day.

The mill uses a hot, highly oxidizing, two-stage acid leach to recover uranium and vanadium. During milling operations, ore has been received from more than 200 mines in the Uravan mineral belt. Tailings have been generated under AEC, Army, and commercial contracts and have been commingled and disposed of on site. The impoundments contain an estimated 10×10^6 tons of tailings. These tailings impoundments are situated on mesas

above Uravan. Impoundments 1 and 2 are adjacent and overlapping and actually constitute just one impoundment. The impoundments are constructed behind dikes of coarse tailings on the outward face and contained by the native terrain on the inward side. Tailings were discharged to the impoundments from spigots situated around the berm. Gravity settling deposited the sands near the dike, and slimes were carried to the interior with the tailings solution.

Impoundments 1 and 2 cover a combined area of 27 ha (66 acres) and have a maximum dam height of 46 m (155 ft) (EPA85, DOE82). Impoundment 3 covers 13 ha (32 acres), and the dike is about 33 m (110 ft) high. Eight other impoundments, which either contain tailings or have been constructed of tailings, were mainly used for evaporation. These eight impoundments cover 15 ha (37 acres). The radium-226 content of the Uravan tailings has been reported to be 480 pCi/gram (EPA83b).

The Uravan operation uses several other ponds in its water management system. Six solvent extraction (SX) raffinate evaporation/seepage ponds receive barren solution from the vanadium SX section. Residue in these ponds will be placed in the tailings ponds at closure. The SX ponds cover 15 ha (36 acres) (NRC84).

The general area is sparsely populated. A recent survey indicates 349 people living from 2 to 5 km (1.2 to 3.0 mi) away from the main tailings impoundments. The survey showed nobody living within 0.5 km (0.3 mi) of these impoundments, but 147 people lived 0.5 to 1.0 km (0.3 to 0.6 mi) distant (PNL84).

The climate at Uravan is semiarid, with only about 25 cm (10 inches) of precipitation a year. Evaporation is about 142 cm (56 inches) per year (EPA83b).

4.2.2 New Mexico

The five licensed mills located in New Mexico are operated by Sohio/Kennecott Minerals, United Nuclear Corporation, Anaconda (Atlantic Richfield), Kerr-McGee Corp. (Quivira Mining), and Homestake Mining Co. (see Figure 4-3). Two additional mills, Bokum Resources Corporation and Gulf Minerals, were licensed but have never operated.

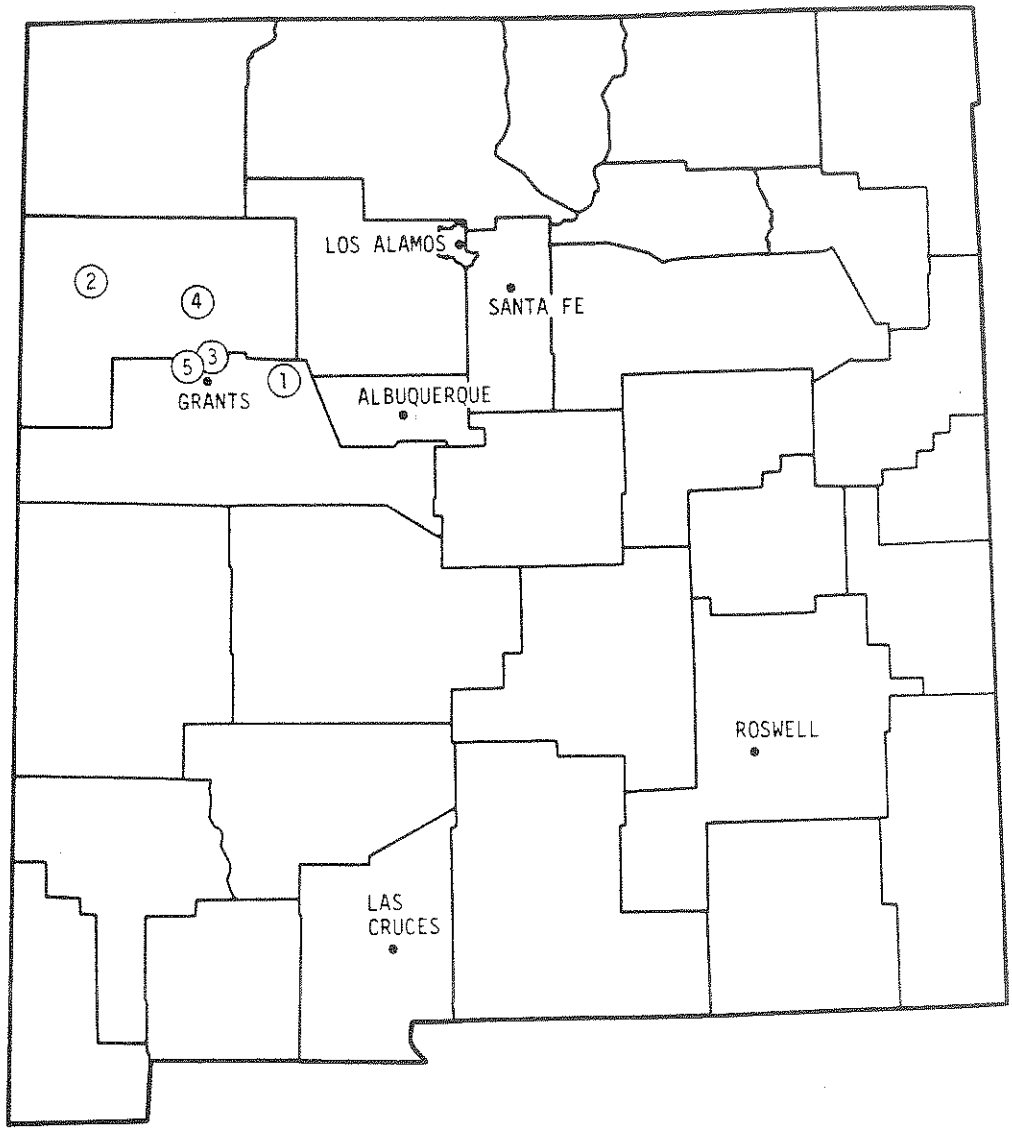
L-Bar Mill

The Sohio/Kennecott L-Bar Uranium Mill is located near Seboyeta in Cibola County, in an area of hilly terrain about 71 km (44 mi) west of Albuquerque and 16 km (10 mi) north of Laguna, New Mexico. Ore is obtained from an underground mine in the Jackpile sandstone formation. The acid-leach mill began operations in 1976, but has been on standby status since May 1981 (NRC84). The ore processing capacity of the mill is 1650 tons per day. Ore reserves are adequate to provide for 10 to 15 years of operation. The ore grade varies from 0.05 to 0.30 percent U_3O_8 and averages 0.225 percent (NRC84). Size reduction is accomplished by semiautogenous grinding.

Mill tailings are contained in a single tailings impoundment. The L-Bar tailings dam was one of the last dams permitted in the industry in which the upstream construction method was used (Jo80). The tailings impoundment is built above grade with an earthen starter dam to the west that keys into natural topography on the north and south. A smaller saddle dam is constructed to the east. Tailings have been discharged to the impoundment from a single pipe that was moved along the dam. Coarse sands settled near the dike, whereas slimes deposited in the interior area. Water was decanted and pumped back to the mill. During operations, the edge of the tailings solution was maintained about 60 m (200 ft) from the dam crest. A light-track pressure dozer was used to construct raises with the sand tailings. The total impoundment area covers 72 ha (180 acres), about 51.2 ha (128 acres) of which are covered with tailings (NRC84). Approximately 11.2 ha (28 acres) of the tailings are covered with tailings solution (EPA85). The impoundment consists of about 1.6×10^6 tons of tailings. The maximum height of the dam is 15 m (50 ft) (NRC80). The facility was designed to provide an ultimate storage capacity of 7.5×10^6 tons of tailings (Jo80). The tailings are reported to contain 500 pCi/g of radium-226 (EPA83b).

During operations, ore is stockpiled at the mill on an ore pad and apron feeder. Since the plant went on standby status in 1981, no ore has been stored on these areas, but a short supply has been stored north of the tailings area (NM85).

The surrounding area is sparsely populated. A 1983 survey indicated no population residing within a 3-km (1.9-mi) radius of the tailings impoundment (PNL84). Reportedly 42 people live between 3 and 4 km (1.8 and 2.5 mi) away and 129 live between 4 and 5 km (2.5 and 3.1 mi) (PNL84).



1. Sohio
   L-Bar Mill
2. United Nuclear Corp.
   Churchrock Mill
3. Anaconda Minerals Co.
   Bluewater Mill
4. Kerr-McGee Nuclear Corp.
   Quivara Mill
5. Homestake Mining Co.
   Homestake Mill

Figure 4-3. Location of mills in New Mexico.

Churchrock Mill

United Nuclear Corporation's Churchrock Mill is located 32 km (20 mi) northeast of Gallup, New Mexico, on an alluvial plain situated near an arroyo. The mill, which opened in 1977, is designed to use acid-leach extraction to process about 4000 tons of ore per day from the company-owned underground mines. The ore contains 0.035 to 0.381 percent U_3O_8 (average is 0.12 percent) in a sandstone matrix. Fresh water for mill operations is obtained from underground mines. The mill has been on standby status since 1982.

The tailings impoundment is formed by a dam built from native clays and compacted coarse tailings. It has three compartments separated by earthen embankments. The total surface area of tailings is 59 ha (148 acres) (EPA85). The surface area of liquid on the tailings impoundment is 3 ha (7 acres). The maximum depth of tailings is about 15 m (50 ft). The storage capacity of the pond is about 10×10^6 m (365×10^6 ft) (NRC84). The tailings are reported to contain 290 pCi/g of radium-226 (EPA83b).

The area around the mill is sparsely populated. The 1983 population survey indicated 25 people residing within 2 km (1.25 mi) and 77 living within 3 km (1.9 mi) (PNL84). The survey also indicated a total of 213 people living within 5 km (3.1 mi) of the mill, but none within 1 km (0.6 mi) (PNL84).

In July 1979, a break in the tailings dam caused about 350 x 106 liters (93 x 106 gal) of effluent and 1100 tons of tailings to spill on or into nearby soil and streams (NRC84). This spill resulted in the release of almost all of the impounded liquid, but less than 1 percent of the solids. The streams carried the spilled tailings into the Rio Puerco River, which flows through Navajo grazing lands, and finally into Arizona. The mill was closed from July 1979 until the fall of 1979 while measures were taken to clean up the streams contaminated by the spill. The cleanup of the streams has been completed. The mill has been inactive since 1982, and corrective action to clean up the contaminated groundwater is continuing (NRC84).

Bluewater Mill

Anaconda's Bluewater Uranium Mill is located in the Grants Mineral Belt about 16 km (10 mi) northwest of Grants, New Mexico. The site is in a small valley characterized by an undulating, relatively level surface with gentle swales and small rounded hills (DOE82). The mill was originally constructed in 1953 and operated until 1982, when it went to standby status. Since 1953, the milling operations have gone through several major modifications. Capacity has been expanded to 6000 tons of ore (0.2 percent U_3O_8) (NRC84). Production has been under both AEC (1956 to 1970) and commercial contracts. Through 1981, the Bluewater mill had processed more than 23.5×10^6 tons of ore ranging from 0.06 to 0.60 percent U_3O_8 (DOE82). Some decommissioning activities have been initiated at this mill.

The mill site has three tailings impoundments. Carbonate tailings from early operations were deposited in an area immediately northwest of the mill in a flat-lying impoundment (No. 2) covering about 19 ha (47 acres) (DOE82). This inactive impoundment has been covered with native soil to an average depth of 0.8 m (2.5 ft) (DOE82). Other tailings from the early carbonate processing were emplaced in what is now the main tailings impoundment for acid tailings (No. 1). A third tailings impoundment, the north area acid pile, is situated immediately northwest of the main pond. It covers 10 ha (24 acres), and in 1977 was covered with about 0.8 m (2.5 ft) of native soil (DOE82).

The main impoundment (No. 1), which was put in operation in 1956, covers 96 ha (239 acres) (EPA85). It is currently dry. The dam surrounding the pond is constructed of compacted natural soils and alluvium and is about 18 m (60 ft) high at the south end and 6 m (20 ft) high at the north end (DOE82). Tailings are discharged along the southern part of the dam. This impoundment contains 25×10^6 tons of tailings (NRC84).

There are also 162 acres of evaporation ponds in the mill water management circuit. Currently, 97 acres are covered with solution, 17 acres are exposed and wet, and 48 acres are exposed and dry (EPA85). Some tailings solids are carried with the water to these evaporation ponds where they remain after the solution evaporates.

The specific activity of radium-226 in the old tailings has been reported to be 520 pCi/gram and 280 pCi/gram in the tailings in the main pond (NM85); however, it has also been estimated to average 620 pCi/g (EPA83a).

The area around the Bluewater Mill is sparsely populated. A 1983 survey indicated 907 people living within 5 km (3.1 mi) of the mill (PNL84). Of this total, 142 lived within 3 km (1.9 mi.). No one lives within 2 km (1.2 mi.) of the mill (PNL84).

Annual precipitation averages 22 cm (8.8 inches)--most as rain, but some as snow. Wind is channeled through the valley in a westerly direction. The site is in the "southwest mountains" climatological subdivision of New Mexico.

Quivira Mill

Kerr McGee's Quivira mill has been on standby status since February 1985. The largest acid leach mill in the United States, its current capacity is 6350 t (7000 tons) of ore per day (NCR84). The Quivira mill is in a flat area of the Grants Mineral Belt about 40 km (25 mi) north of Grants, New Mexico. The mill began operation in 1958 with a capacity of 3270 t of (3600 tons) sandstone ore per day.

All of the tailings from the mill are contained in two main impoundments, (Tailings impoundments Nos. 1 and 2a) and two ancillary impoundments (2b and 2c). Impoundment No. 1 was the most recently active area for tailings deposition. It extends southeasterly from the mill for about 1370 m (4500 ft); its greatest width is about 820 m (2700 ft), and the outside berm ranges from 8 to 27 m (25 to 90 ft) above ground level (DOE82). An earthen starter dike was used along with the upstream method of tailings disposal. Tailings were discharged to the pond from multiple spigots located along the crest at 9-m (30-ft) intervals. The bulk of the sands is deposited on a beach inside the berm, and the slimes and liquid flow into the central depression to form a lake (DOE82). The operator maintains a 150-m (500-ft) wide beach and a 1.5 m (5 ft) freeboard during operation. Impoundment No. 1 covers 108 ha (269 acres) and contains a liquid covered area of about 6 ha (14 acres) (EPA85). Approximately 76 ha (191 acres) are dry and the remaining 26 ha (64 acres) remain saturated (EPA85).

Tailings Impoundment No. 2a covers about 42 ha (105 acres) and is west of and contiguous with Pond No. 1 (EPA85). Impoundments Nos. 1 and 2a have been in use since 1958. These two impoundments contain approximately 26×10^6 tons of tailings. Some tailings are used as backfill in a nearby underground mine. Tailings set aside for use as backfill

are contained in Impoundment No. 2b. Heap leached tailings are contained in Impoundment No. 2c. Impoundments 2b and 2c cover 11 and 12 ha (28 and 30 acres), respectively. Although no water is currently ponded in either of these impoundments, 1 to 1.5 ha (3 or 4 acres) of each are saturated (EPA85). The tailings are reported to contain 620 pCi/g of radium-226 (EPA83b).

The Quivira mill uses 15 evaporation ponds in its water management system. These ponds currently cover a total of 149 ha (372 acres) (EPA85). Of this total surface area, 107 ha (268 acres) are covered with solution, 4 ha (10 acres) are wet, and 38 ha (95 acres) are dry (EPA85). Some tailings solids are carried with the liquid solution and are deposited in these evaporation ponds.

The area surrounding the mill is sparsely populated. The 1983 population survey indicated only one person living within 5 km (3.1 mi) of the mill (PNL84), and that person lived between 2 and 3 km (1.2 and 1.9 mi.) from the impoundment (PNL84).

Precipitation averages 22 cm (8.8 in.) per year (DOE82). Local winds are channeled by the valley, and gusts can exceed 80 km (50 mi) per hour.

Homestake Mill

Homestake Mining Company's mill is 16 km (10 mi) northwest of Grants, New Mexico. The mill began production in 1958. Since its beginning, its capacity has been increased from 675 t (742 tons) to its present 3200 t (3400 tons) of ore per day (DOE82). The Homestake Mill uses the alkaline leach process. The mill has been on standby status since mid-1985. The ore grade milled at Homestake has ranged from 0.05 to 0.30 percent U_3O_8 (NRC84).

The mill site is relatively flat and covers about 600 ha (1500 acres). Two tailings impoundments, one on standby and the other inactive, are located on site. The inactive impoundment contains tailings generated between 1958 and 1962 under AEC contracts. The 1.1×10^6 t (1.2×10^6 tons) of AEC tailings cover about 18 ha (44 acres) and are contained within an 8-m (25-ft) high earthen embankment (DOE82). There currently is 1.6 ha (4 acres) of ponded water on the impoundment (EPA85). Approximately 20 percent, 3.2 ha (8 acres), of this tailings impoundment has been covered with a meter of contaminated soil excavated from an area affected by a past spill from the active impoundment (DOE82). Efforts have been made to revegetate the impoundment to reduce dusting.

The active impoundment contains about 20 x 10^6 tons of commingled tailings (DOE82). The impoundment is shaped like a large rectangular-base prism that rises above the flat ground surface (DOE82). It has a surface area of 82 ha (205 acres) (including the sides) and is about 26 m (85 ft) high. The slopes of the four sides are about 2:1 (h:v). The top of the impoundment is divided into two cells which are used alternately for tailings discharge. Most of the interior of both cells is covered with tailings solution. The total surface area of the ponded fluid in these two cells is about 25 ha (63 acres) (EPA85). Homestake maintains a 15-m (50-ft) beach and 1.5-m (5-ft) freeboard. The embankments are constructed of coarse tailings (sands) built up by the centerline method of construction. A mobile cyclone is used to separate the sands and slimes. Decanted pond liquid is recycled back to the mill. Surface water sprays and chemical treatments are applied to the embankment faces to inhibit dusting. The tailings are reported to contain 385 pCi/g of radium-226 (EPA83b).

Residential areas are located within 1.6 km (1 mi) of the mill. Homestake's 1982 license renewal application and the 1983 survey both indicated no population within 1 km (0.6 mi). The 1983 survey indicated that 190 people live between 1 and 2 km (0.6 to 1.2 mi.) from the impoundment (PNL84). The survey counted a population of 396 people within 5 km (3.1 mi.) of the mill (PNL84). Homestake has purchased additional land adjacent to the mill site to provide a 0.8-km (0.5-mi.) buffer zone (DOE82).

The site's climate is characterized by low precipitation [22 cm (8.8 in.)/y average), sunny days (75 to 80 percent), low humidity, wind gusts to 80 kilometers per hour (50 mph), and moderate temperatures with large diurnal and annual fluctuations (DOE82).

4.2.3 Texas

The three licensed mills in Texas are owned by Chevron Resources, Conoco-Pioneer, and Exxon Minerals. Their locations are indicated in Figure 4-4. One additional mill, Anaconda Minerals Rhode Branch Mill, was licensed in 1982, but was never constructed. Only the Panna Maria Mill is described herein, as the others are being decommissioned.

Panna Maria Mill

The Panna Maria Uranium Project of Chevron Resources Company is located in South Texas about 160 km (100 mi) northwest of Corpus Christi and 10 km (6 mi) north of Karnes City. The mill processes about 2600 tons per day of a mixture of sandy clay ore

averaging 0.05 percent U_3O_8 (Ma85). This facility, which uses semi-autogeneous grinding followed by acid leaching, began operation in January 1979 and has been on standby status since June 1985 (Ma85).

Tailings are contained in a single above-ground impoundment contained by earthen dikes. Material for the dikes was excavated from the area beneath the impoundment. The tailings area covers 50 ha (124 acres); 14 ha (36 acres) consist of dry, exposed beach, and about 27 ha (68 acres) are covered with tailings solution (EPA85). The impoundment contains approximately 3.3×10^6 tons of tailings (NRC84). It was designed to contain all the tailings projected to be generated over the life of the mill. The maximum height of the earthen dam surrounding the pile is 19 m (62 ft), the crest width is 6 m (20 ft), and the downstream slope is 3:1 (h:v) (Ki80). Designed maximum storage of tailings in this impoundment is 10×10^6 tons) (Ki80). The average density of the tailings is 1.2 t/m^3 (0.04 ton/ft^3), and the specific gravity is 2.55 (Ki80).

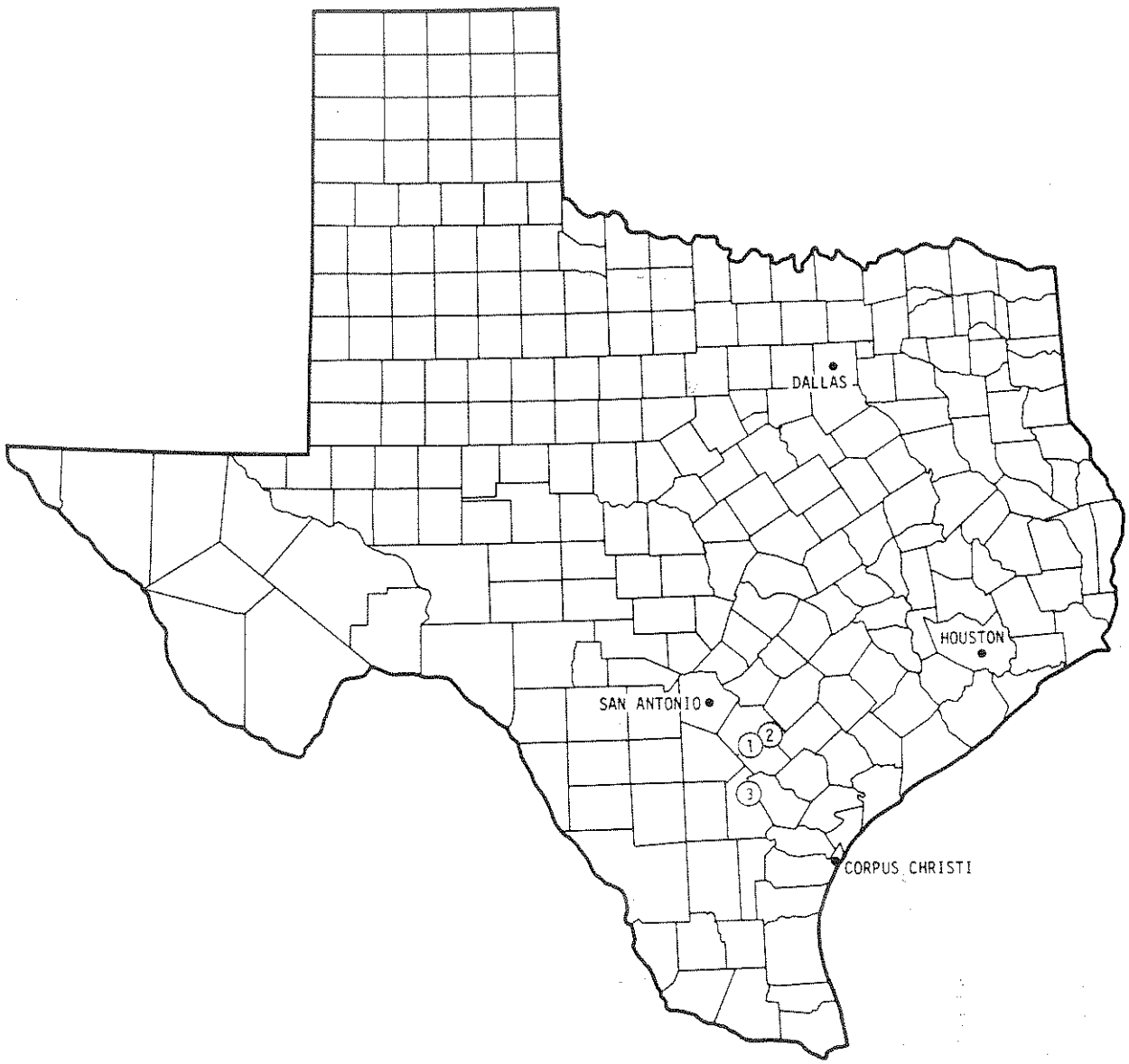
During operations, the tailings discharge to the impoundment is periodically moved around the perimeter of the impoundment. An exposed beach of coarse tailings forms along the dike and the tailings solution gathers in the center portion of the pond. The depth of the solution varies from an average of 1.5 m (5 ft) on the east side to 5 to 6 m (15 to 20 ft) on the west (Ma85).

The radon-222 flux from the tailings has not been measured. The radium-226 content of the tailings is estimated to be 196 pCi/g.

The ore pad at this facility covers approximately 12 ha (30 acres). During normal operations, a 1-month supply of ore [69,000 t (76,000 tons) at capacity] is stockpiled on the pad.

A 1983 survey of population in the area indicated 453 people living within 5 km (3.1 mi) of the tailings impoundment, 12 people within 1 km (0.6 mi), 42 people within 1 and 2 km (0.6 and 1.25 mi), and 33 people within 2 and 3 km (1.25 and 1.9 mi) (PNL84).

The average annual rainfall at the location of the impoundment is 76 cm (30 in.), and the net annual evaporation is 89 cm (35 in.).



(1) Conoco/Pioneer Nuclear
Conquista Project

(2) Chevron Resources Co.
Panna Maria Mill

(3) Exxon Minerals
Ray Point

Figure 4-4. Location of mills in Texas.

4.2.4 Utah

The four licensed mills located in Utah (see Figure 4-5) are owned by Atlas Minerals, Plateau Resources, Ltd., Umetco Minerals, and Rio Algom Corporation.

Umetco White Mesa Mill

The Umetco Minerals White Mesa mill, which is about 8 km (5 mi.) south of Blanding, Utah, began operating in July 1980. This mill is currently active. Semi-autogenous grinding, acid-leaching, and solvent-extraction are used to process ores containing about 0.13 percent U_3O_8 (NRC84). The capacity of the mill is 1800 t (2000 tons) of ore per day (NRC84).

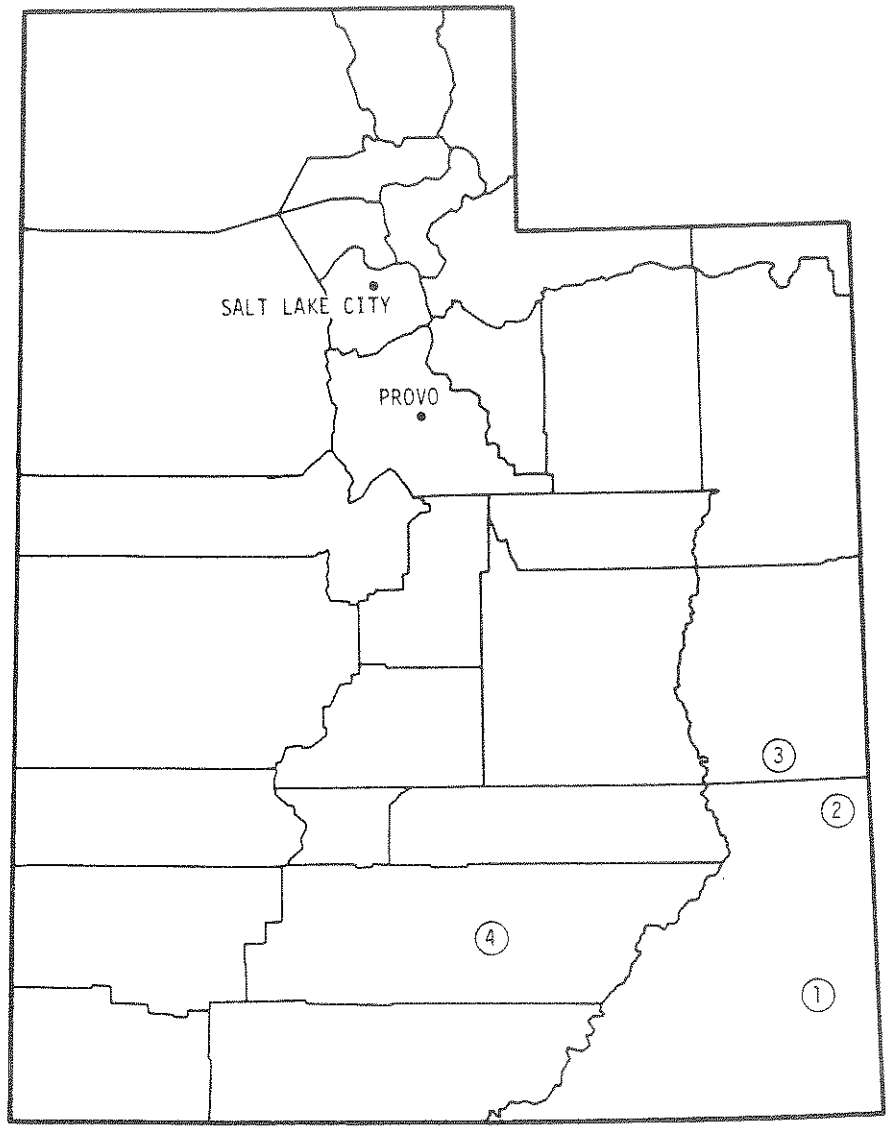
Approximately 500,000 t (550,000 tons) of tailings are contained in three cells of a proposed six-cell disposal system. The cells contain 19, 24, and 21 ha (48, 61, and 53 acres) of tailings for a total of 64 ha (162 acres) (EPA85). A total of 22 ha (56 acres) is covered by solution, 5 ha (13 acres) are saturated, and 42 ha (106 acres) are dry (EPA85). The proposed system was planned to feature simultaneous construction, operation, closure, and reclamation. The tailings impoundments are lined with synthetic liners. The tailings are reported to contain 350 pCi/g of radium-226 (EPA83b).

A 1983 population survey indicated no people living within a 4-km (25-mi) radius of the tailings impoundment (PNL84). The same survey indicated eight people living between 4 and 5 km (2.5 and 3.1 mi) of the tailings disposal area (PNL84).

Rio Algom Mill

The Rio Algom Mill is near La Sal, Utah, about 48 km (30 mi) southeast of Moab. This mill is currently active and has been in operation since 1971. Ore obtained from adjacent underground mining operations is processed by alkaline leaching and ion exchange. The mill's designed throughput is 700 t (750 tons) of ore per day.

Over 1.6×10^6 t (1.8 x 106 tons) of tailings have been generated at this mill (NRC84). The tailings are contained in two unlined tailings impoundments retained by natural soil embankments placed across a drainage course, one immediately upstream of the other (NRC84). The lower impoundment has been in use since 1972, the upper since 1976. The total area of tailings is 30 ha (75 acres) (EPA85). Approximately 6 ha (16 acres) are covered with solution, 3 ha (7 acres) are saturated, and 21 ha (53 acres) are dry (EPA85). The tailings are reported to contain 560 pCi/g of radium-226 (EPA83b).



1. Umetco Minerals
   White Mesa MIll

2. Rio Algom Corp.
   La Sal Mill

3. Atlas Minerals
   Moab Mill

4. Plateau Resources, Ltd.
   Shootaring Canyon Mill

Figure 4-5. Location of mills in Utah.

A 1983 survey of the population in the area indicated no inhabitants living within 0.5 km (0.3 mi.) of the tailings impoundment (PNL84). Eight inhabitants were reported to live between 0.5 and 1.0 km (0.3 and 0.6 mi) from the impoundment, and 105 people between 1 and 2 km (0.6 and 1.2 mi) from the impoundment (PNL84).

Moab Mill

The Atlas Corporation Mill is located on the Colorado River in a long, narrow valley of a mountainous area about 5 km (3 mi.) northwest of Moab, Utah. The mill, which began operations in October 1956, is on standby status. This mill has combined acid and alkaline circuits, which give it greater flexibility in handling a variety of ores (DOE82). Uranium has been produced for sale to both government and commercial buyers. Capacity of the mill is 1980 tons of ore per day (NRC84).

Prior to 1977, mill tailings were discharged to the Colorado River (NRC84). Since that time, all tailings have been placed in a single tailings impoundment. The dam has been constructed mainly of coarse tailings. Tailings are discharged from multiple spigots around the perimeter of the dam. The coarse sand is deposited on and near the dam, whereas the fines are carried to the interior of the impoundment with the tailings solution. The impoundment's total surface area is 60 ha (147 acres (EPA85). Of the total area, 22 ha (54 acres) are covered by ponded solution, 2 ha (4 acres) are saturated, and 36 ha (90 acres) are exposed dry tailings (including the dams) (EPA85). Because the impoundment is on a sloping surface, its height varies from 6 to about 36 m (20 to about 120 ft) above ground (DOE82). Between 7 and 9 x 106 t (8 and 10 x 106 tons) of tailings are contained in this impoundment (DOE82, NRC84).

The radium-226 content of the tailings has been reported to be 540 pCi/gram (EPA83). Ore grade ranges from 0.20 to 0.25 percent U_3O_8 (NRC84).

Moab is the only nearby incorporated community. A 1983 survey indicated a total population of 2361 within a 5-km (3.1-mi) radius of the tailings pile (PNL84). The same survey indicated no people living within 1.0 km (0.6 mi) and 9 people within 1 and 2 km (0.6 and 1.2 mi) from the impoundment. The survey also indicated that 2319 people were living between 3 and 5 km (1.8 and 3.1 mi) of the mill (PNL84).

The climate at the site is semiarid. Annual precipitation is 20 cm (8 inches), and the annual evaporation rate is 163 cm (64 inches) (EPA83). As a means of minimizing dusting, the dried tailings are sometimes wetted with sprinklers and/or a chemical dust suppressant, such as Coherex (DOE82). Windspeeds usually are quite low (DOE82).

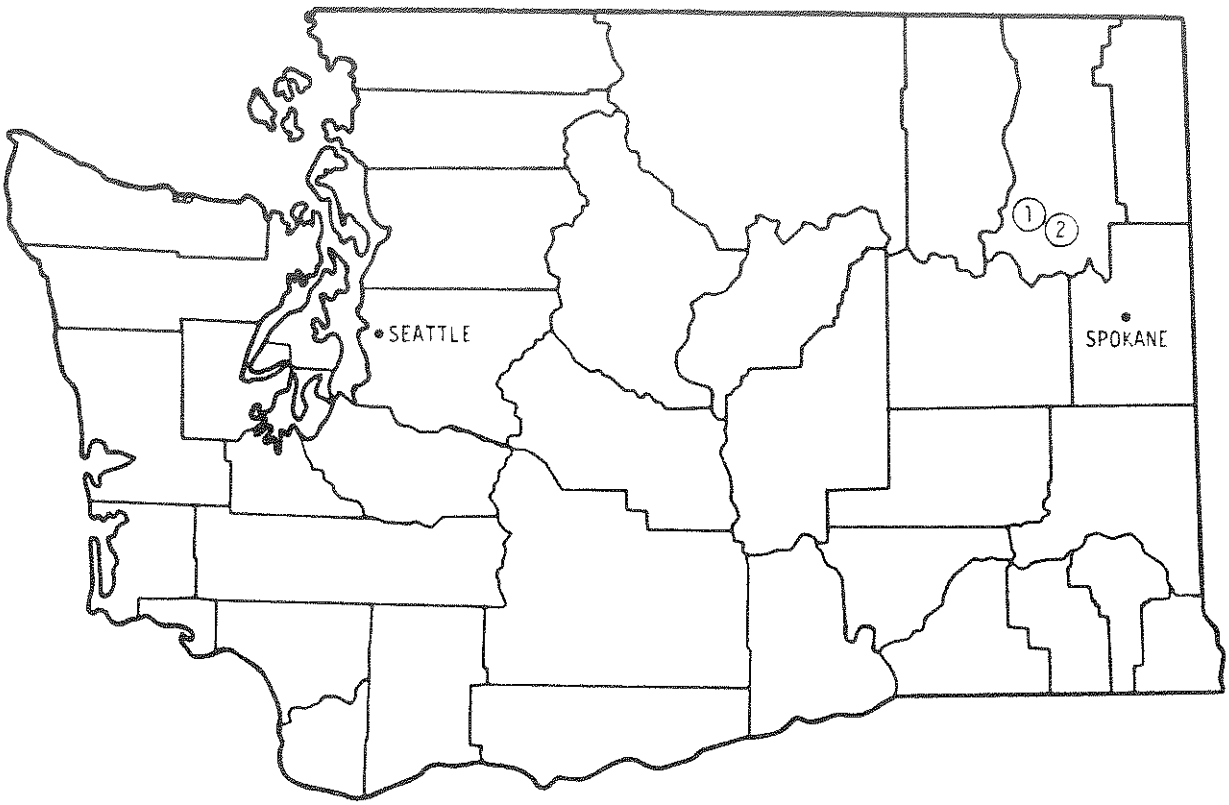
Plateau Resources Mill

The Plateau Resources Shootaring Canyon Mill is located near Hanksville, Utah. This mill was operational only from April to October 1982 and is currently on standby status. The capacity of the mill is 725 t (800 tons) per day (NRC84). The average ore grade is 0.15 percent U_3O_8, ranging from 0.07 to 0.24 percent (NRC84). An average of approximately 97,000 tons of surface mined ore is stockpiled on site when the mill is running at capacity (Ge85). The primary mill circuit involves semi-autogenous grinding of the sandstone ores, followed by a sulfuric acid leach. Tailings are disposed of in a planned, phased disposal system. An earthen dam has been constructed across the valley. Behind the earthen dam, berms have been constructed to form six cells for tailings disposal. Because of the short period of operation, only one cell contains a significant quantity of tailings. Two other cells contain only minor quantities, and the other three cells contain none. The area of the tailings is only 3 ha (7 acres), and about 0.8 ha (2 acres) of these are covered with water (EPA85). Plateau Resources has taken steps to stabilize this impoundment temporarily by inducing water evaporation and placing a 0.3-m (1-ft) cover of local soil over 1.2 ha (3 acres) of the tailings to limit windblown dust. This interim stabilization process will be completed in approximately 3 years. Radon-222 flux from the tailings has not been measured.

The area around the mill is sparsely populated; no inhabitants live within a 4-km (2.4-mi.) radius (PNL84). The 1983 survey indicated 171 people living within 4 and 5 km (2.4 and 3.1 mi) of the tailings impoundment (PNL84).

4.2.5 Washington

Washington has two licensed conventional mills, owned by Dawn Mining (Newmont Mining/Midnight Mines) and Western Nuclear, Inc. (Phelps Dodge) (see Figure 4-6). Another mill, owned by Joy Mining Company, was licensed, but was never fully operational. This latter mill is not typical as it processed a bog material on a leach pad. Only 820 t (900 tons) of tailings (heap leached bog material) was generated. It is reported that this residue has a low radium-226 content (WA86). The license for this mill was suspended in June 1985.



(1) Dawn Mining Co.
Ford Mill

(2) Western Nuclear, Inc.
Sherwood Mill

Figure 4-6. Location of mills in Washington.

Dawn Mining Mill

The Dawn Mining Mill, which is near Ford, Washington, about 72 km (45 mi) northwest of Spokane, is jointly owned by Newmont Mining Corporation and Midnight Mines, Inc. It began operations in 1957 and operated through 1964 under the AEC concentrate purchase program. The mill was shut down and rehabilitated between 1965 and 1969. It operated between 1969 and 1982, but has been inactive and on standby status since 1982.

The production capacity of the mill is 550 t (600 tons) of ore per day. The mill circuit incorporates a two-stage agitation acid leach process followed by ion exchange and precipitation of uranium with ammonia. The Midnight mining open-pit mine produces ore between 0.10 and 0.25 percent U_3O_8 (NRC84). During operations, a 1-year supply of ore [193,000 t (212,300 tons)] was maintained on a 6-ha (14-acre) stockpile at the mill site (DOE82).

The tailings generated by the Dawn Mill are contained in four separate impoundments, three of which are above grade, unlined, and constructed behind earthen dams. These three impoundments have been filled to capacity and are inactive. Impoundment Nos. 1 and 2 contain an estimated 1.2×10^6 tons of tailings from government contract production. They have been covered with about 0.61 m (2 ft) of sandy soil and wood chips for dust control and interim stabilization (DOE82, An84). Impoundment No. 3, which contains about 1.6×10^6 tons of tailings, has also been covered with sandy soil and wood chips. These three impoundments have a surface area of 38 ha (95 acres), all of which is dry (EPA85). Impoundment No. 4 is an excavated, below-grade, lined (Hypalon) pond covering 11 ha (28 acres). Seven hectares (17 acres) are covered by solution and 4 ha (11 acres) are dry (EPA85). The tailings are covered with water to a depth of 1.2 to 1.5 m (4 to 5 ft). The radium-226 content of the Dawn Mill tailings is reported to be 240 pCi/g (EPA86).

The community of Ford is located within 3.2 km (2 mi) of the tailings impoundments. In 1983 approximately 411 people were living within 5 km (3.1 mi.) of the tailings impoundments (PNL84). No one lived within 0.5 km (0.3 mi) and 3 people lived within 0.5 and 1.0 km (0.3 and 0.6 mi). Ninety-three people lived within 1 and 2 km (0.6 and 1.2 mi) and 157 lived within 2 and 3 km (1.2 and 1.9 mi) of the impoundments (PNL84).

The area's topography is characterized by rolling hills. The average annual precipitation is 30 to 46 cm (12 to 18 in); annual evaporation is about 127 cm (50 in) (EPA83b).

Western Nuclear Sherwood Mill

Western Nuclear's Sherwood uranium mill is located in eastern Washington about 64 km (40 mi) northwest of Spokane. Ore taken from a nearby surface mine has averaged 0.05 to 0.09 percent U_3O_8 (EPA83). This mining and milling operation, which began in 1978, has been inactive and on standby status since July 1984.

The tailings generated by acid leaching at the Western Nuclear Mill have been placed in a single above-grade impoundment behind an earthen dam. The area covered by tailings is 38 ha (94 acres) (EPA85). Of this total, 7 ha (18 acres) are covered with tailings solution, 28 ha (70 acres) are dry, and the remainder is saturated (EPA85). Tailings slurry from the mill was neutralized with lime before being pumped to the Hypalon-lined impoundment. Tailings solution decanted from the impoundment was pumped to a 16-acre evaporation pond situated immediately upstream of the tailings impoundment. The current amount of tailings under management is estimated to be (1.6×10^6 tons) (NRC84). The tailings are reported to contain 200 pCi/g of radium-226 (EPA83).

The area is sparsely populated. A 1983 survey indicated 49 people living between 3 and 5 km (1.9 and 3.1 mi) away from the tailings impoundment (PNL84). This survey also indicated that no one was living within 3 km (1.9 mi) of the impoundment. Annual precipitation is 25 to 38 cm (10 to 15 in.), and annual evaporation is about 127 cm (50 in.) (EPA83b).

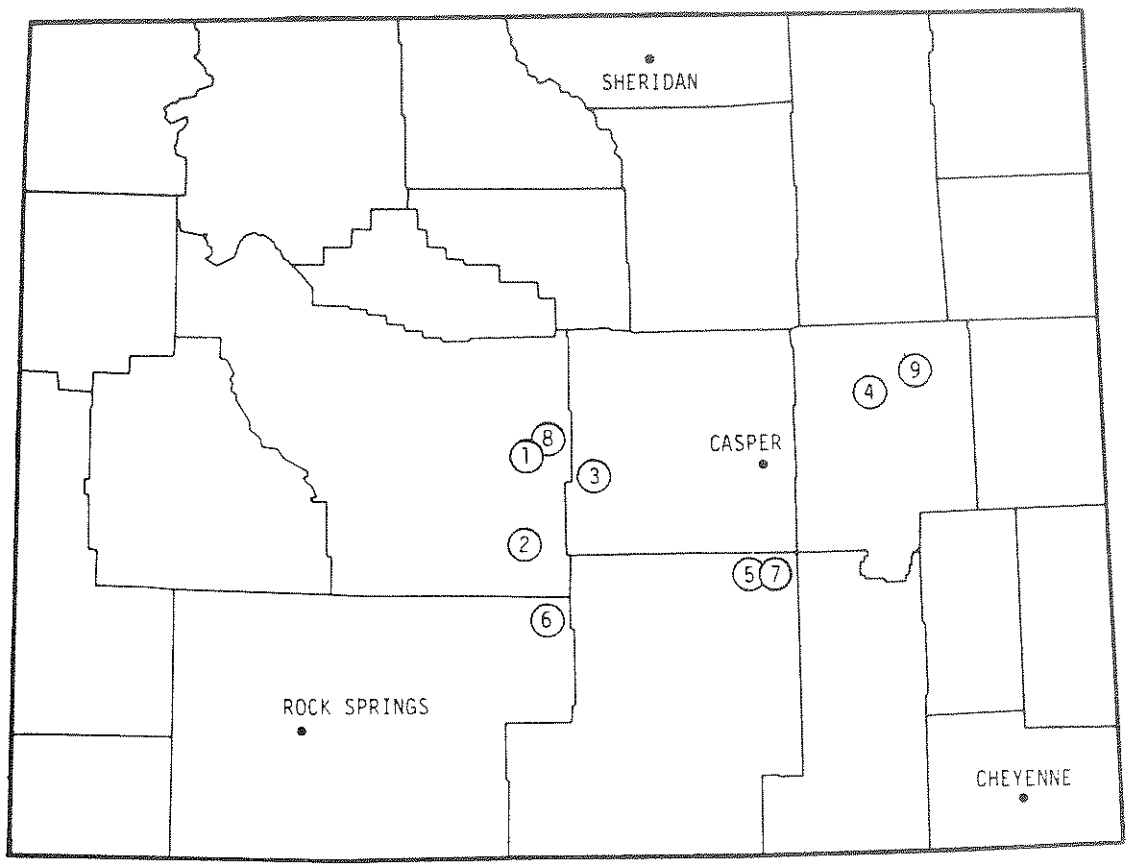
4.2.6 Wyoming

As shown in Figure 4-7, nine mills are located in Wyoming. Three of these have been decommissioned, two are active, and four are on standby status. Descriptions of the active and standby mills are presented in the following subsections.

Pathfinder Gas Hills Mill

The Pathfinder Mines Corp. (formerly Lucky Mc Corp.) Gas Hills Mill is located in the Gas Hills region of Fremond County, Wyoming, about 40 km (25 mi.) northeast of Jeffrey City.

This mill first began producing yellowcake in 1958 with a nominal ore-processing capacity of 850 t (935 tons) per day. Since then, the capacity has been expanded to about 2273 t (2500 tons) of ore per day. The mill uses an acid-leach process and was the first in the United States to incorporate the moving-bed, ion-exchange technique originally developed in South Africa. It is also the only domestic uranium mill that uses anion exchange for concentration of uranium from the feed solution.



1. Pathfinder Mines Corp. Gas Hills Mill
2. Western Nuclear, Inc. Split Rock Mill
3. Umetco Gas Hills Mill
4. Rocky Mountain Energy Bear Creek Mill
5. Pathfinder Mines Corp. Shirley Basin Mill
6. Minerals Exploration Co. Sweetwater Mill
7. Petrotomics Shirley Basin Mill
8. American Nuclear Corp. Gas Hills Mill
9. Exxon Corp. Highland Mill

Figure 4-7. Location of mills in Wyoming.

Company-owned open-pit mining operations, located 1.5 to 3 km (1 to 2 mi) from the mill, supply 90 percent of the ore; the remaining 10 percent is produced at Pathfinder's Big Eagle Mine near Jeffrey City. The ore grade has averaged 0.21 percent U_3O_8 in past operations and is expected to average 0.11 percent in the future (Ha85). Although mines adjacent to the mill also could provide fresh water for ore processing, the availability of hot [57°C (135°F)] well water at the site makes it advantageous, from a process standpoint, to use well water in the mill and to treat mine water for discharge.

The tailings retention system consists of four tailings impoundments having surface areas of 50, 22, 9, and 36 ha (124, 54, 22 and 89 acres) (EPA85) The impoundments are situated sequentially in the head of a draw north-northeast of the mill and are dug into an underlying shale formation. The clay core dams are keyed into the shale. The average tailings depth is now 12 m (40 ft) and is expected to increase to 18 m (60 ft) by the end of the projected milling operation in 1996 (Ha85). Water is sprayed over 8 ha (19 acres) of the dry tailings during warm weather to control dust (Ha85). Dry beaches account for 69 ha (172 acres) of the total, whereas 38 ha (96 acres) are covered with tailings solution. The remaining 8 ha (21 acres) of exposed tailings are saturated with solution (EPA85). The current amount of tailings under management is 11.5 x 10^6 tons) (Ha85).

The radium-226 activity for the solid tailings, combined sands, and slimes is about 160 pCi/g (Ha85). An earlier EPA report estimated the radium-226 content at 420 pCi/g (EPA83b). The radium-226 activity of the tailings liquid is approximately 200 pCi/liter (Ha85).

The Pathfinder Gas Hills Mill is in a remote location away from permanent habitation. The nearest residence is approximately 19 km (12 mi) away (Ha85). A 1983 survey also indicates no population within a 5-km (3-mi) radius of the tailings piles (PNL84).

In 1963 a flood at the mill site resulted in the release of 8.7 x 10^7 liters (2.3 x 10^7 gal) of impounded tailings solution to the environment. As a result of this incident, the tailings impoundment was enlarged to its current capacity. The existing system, with a minimum of 1 m (3 ft) of freeboard, is estimated to provide 12.6 x 10^8 liters (3.3 x 10^8 gal) of emergency storage.

Western Nuclear Split Rock Mill

Western Nuclear's Split Rock Mill is located 3.2 km (2 miles) north of Jeffrey City, Wyoming. This mill began operation in 1957 and has been on standby status since June 1981. When running at capacity, the mill produced 935 tons of yellowcake per year (Bo85). Maximum throughput was about 1700 tons of ore per day (NRC84). The ore grade has ranged from 0.15 to 0.30 percent U_3O_8 in the past and is expected to range from 0.05 to 0.15 percent in the future (NRC84). Milling operations involve semi-autogenous grinding, an acid leach, and solvent extraction. The mill usually stockpiles 2000 to 5000 tons of ore when it is operating. Two 8-m (25-ft) diameter bins are used to store fine ore.

The tailings generated by the Split Rock Mill are contained in a single tailings impoundment that is enclosed by an earthen dam. The tailings impoundment has a surface area of 62 ha (156 acres), and the maximum depth is about 29 m (95 ft)(EPA85, Bo85). Currently, 38 ha (94 acres) of the impoundment are covered by tailings solution (EPA85). There are 17 ha (43 acres) of dry tailings in the impoundment (EPA85). Tailings are discharged from the crest of the dam; the point of discharge is periodically moved along with the crest. Western Nuclear uses a sprinkler system to control dusting from the pond during nonfreezing months. Wind fences, chemical sprays, and vegetation seeding are also used to control dusting. About 12×10^6 tons of commingled tailings are under management (NRC84).

The average radium-226 concentration of the tailings is approximately 100 pCi/g (99.5 $\pm$ 42 pCi/g) (Bo85). Radium-226 values in the sands and slimes were determined to be 63 pCi/g and 87 pCi/g, respectively (Bo85). Western Nuclear has used charcoal canisters to measure radon-222 flux from the tailings. The average flux measurements, made in 1977-1978, were 2 $\pm$ 1.1 pCi/m^2s (Bo85). An earlier EPA report indicated that 430 pCi/g of radium-226 was present in the tailings (EPA83b).

A 1983 population survey indicated that three people lived between 0.5 and 1.0 km (0.3 and 0.6 mi) from the tailings impoundment (PNL84). This survey further indicated that 30 people resided within 2 and 3 km (1.2 and 1.9 mi) of the tailings impoundment, 697 people within 3 and 4 km (1.9 and 2.5 mi), and 176 people within 4 and 5 km (2.5 and 3.1 mi) (PNL84).

Umetco Gas Hills Mill

The Umetco Minerals Gas Hills Mill is located in the southeastern portion of the Wind River Basin of Wyoming. The mill is about 95 km (60 mi) west of Casper in an area of rolling hills interspersed with relatively flat areas. The mill is currently on standby status.

An acid-leach system (RIP-Eluex system) is used to recover uranium. Recycled solution from the impoundment system is used to wash sands after sand-slime separation. Additional pond decant solution is used for tailings dilution. The mill began operation in early 1960 with a capacity of about 1100 tons per day; in January 1980, the capacity was increased to 1400 tons per day. In June 1983, milling of mined ore was temporarily curtailed, and only the heap leach facility waskept in operation. During milling operations, a 2-month stockpile of ore is maintained at the mill (Wo85). This amounts to 85,800 tons when the mill is operating at capacity.

During the anticipated total active life of the project (1960 to 1986), about 13 x 10^6 tons of mill tailings will have been produced. The retention capacity [7.6 x 10^6 t (8.4 x 10^6 tons)] of the mill's original above-grade tailings impoundment has been reached, and since January 1980, tailings have been discharged to a depleted open-pit mine (A-9 Pit), which has a capacity of 2.5 x 10^6 tons. This has an area of 10 ha (25 acres), is clay-lined on the bottom, and has an in-pit dewatering system. The A-9 Pit has an exposed dry tailings beach area of about 6 ha (14 acres) (EPA85). The maximum height of the embankment of the original above-grade tailings impoundment (and expansions) is about 14 m (45 ft). This impoundment has a surface area of 60 ha (151 acres), all of which is dry, and contains 5.8 x 10^6 t (6.4 x 10^6 tons) of commingled tailings (EPA85, Wo85). The inactive tailings area, which has not been used since January 1980, is currently in a preliminary phase of reclamation. The inactive impoundment has been covered with an average thickness of 1.2 m (4 feet) of overburden (Wo85). The tailings are reported to contain 310 pCi/g of radium-226 (EPA83b). The evaporation area consists of three ponds with a combined surface area of 8 ha (20 acres).

An EPA report estimates the radium-226 content of the tailings to be 310 pCi/g (EPA83b). No measurements of radon-222 flux from the tailings impoundment have been made at this site (Wo85).

The area is sparsely populated. A 1983 survey indicated no people living within a 5-km (3-mi) radius of the tailings impoundment (PNL84). Average annual precipitation is 25 cm (10 in.), and evaporation is 17 cm (42 inches) (EPA83b).

Under the current reclamation plan, Umetco is committed to provide a uniform cover of 0.3 m (1 ft) of clay and 2.6 m (8.5 ft) of overburden over the entire tailings area. This will require about 210,000 m^3 (7.5×10^6 ft^3) of clay, at a cost of $1,129,000, and 1.8×10^6 m^3 (65×10^6 ft^3) of overburden, at a cost of $1,840,000 (NRC84). When the cost of revegetation is added, the basic materials needed for the reclamation program will cost about $3,800,000.

Umetco also operates a heap leach facility in the mill area at its Gas Hill site. The water used in the process [1.7 liters/s (27 gal/min)] is taken from a nearby tailings area, and U_3O_8 is recovered from high-grade leach liquor by a solvent-extraction process. The organic phase is pumped to the mill circuit. Heap leach pads cover about 9 ha (22 acres) at this site (EPA85).

Rocky Mountain Energy Mill

Rocky Mountain Energy's Bear Creek Mill is part of a uranium project that includes open-pit mining operations in the Powder River area of Converse County, Wyoming, about 72 km (45 miles) northeast of Casper. The operation, which was dedicated in September 1977, has a capacity of 2000 tons of ore per day (NRC84). The U_3O_8 content of the ore ranges from less than 0.1 to 1.0 percent (NRC84). Ore is stockpiled at the mill on an 8-ha (20-acre) pad; approximately 66,000 tons are currently on hand (Me85). The mill is currently operating at about 20 percent of its capacity and is milling stockpiled ore. It is likely that the mill will go to standby status sometime during the second quarter of 1986.

Mill tailings are contained in a single tailings impoundment enclosed by an earthen dam. The surface area of tailings is 48 ha (121 acres), of which 18 ha (45 acres) are covered with tailings solution and 21 ha (53 acres) are dry tailings beaches (Me85). A portion, 13 ha (32 acres), of the pile has been covered with 30 cm (1 foot) of soil to control fugitive dust (Me85).

No measurements of radon-222 flux from tailings have been made at this site. The radium-226 content of the Bear Creek tailings is reported to be 420 pCi/g (EPA83b).

A 1983 survey indicated no one living within a 5-km (3.1-mi) radius of the tailings pile (PNL84). The annual precipitation in the area is about 30 cm (12 in.), and annual evaporation is 102 cm (40 in.) (EPA83).

Pathfinder Shirley Basin

The Pathfinder Mines Corporation Shirley Basin Uranium Mill is located in an area of plains and rolling hills about 72 km (45 mi) south of Casper, Wyoming. The mill, which began operation in 1971, uses semiautogenous grinding, leaching, and ion exchange. Current mill capacity is 1600 t (1800 tons) of ore per day (NRC84). The mill is currently active and has a throughput of 900 t (990 tons) per day (Si85). Operations are projected to continue through 1994.

Tailings are contained in a single onsite tailings impoundment that is contained above grade by a single-sided earthen retention dam 18 m (60 ft) high. The surface area of the tailings impoundment is 10 ha (261 acres), of which 72 ha (179 acres) are covered with ponded tailings solution (EPA85). Twenty-four hectares (60 acres) are dry beaches. The impoundment contains 5.8 x 106 t (6.4 x 10^6 tons) of tailings (NRC85). The tailings are reported to contain 540 pCi/g of radium-226 (EPA83b).

A 1983 survey of the population in the vicinity of the Pathfinder Shirley Basin Mill indicated no inhabitants living within 3 km (1.9 mi.) of the tailings impoundment (PNL84). Six people, who lived between 3 and 4 km (1.9 and 2.5 mi) from the impoundment, were the only inhabitants within 5 km (3.1 mi) (PNL84).

Minerals Exploration Mill

The Minerals Exploration Company's Sweetwater Mill is located within the Red Desert portion of Wyoming's Great Divide Basin, about 64 km (40 mi) northwest of Rawlins. The mill, which began operations in early 1981, has been inactive since November 1981 and is currently on standby status. The capacity of the mill is 2700 t (3000 tons) per day. The average ore grade processed to date has been 0.03 percent U_3O_8 (Hi85).

All tailings have been placed in a single tailings impoundment. It is a lined (synthetic) impoundment that is partially below grade and has earthen embankments. The total surface area of the tailings is 15 ha (37 acres) (EPA85). With the exception of a 3-ha (7-acre) delta at the tailings discharge point, the tailings are covered by tailings solution. Approximately 0.9×10^6 t (1×10^6 tons) of tailings have been generated and are contained in this impoundment. Plans call for a second cell to be constructed to the north of the existing cell if additional capacity is required. The Sweetwater tailings disposal system is a phased-disposal facility that has gone through several iterations during development. The impoundment was originally designed to be square, below-grade, and divided into four cells. The Minerals Exploration Company reports that measurements of radon-222 flux made on the tailings solids ranged from 90 to 100 pCi/m^2s (Hi85).

A 1983 survey indicated no population living within 5 km (3.1 mi.) of the tailings impoundment (PNL84). The annual precipitation in the area is 15 to 20 cm (6 to 8 in.), and annual evaporation is 102 to 178 cm (40 to 70 in.) (EPA83).

4.3 Population Within 5 km (3.1 mi) of Existing Tailings Impoundments

A 1983 estimate indicated that 12,824 persons lived within 5 km (3.1 mi) from the centroid of the tailings impoundments at the active and standby sites (PNL84). No one lived within 0.5 km (0.3 mi), whereas 173 people lived between 0.5 and 1 km (0.6 and 1.2 mi). Nobody lived within 5 km (3.1 mi) of four of these mills, all of which were in Wyoming. A summary of this information by state and by mill is presented in Table 4-3. By comparison, a population survey conducted by EPA in 1985 showed that there were 11,483 people living within 5 km (3.1 mi) of these tailings impoundments. This more recent survey, which was based on interpretation of aerial photographs, indicated that no one lived within 5 km (3.1 mi) of six of these tailings impoundments. The results of this later survey are presented in Table 4-4.

Table 4-3. Estimate of the population living within 0 to 5 km from the centroid of tailings impoundments of active and standby mills in 1983[a]

State/Owner	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	Total
Colorado							
Cotter	0	0	0	184	2767	2982	5933
Umetco	0	147	193	6	3	0	349
New Mexico							
Sohio	0	0	0	0	42	124	166
United Nuclear	0	0	25	52	85	150	312
Anaconda	0	0	6	136	666	99	907
Kerr-McGee	0	0	0	1	0	0	1
Homestake	0	0	190	104	45	57	396
Texas							
Chevron	0	12	42	33	81	285	453
Utah							
Umetco	0	0	0	0	0	8	8
Rio Algom	0	8	105	154	32	44	343
Atlas	0	0	9	33	1094	1225	2361
Plateau Resources	0	0	0	0	0	171	171
Washington							
Dawn	0	3	93	157	96	62	411
Western Nuclear	0	0	0	0	32	17	49
Wyoming							
Pathfinder (Gas Hills)	0	0	0	58	0	0	58
Western Nuclear	0	3	0	30	697	176	906
Umetco	0	0	0	0	0	0	0
Rocky Mt. Energy	0	0	0	0	0	0	0
Pathfinder (Shirley Basin)	0	0	0	0	0	0	0
Minerals Exp.	0	0	0	0	0	0	0
Total	0	173	663	948	5640	5400	12,824

(a) PNL84.

Table 4-4. Estimate of the population living within 0 to 5 km from the centroid of tailings impoundments of active and standby mills in 1985[a]

State/Owner	0.0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	Total
Colorado							
Cotter	0	0	0	90	1693	3029	4812
Umetco	0	0	14	0	0	0	14
New Mexico							
Sohio	0	0	0	10	60	161	231
United Nuclear	0	0	34	90	105	213	442
Anaconda	0	0	0	67	574	146	787
Kerr-McGee	0	0	0	0	0	0	0
Homestake	0	0	267	118	41	80	506
Texas							
Chevron	0	12	108	104	253	313	790
Utah							
Umetco	0	0	0	4	8	4	16
Rio Algom	0	0	12	16	186	88	302
Atlas	0	0	9	24	923	632	1588
Plateau Resources	0	0	0	9	115	100	224
Washington							
Dawn	0	0	119	253	75	71	518
Western Nuclear	0	0	0	0	56	48	104
Wyoming							
Pathfinder (Gas Hills)	0	0	0	0	0	0	0
Western Nuclear	0	0	6	48	737	358	1149
Umetco	0	0	0	0	0	0	0
Rocky Mt. Energy	0	0	0	0	0	0	0
Pathfinder (Shirley Basin)	0	0	0	0	0	0	0
Minerals Exp.	0	0	0	0	0	0	0
Total	0	12	569	833	4826	5243	11,483

(a) EPA85.

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Chapter 5: INDUSTRY RADON-222 EMISSION ESTIMATES

5.1 Introduction

This chapter presents a discussion of the methodology used to estimate the quantity of radon-222 emitted from tailings impoundments and evaporation ponds at licensed uranium mills. As mentioned in Chapter 3, ore storage and milling operations emit relatively low amounts of radon-222 compared with the amounts emitted by tailings impoundments. Mills that are on standby generate almost no radon-222 other than that from their tailings impoundments. The quantity of radon-222 emitted annually from each site is estimated both for current conditions (i.e., fraction of tailings area with current water cover) and for anticipated future conditions (i.e., dry tailings). Water cover and tailings moisture content have a major influence in controlling the amount of radon-222 that is released; therefore, dry conditions must be considered in the determination of the potential maximum amount of radon-222 that could be emitted (i.e., future conditions). Emissions are estimated for each tailings impoundment and evaporation pond at each licensed uranium mill except the six mills that have already initiated decommissioning activities and are subject to other Federal standards.

5.2 Estimating Emissions

Estimates of radon-222 emissions are based on an assumed emission rate that equals the specific flux of 1 pCi radon-222/m^2s per pCi radium-226/g tailings for dry tailings times the dry area. It has been assumed that tailings that are either saturated with or covered by tailings solution do not emit radon-222. These assumptions were applied to the site-specific data to estimate emissions.

For the specific flux of 1 pCi radon-222/m^2s per pCi radium-226/g to be used, both the dry surface area and the radium-226 concentration of the tailings impoundment must be known. The surface area of existing tailings impoundments has been documented previously (EPA83, NRC80). The uranium industry, however, has changed significantly since the compilation of these earlier data bases, as demonstrated by the drop in uranium production (and thus tailings generation), the initiation of decommissioning activities at six mills, and the drying of tailings impoundments at others because they are not in use. To obtain an updated data base, EPA's Office of Radiation Programs completed a study entitled "Estimates of Population Distribution and Tailings Areas Around Licensed Uranium Mill Sites" (EPA85). As discussed in Chapter 4, this document summarizes the results

of a survey the EPA conducted of 22 uranium mill sites in 1985. This survey produced estimates of the total surface area of the tailings impoundments, which includes the area covered by tailings solution, the saturated area, and the dry surface area of tailings. The same information was also compiled for evaporation ponds. These estimates of tailings areas were used as the basis for estimating radon-222 emissions in this report (See Table 4-2 in Chapter 4). This tabulation includes a listing, by state, of each known tailings impoundment and evaporation pond at the licensed mills. The type of impoundment is also identified, i.e., earthen dam, sand tailings dam, or below-grade impoundment. The status of each impoundment (active, standby, or at capacity) is shown, and estimates of the average radium-226 content in the tailings are listed for each mill. The total impoundment and evaporation pond area is 1570 ha (3882 acres), over 50 percent of which is dry. Only four mills with seven tailings impoundments are currently active; 32 tailings impoundments are on a standby basis or have been filled to capacity.

Concentrations of radium-226 present in tailings vary from site to site. The EPA's Final Environmental Impact Statement for Standards for the Control of Byproduct Materials from Uranium Ore Processing listed radium-226 concentrations in tailings for each licensed mill (EPA83). These values were used in this report to estimate emissions of radon-222.

Emissions were estimated for two conditions: current water-cover conditions (as of late summer of 1985) and after drying. Under current conditions, it was assumed that radon-222 was emitted only from dry areas of the tailings impoundments or evaporation ponds. In the estimates of radon-222 emissions, a specific flux of 1 pCi Rn-222/m^2s per pCi of Ra-226 per gram of tailings was used for dry tailings and a specific flux of zero, for ponded and saturated tailings. As discussed in Chapter 3, this assumed specific flux calculation has been previously documented and used (NRC80, EPA83). This average conservative flux, which provides an approximate estimate of emissions, is useful when the many other factors affecting the flux, such as tailings moisture content, diffusion factors, and emanation coefficients, are not well known. The following calculation was used to estimate emissions from dry areas:

$$\text{kCi Rn-222/y} = \text{dry area, } m^2 \times 1 \text{ pCi Rn-222/}m^2\text{s per pCi}$$

$$\text{Ra-226/g} \times \text{pCi Ra-226/g} \times 3.15 \times 10^{7} \text{s/y} \times 10^{-15} \text{kCi/pCi}$$

The radium-226 concentration in picocuries/gram of tailings is shown in Table 5-1. For estimates of emissions after drying, the total tailings area was substituted for the dry tailings area in

Table 5-1. Summary of radon-222 emissions from uranium mill tailings impoundments

Owner/Impoundment	Radon-222 emissions (kCi/y) Current conditions (flux = 1)[a]	Current conditions (factored)[b]	After drying
Colorado			
Cotter Corp.			
Primary	0.4	0.5	8.4
Secondary	3.0	3.0	3.1
Umetco			
Impoundments 1 & 2	3.8	3.9	4.0
Impoundment 3	1.8	1.8	2.0
Sludge pile	1.2	1.2	1.2
Evaporation pond	0.9	1.0	1.0
New Mexico			
Sohio			
L-Bar	2.9	3.9	8.2
United Nuclear			
Churchrock	2.4	3.2	5.5
Anaconda			
Bluewater 1	19	19	19
Bluewater 2	3.7	3.7	3.7
Bluewater 3	1.9	1.9	1.9
Evaporation ponds	3.8	4.2	13
Kerr-McGee			
Quivira 1	15	17	21
Quivira 2a	4.7	5.6	8.3
Quivira 2b	2.0	2.0	2.2
Quivira 2c	2.1	2.2	2.4
Evaporation ponds	7.5	7.7	29
Homestake			
Homestake 1	5.4	5.8	10
Homestake 2	1.8	1.8	2.2
Texas			
Chevron			
Panna Maria	0.9	1.0	3.1

Table 5-1. Summary of radon-222 emissions from uranium mill tailings impoundments (continued)

Owner/Impoundment	Radon-222 emissions (kCi/y) Current conditions (flux = 1)[a]	Current conditions (factored)[b]	After drying
Utah			
Umetco			
White Mesa 1	1.5	1.6	2.1
White Mesa 2	2.0	2.1	2.7
White Mesa 3	0.6	0.6	2.4
Rio Algom			
1	2.7	2.8	3.1
2	1.1	1.2	2.3
Atlas			
Moab	6.2	6.3	10
Plateau Resources			
Shootaring Canyon	0.1	0.1	0.2
Washington			
Dawn Mining			
Ford 1, 2, 3	2.9	2.9	2.9
Ford 4	0.3	0.3	0.9
Western Nuclear			
Sherwood	1.8	1.8	2.4
Evaporation pond	-	-	0.4
Wyoming			
Pathfinder			
Gas Hills 1	6.4	6.4	6.6
Gas Hills 2	2.1	2.3	2.9
Gas Hills 3	0.1	0.1	1.2
Gas Hills 4	0.6	0.7	4.8
Western Nuclear			
Split Rock	2.4	2.7	8.6
Umetco			
Gas Hills	6.0	6.0	6.0
A-9 Pit	0.6	0.7	1.0
Leach pile	0.9	0.9	0.9
Evaporation ponds	-	-	0.8

Table 5-1. Summary of radon-222 emissions from uranium mill tailings impoundments (continued)

Owner/Impoundment	Radon-222 emissions (kCi/y) Current conditions (flux = 1) [a]	Current conditions (factored) [b]	After drying
Rocky Mountain Energy			
Bear Creek	2.8	3.2	6.5
Pathfinder			
Shirley Basin	4.1	4.6	18
Minerals Exploration			
Sweetwater	0.2	0.2	1.3
Totals	129	137	238

(a) Based on a specific flux of 1 pCi Rn-222/m^2s per pCi Ra-226 per gram of tailings for dry areas and a flux of zero for ponded and wet areas.

(b) Specific flux of 0.3 pCi Rn-222/m^2s per pCi Ra-226 per gram of tailings for wet tailings area, 1 pCi Rn-222/m^2s per pCi Ra-226 per gram of tailings for dry area, and zero for ponded areas.

the preceding calculation. The results of the calculations for impoundments at each mill considered in this report are presented in Table 5-1. Total radon-222 emissions are estimated to be 129 kCi/y under current conditions and to rise to about 238 kCi/y after all the areas have dried.

Although a specific flux of 1 pCi radon-222/m^2s per pCi radium-226/g tailings is commonly used and recommended by NRC (NRC85) when specific data are lacking, alternative methods of flux estimation are available. One alternative method is to assume that the radon-222 flux from dry areas is 1 pCi radon-222/m^2 per pCi radium-226/g; zero from ponded areas, as previously discussed; and 0.3 pCi radon-222/m^2 per pCi radium-226/g for saturated areas instead of zero (NRC80). Estimates of radon-222 emissions made by using this method of calculation indicate 137 kCi/y, as shown in Table 5-1.

Other alternative methods of estimating radon-222 emissions require site-specific data. As discussed in Chapter 3, information on radium-226 and on the moisture content, porosity, density, and emanating power of tailings can be substituted into the diffusion equation to estimate a site-specific flux for each area of a tailings impoundment. An attempt was made to complete such an estimate for each mill in a recent study (PEI85). That study indicated that using a specific flux of 1 pCi radon-222/m^2s per pCi radium-226/g tailings for dry areas and zero for ponded and saturated areas resulted in a conservative (high) estimate of radon-222 emissions. Total emissions estimated by using the assumed specific flux were about twice as high as those made using site-specific information. The site-specific information was based on a number of assumptions, however, as not all of the necessary tailings data are currently available at licensed mill sites. Also, estimating radon-222 emissions from tailings after drying would require additional assumptions regarding their physical characteristics. The current data base is not sufficient to allow more accurate calculation of emissions based on site-specific tailings characteristics; therefore, the specific flux (1 pCi radon-222/m^2s per pCi radium-226/g) for dry areas and zero for ponded and saturated areas were used in this report. The emission estimates presented herein may be conservative compared with estimates made by other means, but insufficient specific data are available to draw any definite conclusions.

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Chapter 6: BASELINE INDUSTRY RISK ASSESSMENT

6.1 Introduction

This chapter contains an assessment of the risks of fatal lung cancer caused by radon-222 emissions from uranium tailings impoundments. Two measures of risk are presented: risks to nearby individuals and risks to the total population. The first measure refers to the estimated increased lifetime risk imposed upon individuals who spend their entire lifetime at a location near a tailings impoundment, where the predicted radon-222 concentrations are highest. Risks to nearby individuals are expressed as a probability, i.e., 0.001 (1/1000) or 1E-3. This means that the increased chance of lung cancer in an exposed person's lifetime is 1 in 1000. Estimates of risks to nearby individuals must be interpreted cautiously, as few people generally spend their whole lives at such locations. The second measure, risks to the total population, refers to all people exposed to radon-222 emissions from all of the licensed uranium mill tailings impoundments. Expressed in terms of the number of fatal cancer cases caused by the amount of radon-222 emitted annually, this provides a measure of the overall public health impact.

An epidemiological approach is used to estimate risks which are based on relative risk from exposures to radon-222 expressed in working level months (WLM). The WLM is in turn related to a concentration of radon-222 decay products, expressed in picocuries/liter. Risks are directly proportional to emissions; therefore, one can estimate the deaths due to radon-222 in the future by assuming that new tailings impoundments will be located in the same general area of existing impoundments.

6.2 Risk Estimates

6.2.1 Nearby Individuals

Individual risks are calculated by using the life table methodology described by Bunger et al. (Bu81). The relative risk projections used for lifetime exposure were based on relative risk coefficients of 1 and 4 percent per WLM for the radiation-induced increase in lung cancer. See discussion in Section 2.3.

The AIRDOS-EPA and DARTAB codes and an assumed radon-222 decay product equilibrium fraction determined as shown in Table 2-4 were used to estimate the increased chance of lung cancer for individuals living near a tailings impoundment and receiving the maximum exposure. Results are shown in Table 6-1. The maximum risk of 2 percent (2E-2) occurs at Anaconda, New Mexico at a distance of 1.5 km from the center of the impoundment.

6.2.2 Regional Population

Collective (population) risks for the region are calculated from the annual collective exposure (person WLM) for the population in the assessment area by a computerized methodology known as AIRDOS-EPA (Mo79). An effective equilibrium fraction of 0.7 is presumed because little collective exposure takes place near the mill.

In this study, population data in the 0- to 5-km and 5- to 80-km regions around each mill were obtained from an earlier detailed study by EPA and are summarized in Chapter 4 (EPA83). Collective exposure calculations expressed in person WLM were performed for each mill by multiplying the estimated concentration in each annular sector by the population in that sector. The parameters used in the AIRDOS-EPA code are shown in Table 6-2. An approximate emission height of 1 meter was assumed in all cases. Meteorological parameters from selected weather stations were used for each mill. Included in this table are the resulting exposure for that mill based on the emission rate and the population near the mill. Estimates of the number of fatal cancers corresponding to this exposure were made by using a risk factor of 3 percent (760 deaths per 10^6 person WLM). These estimates were then multiplied by 1520/760 or 380/760 to adjust to the risk coefficients of 4 and 1 percent, respectively (1520 and 380 deaths per 10^6 person WLM). A summary of the estimated fatal cancers due to radon-222 from existing tailings impoundments is shown in Table 6-3 under the current (partially wet and partially dry) conditions and under entirely dry conditions.

These estimated health effects for the 20 mills considered compare favorably with the previous EPA study (EPA83) for uranium byproduct materials. In the earlier study, a model plant approach was used at 26 sites, and 0.38 and 2.1 deaths were estimated for the 0-5 km and 5-80 km regions, respectively, for post-operational (dry) conditions (Page 6-14 in EPA83).

Table 6-1. Estimated risk of fatal lung cancer from maximum exposure for an individual living near tailings impoundment

State	Mill owner	Maximum lifetime risk to individual (b)	Distance (a) meters
Colorado	Cotter	3E-4 (8E-5)	2500
	Umetco	8E-3 (2E-3)	750
New Mexico	Kerr-McGee	1E-2 (2E-3)	2500
	Anaconda	2E-2 (5E-3)	1500
	United Nuclear	2E-3 (4E-4)	1500
	Homestake	6E-3 (1E-3)	1500
	Sohio	7E-4 (2E-4)	3500
Texas	Chevron	2E-3 (4E-4)	750
Utah	Umetco	2E-4 (6E-5)	4500
	RioAlgom	3E-3 (7E-4)	750
	Atlas	4E-3 (1E-3)	1500
	Plateau Res.	2E-5 (4E-6)	4500
Washington	Dawn	3E-3 (6E-4)	750
	Western Nuclear	2E-4 (5E-5)	4500
Wyoming	Minerals Exploration	4E-6 (9E-7)	30000
	Pathfinder		
	Gas Hills	2E-3 (6E-4)	2500
	Shirley Basin	9E-5 (2E-5)	15000
	Rocky Mt.	9E-5 (2E-5)	15000
	Umetco	1E-4 (3E-5)	15000
	Western Nuclear	2E-3 (5E-4)	750

(a) Distance from center of a homogenous circular equivalent impoundment.

(b) The value in the first column is based on a risk factor of 1520 deaths/10^6 person WLM, and the values in parentheses are based on 380 deaths/10^6 person WLM.

Table 6-2. AIRDOS-EPA code inputs and estimated risks

State	Company	AIRDOS code inputs: Atmospheric mixing depth (m)	AIRDOS code inputs: Precipitation (cm/y)	AIRDOS code inputs: Ambient temperature (°C)	Approximate impoundment area (ha)	Deaths/year[a]: 0-5 km	Deaths/year[a]: 5-80 km
Colorado	Cotter	700	38.8	10	10	1.2E-2	5.2E-2
	Umetco	700	40.2	10	50	2.3E-2	2.1E-2
New Mexico	Kerr-McGee	800	29.1	11	200	2.0E-4	1.9E-1
	Anaconda	800	27.0	11	100	5.0E-2	2.7E-1
	United Nuclear	800	29.1	11	30	1.7E-3	1.8E-2
	Homestake	800	27.0	11	60	1.5E-2	8.6E-2
	Sohio	800	27.0	11	20	7.6E-4	4.3E-2
Texas	Chevron	1000	76.6	21	10	6.7E-4	2.6E-2
Utah	Umetco	700	22.2	13	40	1.8E-5	6.1E-3
	RioAlgom	700	22.2	13	20	2.2E-3	4.6E-3
	Atlas	700	22.1	13	40	1.8E-2	1.4E-2
	Plateau Res.	700	25.2	13	2	3.3E-5	6.4E-6
Washington	Dawn	600	54.2	9	40	3.5E-3	3.0E-2
	Western Nuclear	600	54.2	9	30	8.7E-5	1.2E-2
Wyoming	Minerals Exploration	700	27.3	6	3	-	8.3E-5
	Pathfinder						
	Gas Hills	700	28.0	6	70	1.9E-3	2.9E-3
	Shirley Basin	700	29.6	6	20	-	4.6E-3
	Rocky Mt.	700	35.4	6	20	-	3.7E-3
	Umetco	700	33.9	6	80	-	2.2E-3
	Western Nuclear	700	28.0	6	20	1.4E-3	5.2E-4

(a) Based on 760 deaths per 10^6 person WLM.

(b) Zero population in the 0-5 km region.

Table 6-3. Summary of regional health effects from existing tailings impoundments

Condition of tailings	Emissions[a] (kCi/y)	Committed fatal cancers per year[b]		
		0-5 km	5-80 km	0-80 km
Current	129	0.3 (0.1)	1.6 (0.4)	1.8 (0.5)
All dry	238	0.4 (0.1)	2.9 (0.7)	3.3 (0.8)

(a) Based on radon-222 flux of 1 pCi/m^2 per pCi of Ra-226 per gram of tailings.

(b) Values in first column are based on 1520 deaths due to lung cancer per 10^6 person WLM. The values in parentheses are based on 380 deaths per 10^6 person WLM.

6.2.3 National

Radon-222 released from mills can be transported beyond the 80-km regional cutoff. A trajectory dispersion model developed by NOAA (NRC79) has been used to estimate the national impact of radon-222 releases. The model yields radon-222 concentrations (in picocuries per liter) in air, which are then converted to decay product exposures by assuming an effective equilibrium fraction of 0.7. National annual collective exposures (person WLM) are calculated for distances beyond the 80-km regional limit for a total population of 200 million persons. This model was used in a previous EPA study on byproduct material from uranium ore processing (EPA83). Inasmuch as all mills are still in the same location, the results of this earlier study were used to estimate current national health effects by ratioing the estimated deaths to the current emission estimates and adjusting for the revised risk factor ranges.[a] The calculations are shown below and summarized in Table 6-4.

$$\frac{2.47 \text{ deaths}}{202.7 \text{ kCi/y}} \times 129 \text{ kCi/y} \times \frac{1520}{760} = 3.1 \text{ deaths/y}$$

$$\frac{2.47 \text{ deaths}}{202.7 \text{ kCi/y}} \times 129 \text{ kCi/y} \times \frac{380}{760} = 0.8 \text{ death/y}$$

For the dry tailings condition with emissions of 238 kCi/y, the corresponding values are 5.8 and 1.4 deaths per year.

(a) The 2.47 deaths from emissions of 202.7 kCi/y are from EPA's 1983 report and were based on a risk of 760 deaths per 10^6 person WLM.

Table 6-4. Summary of health effects beyond the 80-km region from tailings impoundments

Condition of tailings	Emissions (kCi/y)	Committed fatal cancers per year[a]
Current	129	3.1 (0.8)
All dry	238	5.7 (1.4)

(a) Values in first column are based on 1520 deaths due to lung cancer per 10^6 person WLM. The values in parentheses are based on 380 deaths per 10^6 person WLM.

The estimated health effects from existing impoundments is shown in Table 6-5. This summary shows that about 3 fatal cancers per year can be attributed to tailings impoundments in their current conditions, and this could increase to 6 deaths per year if the impoundments dried and emissions increased.

6.2.4 Risks from New Tailings Impoundments

Radon-222 emissions will not increase greatly until the current impoundments reach capacity and new impoundments are built. The need for new impoundments is directly related to industry growth. The health effects caused by new impoundments may be estimated by assuming a direct proportion of effects to emissions. This procedure assumes that new impoundments will be located in the same geographical area as the existing impoundments and will have the same impact on surrounding populations. Emissions from model new tailings impoundments are estimated in Chapter 7 and will vary with the design and work practice used.

Table 6-5. Summary of fatal cancers from current tailings impoundments

Condition of tailings	Fatal cancers per year[a]			
	0-5 km	5-80 km	National	Total
Current	0.3 (0.1)	1.6 (0.4)	3.1 (0.8)	4.9 (1.2)
Dry	0.4 (0.1)	2.9 (0.7)	5.7 (1.4)	9.0 (2.3)

(a) Values in first column are based on 1520 deaths due to lung cancer per 10^6 person WLM. The values in parentheses are based on 380 deaths per 10^6 person WLM.

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Chapter 7: RADON-222 CONTROL TECHNIQUES

The reduction of radon-222 emissions at licensed uranium mill sites is accomplished most effectively by reducing the emissions from the tailings disposal area. Radon-222 emissions from the balance of the milling circuit are relatively small and are not easily controlled. At mills that are not operating and are on a standby basis, almost all of the radon-222 emissions come from the tailings disposal area.

This chapter is concerned with control techniques that can be applied to licensed uranium mill tailings impoundments to reduce radon-222 emissions. A general discussion of radon-222 control techniques is followed by more detailed discussion of controls for existing and new impoundments.

Radon-222 emissions from uranium mill tailings can be controlled most easily by keeping the tailings covered with water or by covering them with earthen material. At new tailings impoundments, phased disposal of the tailings or continuous disposal by dewatering and immediate covering represent systematic ways of controlling radon-222 emissions using water or earth covers. Extraction of radium-226 from the tailings, chemical fixation, and sintering of tailings have been explored as means of reducing radon-222 emissions, but they have not been applied on a large scale and they appear to be too costly for general application (NRC80).

The applicability and effectiveness of control techniques depend primarily on the design of the mill tailings disposal area and the mill's operating schedule. Thus, the control techniques can be broadly classified as applicable to (1) existing tailings disposal areas at existing uranium mills, and (2) new tailings disposal areas at either new or existing uranium mills.

7.1 Description of Control Practices

The most effective way of controlling radon-222 emissions is to cover the radium-bearing tailings with an impervious material. Earth and water are the cover materials most commonly used and are effective in reducing radon-222 emissions. These cover materials retard the movement of radon-222 long enough for it to decay in the cover material; thus, the decay products remain in the cover.

7.1.1 Earth Covers

Covering the dried beach area with earthen materials has been used to control dust and radon-222 emissions at inactive tailings impoundments. The depth of earth required for a given amount of control varies with the type of earth and the rate at which radon-222 emanates from the bare tailings.

Earth cover restricts the diffusion of radon-222 long enough so that it will decay in the cover material. Radon-222 diffusion through earth is a complex phenomenon affected by processes such as molecular diffusion, described mathematically by Fick's law. These complex diffusion parameters have been evaluated by Rogers and Nielson (Ro81). They determined that diffusion depends greatly on the porosity and moisture content of the medium through which it occurs. Ideally, the diffusion coefficient should be measured experimentally for a given earth cover at its ambient moisture content and expected compaction level. This coefficient can, however, be estimated based on the moisture content and porosity of the material. Clay soils have superior moisture retention (9 to 12 percent moisture) and are best for covering tailings; clay soils are found in the uranium milling regions of Colorado, New Mexico, Utah, and Wyoming (Ro81).

Cover thickness may be calculated by using the same diffusion equations that apply to emissions from uncovered tailings as shown in the following equations (Ro84):

$$J_c = J_t \exp(-b_c x_c)$$

where J_c is the flux through cover (pCi/m^2s); J_t is the flux through tailings (pCi/m^2s); b_c is $(\lambda/D_c)^{1/2}$; g is the radon-222 decay constant ($2.1 \times 10^{-6}/s$); D_c is the diffusion coefficient of cover, $0.07 \exp[-4(m-mp^2 + m^5)]$; m is the moisture saturation fraction $[0.01 M(1/\rho - 1/g)^{-1}]$; M is the moisture content of cover material (percent dry weight); ρ is the bulk density (g/cm^3); g is the specific gravity (g/cm^3); p is the porosity ($1 - \rho/g$); and x_c is the depth of cover material (cm).

This simplified equation assumes that the physical parameters of the cover material, such as its density, specific gravity, moisture content, and porosity, are similar to those of the tailings, and that the tailings are sufficiently thick so that other terms approach a value of one. The flux through the cover material may be estimated by substituting values for the cover depth and the uncovered tailings flux.

Effectiveness and Cost

The approximate effectiveness of various types of earth cover in reducing radon-222 emissions is shown in Figure 7-1. The application of almost any type of earth will initially achieve a rapid decrease in radon-222 emissions. One meter's depth of high-moisture-content earth such as clay will reduce radon-222 emissions by about 90 percent. In Figure 7-1 the earth types are categorized by their "half-value layer" (HVL). The HVL is that thickness of cover material (earth) that reduces the radon-222 flux to one-half its uncovered value. High-moisture content earth provides greater radon-222 emission reduction because of its smaller diffusion coefficients and its lower HVL values. The approximate reduction in radon-222 emissions achieved by applying selected types of earth at 0.5m, 1m, 2m, and 3 meter depths is shown in Table 7-1.

In practice, earthen cover designs must take into account uncertainties in the measurements of the properties of the specific cover materials used, the tailings to be covered, and especially the predicted long-term values of equilibrium moisture content for the specific location. Predicting long-term moisture content requires specific knowledge of the earthen cover to be used and the climatic conditions (Ha84, Ge84). Proper consideration of these factors at the design stage help ensure that radon-222 emissions remain constant over the long term. In predicting reductions in radon-222 flux, uncertainty increases when the required radon-222 emission limit is very low.

The cost of applying earth covers varies widely with location of the tailings impoundment, its layout, and availability of earth. Costs also depend on the size and topography of the disposal site, its surroundings, the amount of earth required, and the hauling distance. Another factor affecting the costs of cover material is ease of excavation and the type of excavating equipment used. In general, the more difficult the excavation, the more elaborate and expensive the equipment is and the higher the cost. The availability of such materials as clay will also affect costs. Large deposits of bentonite and similar clays are found in Wyoming and Utah, and smaller deposits are found in all the Western States. If the necessary materials are readily available locally, no incremental costs would be incurred; if they must be purchased or hauled, costs could increase significantly. Cost factors for earth cover application are given in Table 7-2, and more detailed cost factors are presented in Appendix B. These are direct costs, and they do not include indirect costs such as engineering design and permit costs, insurance, or a contingency. Indirect costs would add approximately 30 percent to the direct charges.

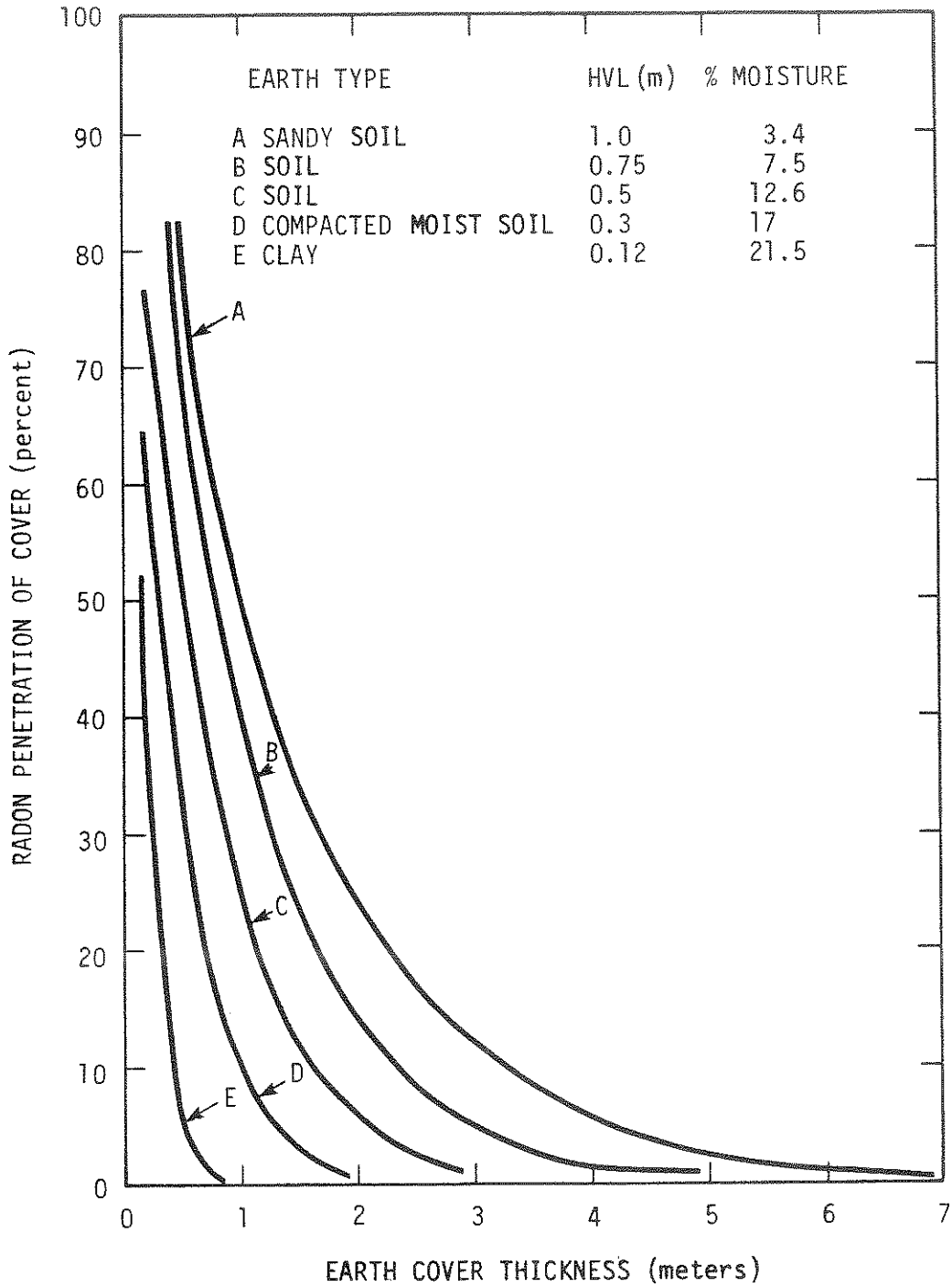


Figure 7-1. Changes in radon-222 penetration with earth cover thickness. (adapted from EPA83)

Table 7-1. Percentage reduction in radon-222 emissions attained by applying various types of earth cover

Earth type[a]	HVL(m)	Depth of earth cover (m)			
		0.5	1.0	2.0	3.0
A	1.0	29	50	75	88
B	0.75	37	60	84	94
C	0.5	50	75	94	98
D	0.3	68	90	99	>99
E	0.12	94	>99	>99	>99

[a] See Figure 7-1.

Table 7-2. Summary of unit costs for estimating earth cover costs[a]

Task	Unit cost ($)
Grading, self-propelled scraper, 1000-ft haul	1.16/yd^3
Excavation, elevating scraper, 5000-ft haul	2.46/yd^3
Compaction, vibrating	1.00/yd^3
Excavation, front-end loader, truck-loaded	0.84/yd^3
Hauling, 12-yd dump truck, 2-mile round trip	2.35/yd^3
Fencing, 6-ft, aluminized steel	11.30/linear ft
Riprap, machine-placed slope protection	21.00/yd^3
Borrow, bank-run gravel	6.60/yd^3

(a) Building Construction Cost Data 1985, R. S. Means Co., Inc., 43rd Annual Edition, 1984.

Based on the cost factors and the required earth thickness shown in Figure 7-1, the resulting total costs per hectare for earth cover can be estimated (as shown in Table 7-3) for selected emission or flux levels and a bare tailings radon-222 emission rate of 280 pCi/m^2s. These costs only take into account the earth moving and placement costs; they do not include any indirect charges or final closure costs, such as riprap or reclaiming borrow pits. They are presented to show the variation in costs among the different types of soil.

For a model 50-ha (124-acre) tailings impoundment, the approximate direct earth moving cost to achieve a 64 percent reduction (from 280 to 100 pCi/m^2s) is $\$5.2 \times 10^6$ (50 ha x \$105,000/ha = \$5,250,000) with a fairly dry type A earth and $\$1.4 \times 10^6$ for a more moist type D earth.

Earth cover is applied to dry tailings with conventional earth-moving equipment and engineering practices. However, some areas, especially the sloped sides of dams constructed of coarse tailings, may be difficult to cover without recontouring the pile. Dams constructed of coarse tailings are located at six mill sites, mainly in New Mexico. The slope of the sides of these dams is 2:1 or steeper. Some of these dams have heights of 100 ft or more. These sloped areas represent about 8 percent of the total tailings area. At least one site, Uravan in Colorado, has applied a partial earth cover to the sloped sides of dams constructed of tailings, which would indicate that this is a feasible practice.

7.1.2 Water Cover

Maintaining a water cover over tailings reduces radon-222 emissions. The degree of radon-222 control increases slightly with the depth of the water. Factors affecting this practice include the mill water recirculation rate (if any), evaporation and precipitation rates, impoundment construction and slope, phreatic levels, ground-water contamination potential, and dike or dam stability. Some above-ground tailings impoundments minimize the depth of water to reduce seepage and possible ground-water contamination by draining the water through an overflow pipe to a separate evaporation pond. All uranium mill surface impoundments are subject to ground-water concentration standards as specified in 40 CFR Subpart D 192.32 and incorporated in NRC criteria for tailings impoundments (10 CFR 40, Appendix A). These strict ground-water contamination standards will frequently determine the type of impoundment design and degree of water cover maintained in an active area. An impoundment liner and ground-water monitoring programs will be required for new installations.

Table 7-3. Earth moving and placement costs (thousands of dollars per hectare)[a] of attenuating radon-222 as a function of thickness (meters of different soils) and type of earth

Final flux[c] (pCi/m^2s)	Earth Type[b] A		B		C		D		E	
	Cost	Thickness	Cost	Thickness	Cost	Thickness	Cost	Thickness	Cost	Thickness
20	267	3.81	200	2.86	133	1.90	80	1.14	32	0.46
50	174	2.49	130	1.86	87	1.24	52	0.75	21	0.30
100	104	1.49	78	1.11	52	0.74	31	0.45	12	0.18
200	34	0.49	25	0.36	17	0.24	10	0.15	4	0.06

(a) Cost basis: \$7.00/m^3 (\$5.35/yd^3) of soil cover material; includes excavating (\$0.84/yd^3), hauling (\$2.35/yd^3), spreading (\$1.16/yd^3), and compacting (\$1.00/yd^3), in 1985 dollars.

(b) See Figure 7-1.

(c) Based on initial radon-222 emission rate of 280 pCi/m^2s.

Effectiveness and Cost

The diffusion coefficient of water is very low (1.1×10^{-5} cm^2/s), about one-thousandth of that of soil with a 9 percent moisture content. Thus, water is an effective barrier for radon-222. In shallow areas, the release of radon-222 dissolved in water is increased by thermal gradients and wave motion, and emissions approach those of saturated tailings. Increased radium-226 content in the water reduces its overall effectiveness in controlling radon-222 because the solution also releases radon-222. For a water depth less than 1 meter, the flux rate is similar to that of saturated tailings and may be estimated by Equation 3-1 as presented in Section 3. Water-covered tailings have a radon-222 flux of about 0.02 pCi/m^2s per pCi of radium-226 per gram of tailings compared with a dry tailings flux of about 1 pCi/m^2s per pCi of radium-226 per gram, or a radon-222 reduction efficiency of about 98 percent (PEI85). Emission estimates of zero are frequently used for ponded and saturated areas, and that assumption is used throughout this report (Ha85) (EPA83).

If a pond is initially designed and built to maintain a water cover, there is no added cost for this form of radon-222 control. Continued monitoring is required to determine if any seepage is occurring through the dam or sides, and ground-water samples may be required periodically as a check for contamination.

7.1.3 Water Spraying

Water (or tailings liquid) sprays can be used to maintain a higher level of moisture in the tailings beach areas. This reduces fugitive dust emissions and may reduce the diffusion of radon-222 through the tailings; however, ground-water contamination may be increased at some sites. The effectiveness of this method varies with the moisture content of the tailings. As shown in Figure 7-2, the radon-222 emanation coefficient initially increases with increasing moisture content up to about 5 to 10 weight percent moisture and then remains fairly constant. Thus, if water is applied to a very dry beach area, radon-222 emissions may initially increase because of a larger emanation coefficient. As the moisture increases, however, the diffusion coefficient will decrease. These mechanisms (both affecting radon-222 emissions) "compete" at low moisture levels. Whereas some reports (NRC80) estimate that wetting can achieve an overall radon-222 reduction of 20 percent, others (ST82) have stated that by wetting tailings at low moisture levels, a larger emanation coefficient may outweigh the effects of a lower diffusion coefficient and result in increased emissions at low moisture contents. The overall

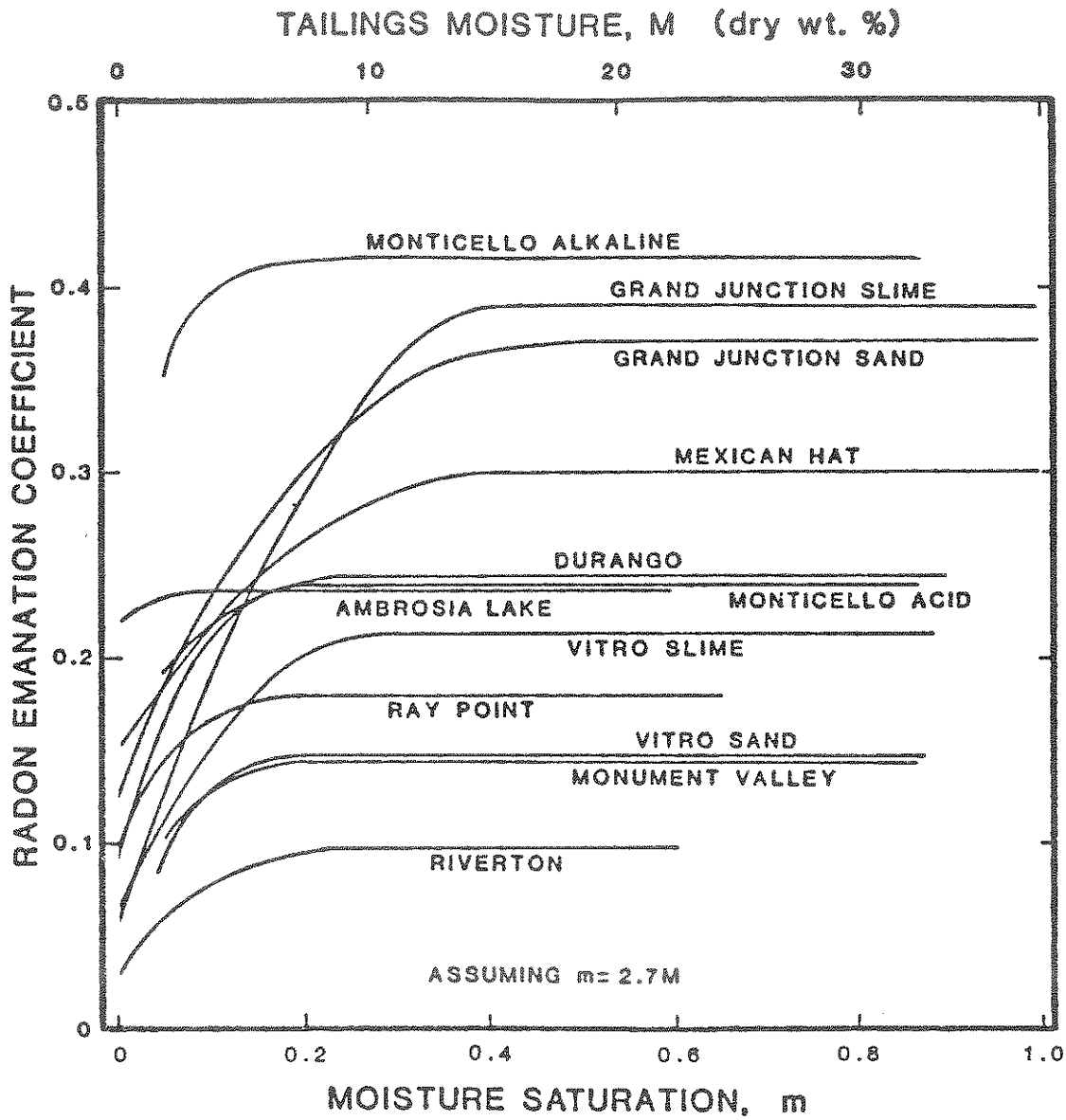


Figure 7-2. Radon emanation coefficients for tailings samples (Ro84).

feasibility of wetting to achieve significant radon-222 reductions is questionable, especially in arid regions, because large quantities of liquid are required to maintain high moisture levels.

7.1.4 Other Control Techniques

Several other radon-222 control techniques have been evaluated. Although none of these methods has been applied on a large scale, they are described briefly here as part of this Background Information Document.

Synthetic Covers

Synthetic material, such as polyethylene sheet, can reduce radon-222 emissions if carefully placed on dry beach areas and sealed. Diffusion coefficients of less than 10^{-6} cm^2/s have been measured for synthetic materials (Ro81). Such covering could be used on portions of the tailings on a temporary basis and then removed or covered with fresh tailings. Such a barrier also would aid, at least temporarily, in the control of radon-222 if a soil cover material were subsequently applied. The overall effectiveness of synthetic covers is not known because leaks occur around the edges and at seams and breaks. Synthetic covers have a limited life, especially in dry, sunny, windy areas, and will not provide a long-term barrier to radon-222. The cost of installing polyethylene material is about $\$0.01/ft^2$ per mil of thickness or $\$0.50/ft^2$ for 50 mil material, which is equivalent to about $53,800/ha ($21,750/acre).

Chemical stabilization sprays that form coatings on the dry tailings are effective for controlling dust, but they are not useful for suppressing radon-222 because they do not provide an impermeable cover.

Asphalt Covers

Asphalt cover systems have been proposed as a radon-222 control technique because such systems exhibit very low radon-222 diffusion coefficients. The Pacific Northwest Laboratory (PNL) has investigated controlling the release of radon-222 through use of asphalt emulsion covers for several years for DOE's Uranium Mill Tailings Remedial Action Project (UMTRAP). Results have shown asphalt emulsion cover systems to be effective at substantially reducing radon-222 emissions, and field tests indicate that such systems have the properties necessary for long-term effectiveness and stability. Of the various types of asphalt cover systems that were researched, an asphalt emulsion admix seal was found to be the most effective (Ha84, Ba84).

Costs of applying a full-scale asphalt cover were estimated to be $24.20/m ($20.23/yd) in 1981 dollars or $100,000/acre (Ba84). These cost estimates are probably applicable to relatively flat sites. Existing uranium mill tailings impoundments may have to be regraded before these techniques could be applied. Cover protection, in the form of gravel or revegetation, above an earthen cover applied over the asphalt radon-222 barrier to protect it may also have to be considered. Asphalt cover systems could prove to be economically competitive with earthen covers at some existing sites. Site-specific evaluations would have to be performed that analyzed the amount of earth required as well as its availability and cost versus the cost of applying an asphalt cover system. An ample supply of earthen material should be available as a final cover of new uranium mill tailings impoundments that are constructed below or partially below grade; such a supply would probably make an asphalt cover system economically unattractive.

Thermal Stabilization

Thermal stabilization is a process in which tailings are sintered at high temperatures. The Los Alamos National Laboratory has conducted a series of tests on tailings from four different inactive mill sites where tailings were sintered at temperatures ranging from 500° to 1200°C (Dr81).

The results show that thermal stabilization effectively prevented the release (emanation) of radon-222 from tailings. The authors note, however, that before thermal stabilization can be considered as a practical disposal method, information is needed on the following:

(1) The long-term stability of the sintered material exposed to physical degradation and chemical attack (e.g., solubility of new minerals and amorphous material found in thermally stabilized tailings).

(2) The interactions of the tailings with the refractory materials lining a kiln.

(3) The gaseous and particulate emissions produced during sintering of tailings.

(4) Revised engineering and economic analysis as more information is developed.

Gamma radiation is still released after sintering; therefore, protection against the misuse of sintered tailings would be required. Although the potential health risk from external gamma radiation is not as great as that from the radon-222 decay products, it can produce unacceptably high exposure levels in and around occupied buildings. Also, the potential for ground-water contamination may require the use of liners in a disposal area.

Chemical Processing

The Los Alamos National Laboratory has also studied various chemical processes for the extraction of thorium-230 and radium-226 (precursors of radon-222) from the tailings along with other minerals (Wm81). After their removal from the tailings, the thorium-230 and radium-226 can be concentrated and fixed in a matrix such as asphalt or concrete. This greatly reduces the volume of these radioactive materials and permits disposal with a higher degree of isolation than economically achievable with tailings.

The major question regarding chemical extraction is whether it reduces the thorium-230 and radium-226 values in the stripped tailings to safe levels. If processing efficiencies of 80 percent to 90 percent were attained, radium-226 concentrations in tailings would still be in the range of 30 to 60 pCi/g. Thus, careful disposal of the stripped tailings would still be required to prevent misuse. Another disadvantage of chemical processing is the high cost, although some of the costs might be recovered from the sale of other minerals recovered in the process (Th81).

Soil Cement Covers

A mixture of soil and portland cement, called soil cement, is widely used for stabilizing and conditioning soils (PC79). The aggregate sizes of tailings appear suitable for producing soil cement, which is relatively tough, withstands freeze/thaw cycles, and has a compressive strength of 300 to 800 psi. When combined in a disposal system with a 1-meter earth cover over it, soil (tailings) cement would likely provide reasonable resistance to erosion and intrusion, could be expected to reduce radon-222 releases, and would shield against penetrating radiation. The costs are expected to be comparable to those of thick earth covers.

The long-term performance of soil cement is unknown, especially as tailings impoundments shift or subside with age. Also, soil cement cracks at intervals when placed over large surface areas. The importance of this cracking on the effectiveness of soil cement for radon-222 control has not been evaluated.

Deep-Mine Disposal

Disposal of tailings in worked-out deep mines offers several advantages and disadvantages compared with surface disposal options. The probability of intrusion into and misuse of tailings in a deep mine is much less than that of surface

disposal. Radon-222 releases to the atmosphere would be reduced, as would erosion and external radiation. This method, however, has potential for ground-water contamination problems. Also, it could be costly, depending on the mine location and the controls required to guard against potential ground-water contamination.

7.2 Control Practices Applicable to Existing Tailings Impoundments

Control practices that are applicable to existing tailings impoundments are limited to application of earthen covers, or possibly asphalt mixtures, to dry areas, and maintaining or expanding the area of tailings covered by water (if it were determined that ground-water impacts would not result). Either interim (i.e., short-term) or final (i.e., long-term) controls could be applied. Interim control is the application of a cover that reduces radon-222 emissions but that does not meet the requirements of final reclamation. Standards for final reclamation include requirements for reducing average radon-222 emissions to 20 pCi/m^2s and for long-term (1000 y) stability and protection against misuse.

7.2.1 Interim Controls

Application of an interim earthen cover on the dry portions of tailings impoundments could reduce radon-222 emissions over the period of licensed operation and prior to final reclamation. For example, a 0.3 m (1 ft) or 1 m (3.3 ft) thick earth cover having 8 percent moisture content would theoretically reduce radon-222 emissions by about 25 and 62 percent, respectively (Table 7-1). There are many unknowns regarding the effectiveness, applicability, timing, and operational aspects of interim cover. These items are discussed below and more fully in Appendix C.

The operational status (at capacity, standby, or active) and the type of construction (dams constructed of coarse tailings, earth dams, or below-grade lined impoundments) control the extent to which interim cover could be applied. Interim cover could be applied immediately to most dry areas of existing impoundments (excluding dams). Currently, about 50 percent of the total area of existing impoundments is dry (Table 4-2). Ten existing impoundments have been filled to capacity. These impoundments represent about 14 percent of the total area and about 25 percent of the total area that is currently dry (the dry areas are the major sources of radon-222 emissions as discussed in Chapter 3). Impoundments that are at capacity could be covered immediately because they have already dried and because they will never be used again for tailings disposal.

Site characteristics that control or prohibit the applicability of interim cover include impoundment design and construction; dam height; stability; phreatic level; permeability; site water balance; evaporation rates; presence and location of movement monitors, monitor wells or piezometers; and availability of suitable earth cover material. Operating factors such as expected uranium production rate, length and number of standby periods, impoundment capacity, and expected mill life also affect the applicability of interim cover.

At active impoundments, only those areas that are not to be used further would be covered. Which areas could be covered are a function of expected mill life and quantity of tailings, the size of tailings impoundment, the level of tailings generated (percentage of capacity), and the operational practices used to construct the impoundment. In addition, a source of cover material must be obtained and a technique must be developed for hauling, dumping, spreading and compacting the earth cover onto the beach area. Limited access to the tailings area and the stability of the dam would affect the size of the equipment that can be used to transport and spread the cover material. Metal gratings or timbers may be required to distribute vehicle wheel loads on the dike or dried beach area to facilitate the use of earthmoving equipment. These site-specific factors would increase earthmoving costs.

Of the existing tailings impoundments, 11 have sand tailings dams and are above ground, 22 have earthen dams and are above ground (4 of these are lined), and 5 are below grade and lined. Currently, all tailings impoundments at licensed mills must limit radon-222 to as low as reasonably achievable (ALARA) levels, as specified in 40 CFR 192. Work practices or emission limits are not specified, however. Mills that are on standby and have begun or are about to begin the decommissioning process will eventually cover the tailings areas and reduce emissions to 20 pCi/m^2s as required by Federal regulations. Mills that wish to retain their operating licenses do not have to begin their final decommissioning process, but they could take some interim actions to minimize radon-222 emissions. Interim cover as a means of reducing radon-222 emissions to air from operational tailings impoundments is difficult to apply as new tailings beach areas are continuously being formed.

Covering the currently dry beach areas, excluding dams, with 1 meter of earth and maintaining the current water cover on the ponded and wet beach areas would reduce radon-222 emissions from 129 kCi/y to about 69 kCi/y, a reduction of 46 percent,[(a)] at a cost of about $\$63 \times 10^6$ (1985 dollars). Additional details regarding the applicability, timing, and operational aspects of interim cover are discussed in Appendix C.

(a) Based on soil with 7.5 percent moisture content.

The feasibility of maintaining water cover is limited because of potential site-specific factors such as seepage, ground-water contamination, and dam stability problems. For an existing above-ground tailings impoundment, many site-specific factors cannot be readily changed, and the feasibility of water cover is limited, mainly because of dike stability and seepage. Also, during extended standby periods, maintaining the water cover would be difficult, especially in arid areas. Ideally, the impoundment would be lined and constructed to allow approximately a 1-meter depth of water cover and have an overflow pipe leading to an adjacent evaporation pond and/or for recycling to the mill. The use of water cover would require maintaining sufficient freeboard to prevent overflow and the monitoring of ground water. Eight impoundments are lined, representing 11 percent of the total tailings area and 9 percent of the dry exposed tailings areas. Five of these impoundments are below grade. The water cover on these lined impoundments could be increased to reduce radon-222 emissions from the 200 acres of dry tailings that they currently contain. The potential for increased ground-water contamination, however, would limit the use of this radon-222 control option.

7.2.2 Final Reclamation

If all existing impoundments were allowed to dry, and were covered with enough earth to achieve a flux of 20 pCi/m^2s, the total radon-222 emissions would be reduced to 8 kCi/y. The cost would be about $\$660 \times 10^6$. For ongoing milling operations, new tailings impoundments would be built and work practices would be instituted to reduce emissions.

Bringing existing impoundments to final reclamation entails substantially more effort than effecting interim control measures. After the sand tailings dams have dried, they are recontoured to 5:1 (H:V) slopes for long-term stability. Earth dams were not recontoured in the cost estimates presented in this section. The cost of enough earth (8% moisture) to attenuate the radon-222 flux to 20 pCi/m^2s is placed over the tailings. The earthen cap is covered with gravel to protect the top surface, and the riprap is used to protect earth-covered side slopes from erosion. The cost estimate also includes reclaiming the on-site borrow pits that are assumed to be the source of earthen cover material.

7.2.3 Comparison of Interim and Final Controls

Estimates of the reduction in emissions, the avoided fatal cancers, and the costs of applying earth cover to achieve various control alternatives are summarized in Table 7-4. Covering the

Table 7-4. Benefits and costs of alternatives that apply earth cover to existing tailings impoundments

Alternative	Radon-222 emissions (kCi/y)		Avoided fatal cancers/y[a]		Cost[b] ($ x 10^6)
	Current	After	0-80 km	National	
Cease use of current impoundments, allow to dry and apply final cover.	129	8	1.7(0.5)	2.9(0.7)	660
Cover current dry areas with 1 m of earth.	129	69	0.8(0.2)	1.5(0.4)	63

(a) Values are based on 1520 deaths due to lung cancer per 10^6 person WLM. The values in parentheses are based on 380 deaths per 10^6 person WLM.

(b) Total cost, including indirect charges. Final cover includes earth required to achieve 20 pCi/m^2s, regrading sand tailings dams to 5:1 (H:V) slope, riprap on sides, and gravel on top of impoundments (1985 dollars).

currently dry areas, excluding dams and evaporation ponds, with a meter of earth achieves a theoretical estimated reduction in emissions of 46 percent at a cost of $63 x 10^6 (1985 dollars) and prevents from 0.6 to 2.3 cancers per year (based on a range of 380 to 1520 deaths per 10^6 person WLM). Total avoided cancers are the sum of avoided cancers in the 0-80 km region and the national (i.e., outside the 0-80 km region). An estimated emission reduction of 94 percent can be achieved by applying sufficient cover to achieve 20 pCi/m^2s; this would cost $660 x 10^6 (1985 dollars) and prevent from 1.2 to 4.6 cancers each year. (These cost estimates are for the control practice only and do not include the cost of establishing new impoundments. In addition, these estimates have not been discounted.) This comparison shows one point in time only. It does not reflect reapplications of interim cover required after restarting of operations at specific sites or changes in emissions due to interim cover deterioration. Annual maintenance costs that would occur over time are also not included.

7.3 Control Practices Applicable to New Tailings Impoundments

New tailings-disposal impoundments at uranium mills can be designed to incorporate radon-222 control measures. Three different kinds of new model impoundments are considered: single-cell, phased disposal, and continuous disposal of dewatered tailings. Descriptions of radon-222 emissions and estimated costs of the three types of new model tailings impoundments are presented in the following sections.

Below-grade impoundments are the NRC's preference, as this method minimizes potential for windblown emissions and water erosion and eliminates the potential for dam failure (NRC80). Although below-grade disposal is preferable, well-designed and operated above-grade tailings impoundments can also provide adequate safety and be licensed by the NRC.

7.3.1 Single-Cell Tailings Impoundment

New tailings disposal areas must conform with Federal regulations (40 CFR 190 and 192 and 10 CFR 40) for prevention of ground-water contamination and airborne particulate emissions. New impoundments will also be designed to facilitate final closure as required by current Federal Standards. New tailings areas will have synthetic liners, will probably be built below or partially below grade, and will have earthen dams or embankments. A means for dewatering the tailings at closure also should be incorporated. This basic layout is amenable to maintaining a water cover over nearly the entire tailings area during the operational phase and standby periods; therefore, it

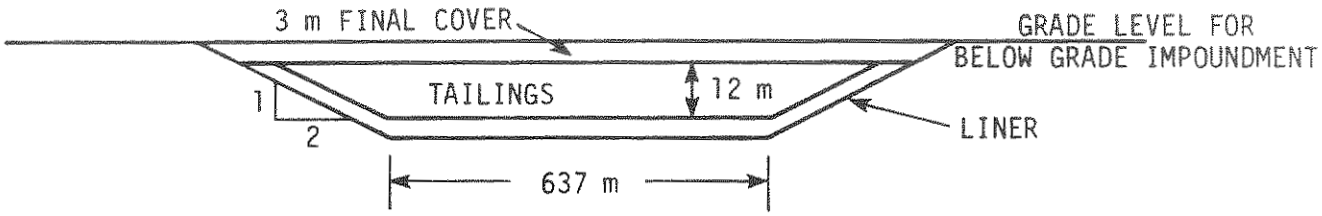
will maintain a very low level of radon-222 emissions. The drainage system can be used to accelerate dewatering of the tailings when the impoundment is full.

Effectiveness and Cost

A model single-cell impoundment was used to estimate radon-222 emissions and the effectiveness of single-cell tailings impoundments. The basic design and layout of this impoundment are consistent with previous uranium mill tailings studies. The impoundment is a square sloping pit containing a 12-meter depth of tailings and having a final tailings surface area of 47 ha (116 acres), as shown in Figure 7-3. A synthetic liner is placed along the sides and bottom. It handles about 2000 tons/day of tailings over a 15-year active period. During operation, 20 percent of the surface area is assumed to be dry beach and the remainder is assumed to be water-covered. Cover material is applied after the impoundment has reached capacity or is not going to be used further and the tailings have dried. Emissions average 0.8 kCi/y during the operational 15-year life and increase after drying begins, as shown in Figure 7-4 and Table 7-5.

Emissions are constant at approximately 4.2 kCi/y after the tailings are dry. If an earth cover is applied after drying, emissions can be reduced (as shown in Figure 7-4 and Table 7-5) to about 0.30 kCi/y with 3 meters of earth (Type B soil, 8 percent moisture as shown in Figure 7-1). Total emissions during the 5-year drying period amount to 12.5 kCi.

The approximate costs for constructing a new single-cell impoundment are shown in Table 7-6 for a below-grade design and a partially above-grade design. The cost of a new impoundment would vary widely, depending mainly on the site-specific topography and the ease of excavation. The total cost for a below grade impoundment is approximately $\$41.3 \times 10^6$, including a final cover cost of about $\$6.0 \times 10^6$ ($\$4.15 \times 10^6$ for earth cover and $\$1.9 \times 10^6$ for gravel cap). The partially above-grade design is identical to the below-grade design except that 6 m (19.6 ft) of tailings are below grade and 6 m (19.6 ft) are above grade and surrounded by an earthen dam. This design is less costly because of the savings resulting from decreased excavation. The cost is about $\$29.7 \times 10^6$. Final closure costs are slightly higher at $\$7.8 \times 10^6$, as riprap is required on the sides of the dam.



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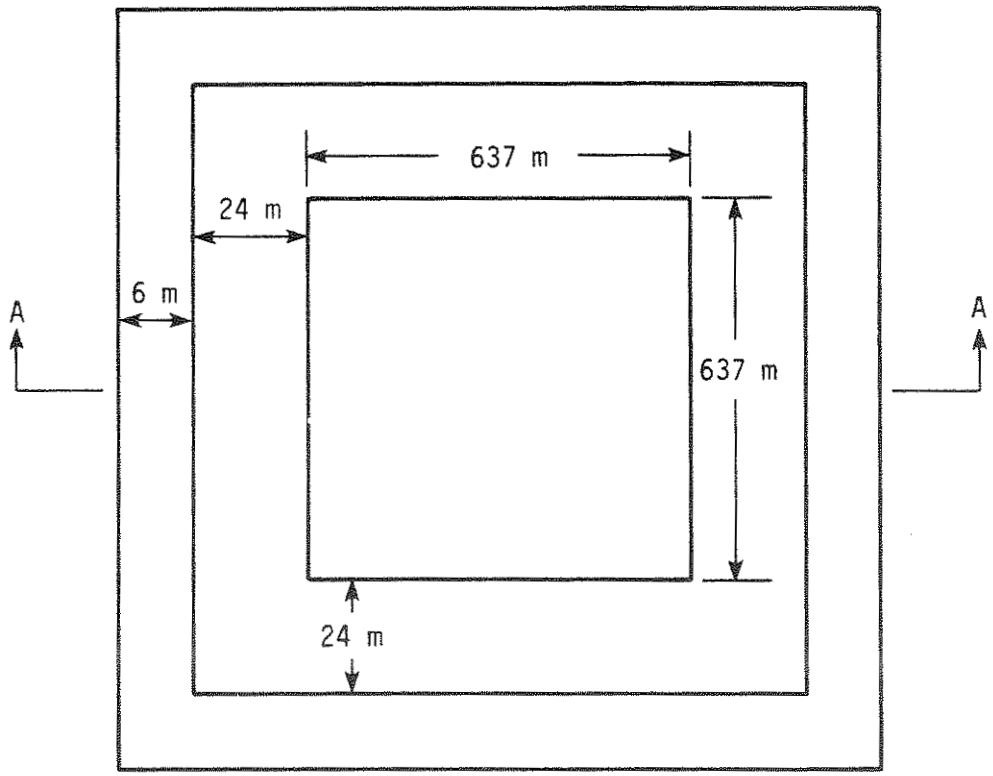


TAILINGS CAPACITY = 1800 t/d x 310 d/y x 15 y = 8.4×10^6 t

TAILINGS VOLUME = 8.4×10^6 t ÷ 1.6 t/m^3 = 5.25×10^6 m^3

FINAL TAILINGS SURFACE AREA = 47 ha (116 acres)

DIAGRAMS ARE NOT TO SCALE.

Figure 7-3. Size and layout of the model single-cell tailings impoundment.

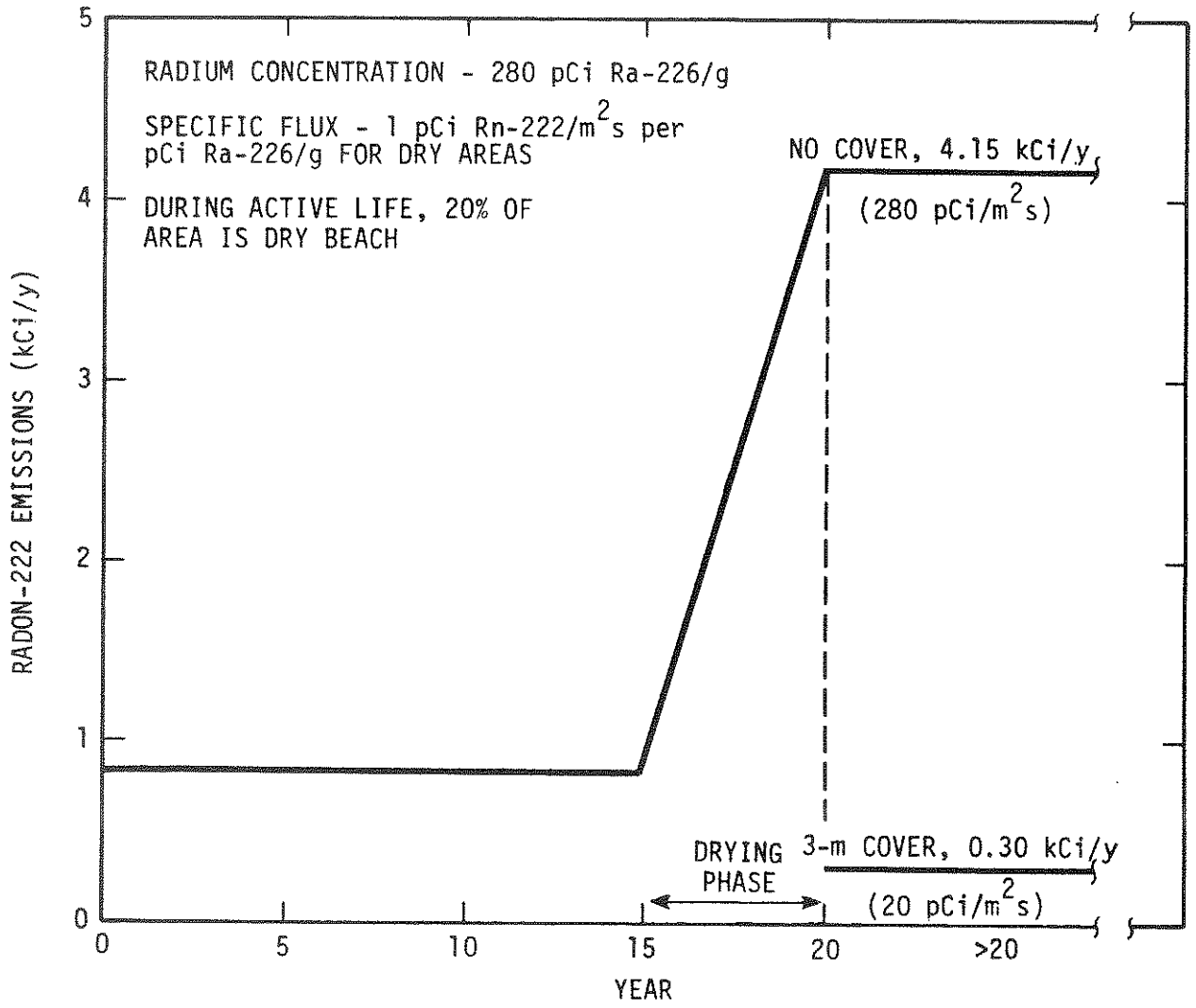


Figure 7-4. Estimated radon-222 emissions from a model single-cell tailings impoundment.

Table 7-5. Average radon-222 emission rate from model single-cell tailings impoundments[a]

Time period	Emissions (kCi/y)
Year 0-15	0.8
Year 15-20	2.5
Year >20	4.2 uncovered 0.3 with 3 meters of earth

(a) For 47-ha new model impoundment with 15-year life and 5-year drying-out period. Emissions are based on 280 pCi Ra-226/g and a specific flux of 1 pCi Rn-222/m^2s per pCi Ra-226/g of tailings when dry.

Table 7-6. Estimated costs for a model single-cell tailings impoundment[a]

Item	Costs ($ x 10^6)	
	Below grade	Partially above grade[b]
Excavation	21.51	8.14
Synthetic liner (30-mil)	3.03	3.03
Grading	0.40	0.40
Drainage system	0.40	0.40
Dam construction	-	2.75
Cover (3-m)	4.05	4.05
Gravel cap (0.5-m)	1.92	1.99
Riprap on slopes	-	1.74
Subtotal direct cost	31.31	22.50
Indirect cost[c]	10.02	7.21
Total cost	41.33	29.71

(a) Below-grade impoundments are constructed so that the top of the final cover is at grade.

(b) Fifty percent below grade and 50 percent above grade.

(c) Indirect costs are estimated to be 32 percent of direct costs.

7.3.2 Phased-Disposal Tailings Impoundment

In phased-disposal systems, a tailings area is partitioned into sections or cells that are used independently of other sections. After a cell has been filled, it can be dewatered, dried, and covered while another section is in use. In practice, one or two lined cells would be constructed initially. Tailings are pumped to the first cell until it is filled and then pumped to the second cell while the first cell is dewatered and allowed to dry. After the first cell has dried, it would be covered with earth obtained from the cells excavation. This process continues sequentially. This system reduces emissions at any given time, as a cell can be covered after use without interfering with the operation of subsequent cells. Standby periods do not present as great a problem and construction of new cells can easily be postponed. Less total tailings surface area is thus uncovered at any one time compared with operation of the model single-cell impoundment, which is uncovered until mill closure and the impoundment dries.

Several existing mills have either proposed or implemented phased-disposal systems. At the Plateau Resources Shootaring Canyon Mill in Utah, an earthen dam has been constructed across a valley. Behind this dam, earthen beams have been constructed to form six cells for tailings disposal. Currently, only one cell contains a significant quantity of tailings. Umetco's White Mesa Mill, also in Utah, uses a phased tailings disposal system designed to feature simultaneous construction, operation, and reclamation. Three cells of a proposed six-cell system have been constructed. These impoundments are lined with either clay or synthetic liners. Minerals Exploration's Sweetwater Mill also has a planned phased-disposal system. One cell of a proposed multicell impoundment system has been constructed. This system has gone through several iterations during development. Originally, it was designed to consist of four square, below-grade cells.

Effectiveness and Cost

Phased disposal is effective in reducing radon-222 emissions because tailings are assumed to be completely covered with water during cell operation and, finally, with soil. Only during the drying-out period (about 5 years for each cell) do any radon-222 emissions occur, and these are from a relatively small area. During mill standby periods, a water cover could be maintained on the operational cell. For extended standby periods, the cell could be dewatered and an earth or synthetic cover applied. To estimate radon-222 emissions, a model phased-disposal impoundment comparable to the model single-cell impoundment was used. This

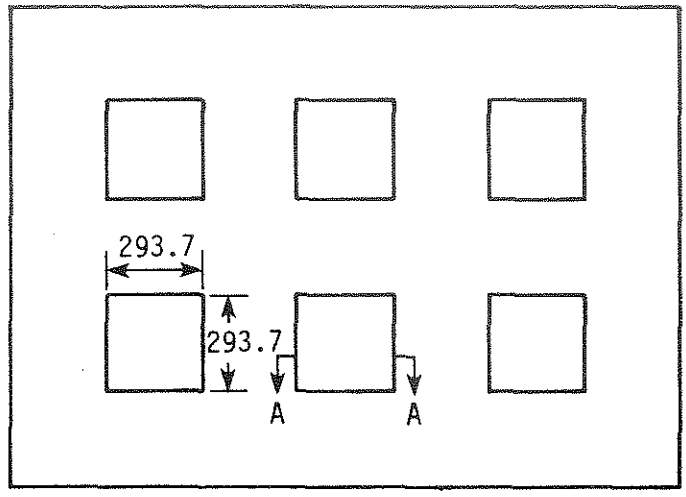
impoundment consists of six cells, and each cell holds one-sixth of the mill tailings generated during a 15-year operational period (i.e., 2 years worth of tailings). Each cell is square with a tailings depth of 12 meters and a trapezoidal cross section, as shown in Figure 7-5. The total tailings surface area at capacity is 86,260 m^2 per cell.

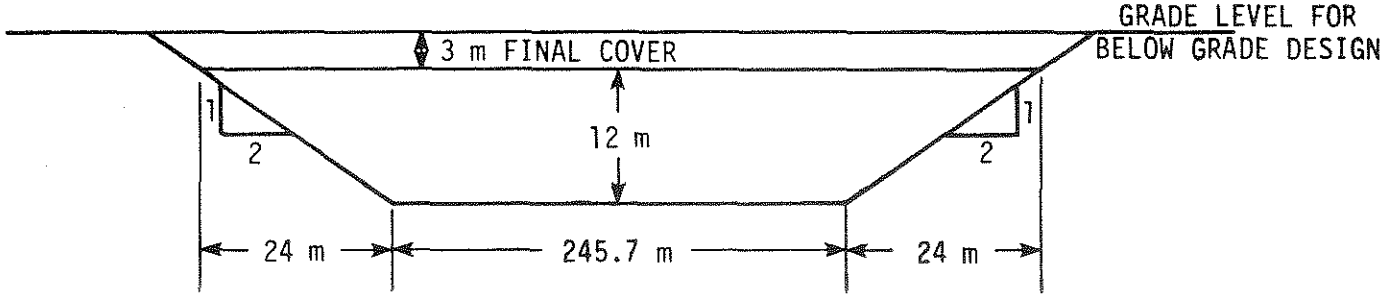
Emissions from a cell during operation are zero because the cell is covered with water. After the first cell reaches capacity, it is dewatered and begins a 5-year drying period. Over this period, radon-222 emissions gradually increase up to a rate of about 0.8 kCi/y, at which time the cell is dry and soil cover is applied. Meanwhile, the second cell has begun drying and also contributing emissions. Emissions thus increase at 2.5-year intervals as the cells reach capacity and begin their drying out periods. The emission rates occurring after 3 meters of earth cover have been applied to dry cells are shown in Figure 7-6. Earth cover of the first cell is not started until after 7.5 years have elapsed. After the final 5-year drying period for the last cell is complete (at the 20th year), this cell is also covered and emissions are then constant at 0.33 kCi/y.

Total emissions during the 20-year operating life of this impoundment are 13.5 kCi. Average radon-222 emission rates are shown in Table 7-7. During the operational phase, the average emission rate of 0.7 kCi/y is lower than that for a single cell impoundment (1.2 kCi/y). In the post-operational period, emissions from a phased-disposal impoundment are much lower than those from uncovered single-cell impoundments and equivalent to those from single-cell impoundments with the same respective earth cover.

Estimated costs of building phased-disposal impoundments are shown in Table 7-8. The total cost of below-grade phased disposal, at \$47.88 x 106, is greater than the cost of a single-cell impoundment with similar earth cover, but the costs are incurred over a 20-y period. This cost is based on a 12-m tailings depth (similar to the model single-cell impoundment). An evaporation pond is included as part of the phased-disposal system. The cost for a partially above-grade phased-disposal system is about $\$6.9 \times 10^6$ per cell, or a total of $\$41.5 \times 10^6$. The decreased cost of excavation is partially offset by the dam construction cost and the riprap on the sides.

Numerous variations in the model phased-disposal impoundment are conceivable. An impoundment could be designed to include any number of cells, each capable of containing an equal amount of the mill tailings generated during a 15-year operational period. As an example, a below-grade, phased-disposal impoundment utilizing three cells was investigated.





SECTION A-A

NOTES:

TAILINGS CAPACITY PER CELL = 1800 t/d x 310d/y x 15y ÷ 6 CELLS = 1.4×10^6 t/CELL

TAILINGS VOLUME PER CELL = 1.4×10^6 t/CELL ÷ 1.6 t/m^3 = 8.75×10^5 m^3/CELL

FINAL TAILINGS SURFACE AREA = 8.6 ha/CELL (21.3 acre/CELL)

DIAGRAM IS NOT TO SCALE

Figure 7-5. Size and layout of model phased-disposal impoundment.

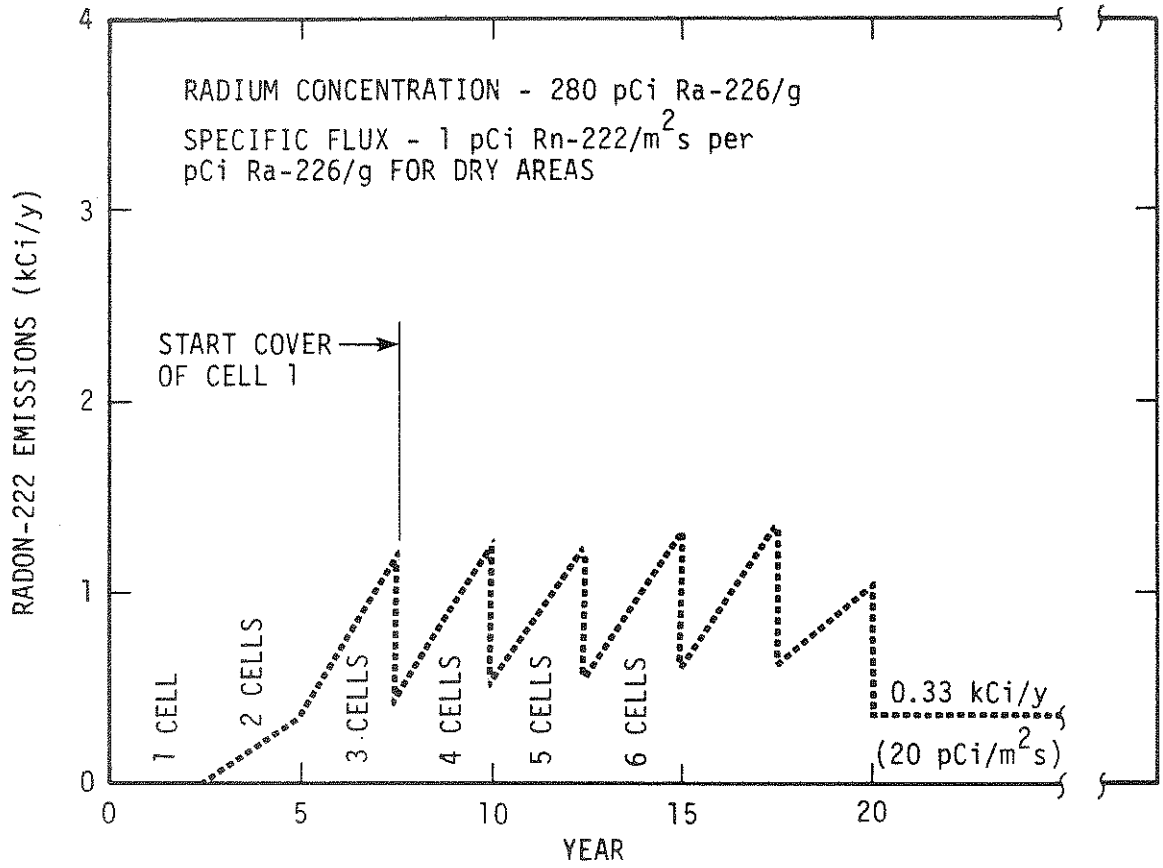


Figure 7-6. Estimated radon-222 emissions from a model phased-disposal impoundment.

Table 7-7. Average radon-222 emission rate for model single-cell and phased-disposal tailings impoundments

	Average emission rate (kCi/y) [a]	
	Operational phase [b]	Post-operational phase
Single-cell	1.2	4.2 Uncovered 0.30 covered with 3 m of earth
Phased-disposal	0.7	0.33 covered with 3 m of earth

(a) For new model impoundment with 15 yr. life and 5 yr. drying period for each cell. Emissions based on 280 pCi Ra-226/g and specific flux of 1 pCi Rn-222/m^2s per pCi Ra-226/g of tailings when dry.

(b) Assumes a 5-y drying-out period for each cell and immediate cover of 3m of earth.

Table 7-8. Estimated costs for a model phased disposal impoundment[a]
($ x 10^6)

Item	Below grade		Partially above grade	
	One cell	All cells	One cell	All cells
Excavation	3.68	22.08	1.28	7.70
Synthetic liner (30-mil)	0.57	3.40	0.57	3.40
Grading	0.07	0.45	0.07	0.45
Drainage system	0.07	0.40	0.07	0.40
Dam contruction	-	-	1.27	7.61
Cover (3 m)	0.76	4.57	0.76	4.57
Riprap on slopes (0.5 m)	-	-	0.32	1.91
Gravel cap (0.5-m)	0.37	2.21	0.39	2.34
Evaporation pond	0.52	3.09	0.52	3.09
Subtotal direct cost	6.04	36.20	5.25	31.47
Indirect cost[b]	1.93	11.58	1.68	10.07
Total cost	7.97	47.78	6.93	41.54

(a) Below-grade impoundments are constructed so that the top of the final cover is at grade. Partially above-grade impoundment is 6 m below grade and 6 m above grade.

(b) Indirect costs are estimated to be 32 percent of direct costs.

Compared with the design of the previously-discussed phased-disposal impoundment with six cells, the three-cell impoundment is conceptually identical except that each cell's capacity is now doubled. Because the total surface area of a three-cell impoundment is somewhat less than that of a six-cell impoundment, some reductions in cost and emissions are effected. The estimated cost of a below-grade, phased-disposal impoundment with three cells is 46.58×10^6, compared with 47.88×10^6 for six cells. The average radon-222 emission rate during the operational phase of a three-cell impoundment is 0.62 kCi/y, compared with 0.67 kCi/y for six cells, and during the post-operational phase, the emissions are 0.31 and 0.33 kCi/y, respectively.

7.3.3 Continuous Disposal

Water can be removed from the tailings slurry prior to disposal. The relatively dry, dewatered (25 to 30% moisture) tailings can be placedand covered with soil almost immediately. No extended drying phase is necessary. Ground-water problems would also be reduced. Implementation of a dewatering system would require added planning, design, and modification of current designs. Acid-based leaching processes do not generally recycle water, and larger evaporation ponds with ancillary piping and pumping systems would be required to handle the liquid removed from the tailings.

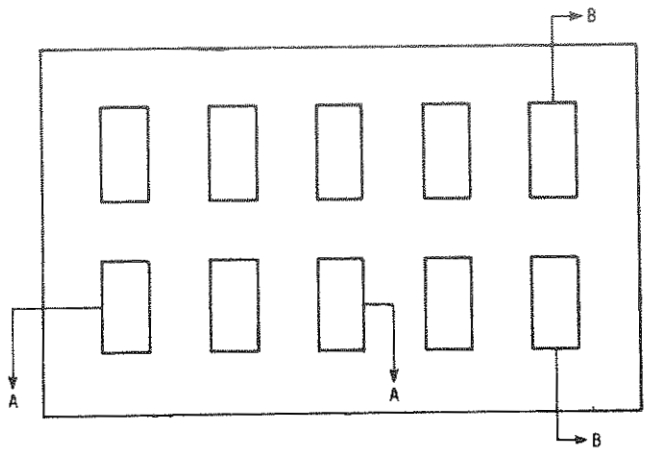
Tailings dewatering systems have been used successfully at nonferrous ore beneficiation mills in the United States and Canada (Ro78). Various filtering systems, such as rotary, vacuum, and belt filters, are available and could be adapted to a uranium tailings dewatering system. Experimental studies would be required for a specific ore to determine the filter media and dewatering properties of the sand and slime fractions. The typical mill ore grinding circuit may have to be modified to permit efficient dewatering and to prevent filter plugging or binding. Corrosion-resistant materials would be required in any tailings dewatering system because of the highly-corrosive solutions that must be handled. Although it is used in some foreign countries, continuous tailings dewatering is not practiced at any uranium mills in the United States; however, it has been proposed for several sites. In a planned installation in the Eastern United States, tailings were to be dewatered by a belt filter system and trucked to a tailings disposal area, where a 0.3-m (1-ft) clay cap would be applied (Ma83). An active working edge of 100 m (300 ft) was allowed for spreading, but no more than 4.0 ha (10 acres) of tailings were to be exposed at any one time. The clay cap was to be covered with 0.2 m (8 inches) of gravel and about 2.7 m (8 ft) of random fill. Additional random fill and overburden from a surface mining operation were to complete the tailings cover.

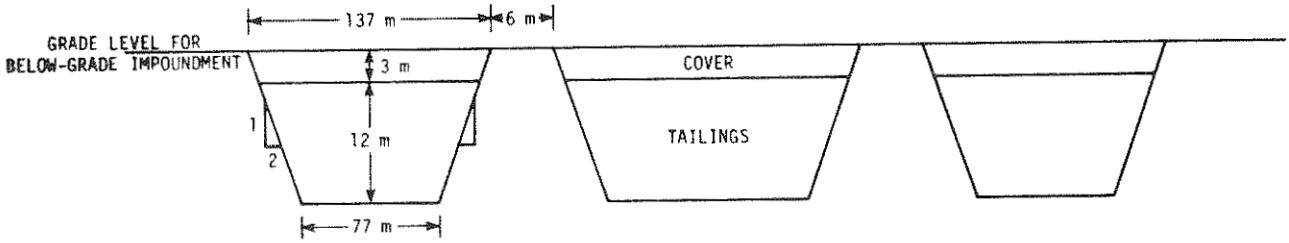
At least three uranium mills have proposed the use of continuous disposal systems. Anaconda submitted conceptual plans of such a tailings disposal system prior to the downturn of the uranium market. However, the plans were never implemented. The system was to be a trench and fill type operation. Tailings were to be thickened to 60 percent solids prior to pumping to 91-m (300-ft) by 2300-m (7500-ft) trenches excavated to a depth of 15 to 21 m (50 to 70 ft). The tailings were then to be covered with 5 m (16 ft) of earthen material. Pioneer Uravan, Inc., submitted plans to build the San Miguel Mill using continuous tailings disposal at Slick Rock, Colorado (NRC81). The mill has not been constructed. The planned tailings disposal operation consisted of below-grade burial of belt-filtered tailings in a series of 10 trenches. Excess water was to be transferred to two evaporation ponds. Each trench would measure 76 by 760 m (250 by 2500 ft) and be 9 to 11 m (30 to 35 ft) below grade. Tailings would be transferred from the mill to the trench via conveyor. Six to 6.4 m (20 to 21 ft) of earth cover would be placed over the tailings. Excavation, filling, and covering would be carried out simultaneously. Umetco Minerals proposed a continuous disposal system that would be located on a mesa adjacent to the Uravan, Colorado, mill. The existing impoundments at this site have been filled to capacity.

Effectiveness and Cost

Continuous disposal is an effective means of reducing radon-222 emissions, especially during the operational life of a uranium mill. Dewatered tailings are placed in trenches and covered with soil shortly after placement, which eliminates the drying period associated with other tailings disposal techniques. The model continuous-disposal impoundment consists of a series of 10 trenches, each having the capacity for one-tenth of the volume of tailings generated over the 15-y life of the model mill. Each trench has sloping sides and contains a 12-m depth of tailings. A 6-m berm separates the trenches to allow for tailings placement. A diagram of the model continuous-disposal impoundment is shown in Figure 7-5. The total tailings surface area at capacity is 572,000 m, or 57,200 m per trench.

Another alternative method of continuous disposal of uranium mill tailings entails a combination of two previously discussed methods. Continuous/single-cell disposal involves placement of dewatered tailings in a single large impoundment as opposed to placement in a series of trenches. The size of the impoundment would be comparable to that required for the single-cell impoundment. A partially below-grade continuous/single-cell disposal impoundment is also considered because it minimizes the excavation cost as well as the cost of dam construction.





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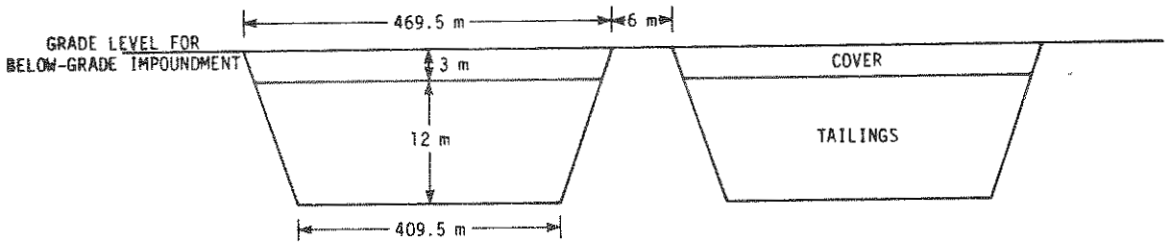

SECTION B-B

NOTES:

TAILINGS CAPACITY PER TRENCH = 1800 t/d x 310 d/y x 15y ÷ 10 TRENCHES = 8.4×10^5 t

TAILINGS VOLUME PER TRENCH = 8.4×10^5 t ÷ 1.6 t/m^3 = 5.25×10^5 m^3

FINAL TAILINGS SURFACE AREA = 5.72 ha/TRENCH (14.1 acre/TRENCH)

DIAGRAM IS NOT TO SCALE

Figure 7-7. Size and layout of the model continuous-disposal impoundment.

Emissions from continuous-disposal impoundments during operation are low. Elimination of the drying-out period, which is responsible for the majority of the operational radon-222 emissions associated with the other model disposal impoundments, substantially reduces emissions from continuous-disposal impoundments. This is evident in Table 7-9, which shows the average emission rates for continuous-disposal and the single-cell model impoundments.

Figures 7-8 and 7-9 show the radon-222 emission rates for the model continuous-disposal impoundments of single-cell and trench designs, respectively. It has been assumed that 4 ha (10 acres) of dewatered tailings are uncovered at any point in time over the 15-y life because of the normal short interval between placement and covering of tailings. At year 15, when the impoundment is at capacity, the final 4 ha of tailings are covered. The final emission rates, 0.36 kCi/y or 0.30 kCi/y, are similar to the other model impoundments. The estimated costs for continuous disposal, shown in Table 7-10, include an evaporation pond for the liquid removed from the tailings and a vacuum filter system. The cost of a below-grade impoundment is estimated to be about $\$54.2 \times 10^6$, and the cost of a partially above-grade trench design system, at about $\$61.0 \times 10^6$. A design consisting of a single large impoundment partially above grade could reduce the large dam construction cost inherent in building 10 trenches. This alternative would cost about $\$37.4 \times 10^6$.

Table 7-9. Estimated radon-222 emission rates for model single-cell, phased disposal, and continuous-disposal tailings impoundments

	Average emission rate (kCi/y)[a]	
	Operational phase	Post-operational phase
Single cell	1.2[b]	4.2 uncovered 0.30 covered with 3m of earth
Phased disposal	0.7[b]	0.33 covered with 3m of earth
Continuous disposal (single-cell)	0.5	0.30 covered with 3m of earth
Continuous disposal (trenched)	0.5	0.36 covered with 3m of earth

(a) For new model impoundments with 15-y operational life emissions based on 280 pCi Ra-226/g and specific flux of 1 pCi Rn-222/m^2s per pCi Ra-226/g of tailings when dry.

(b) Includes 5-y drying-out period.

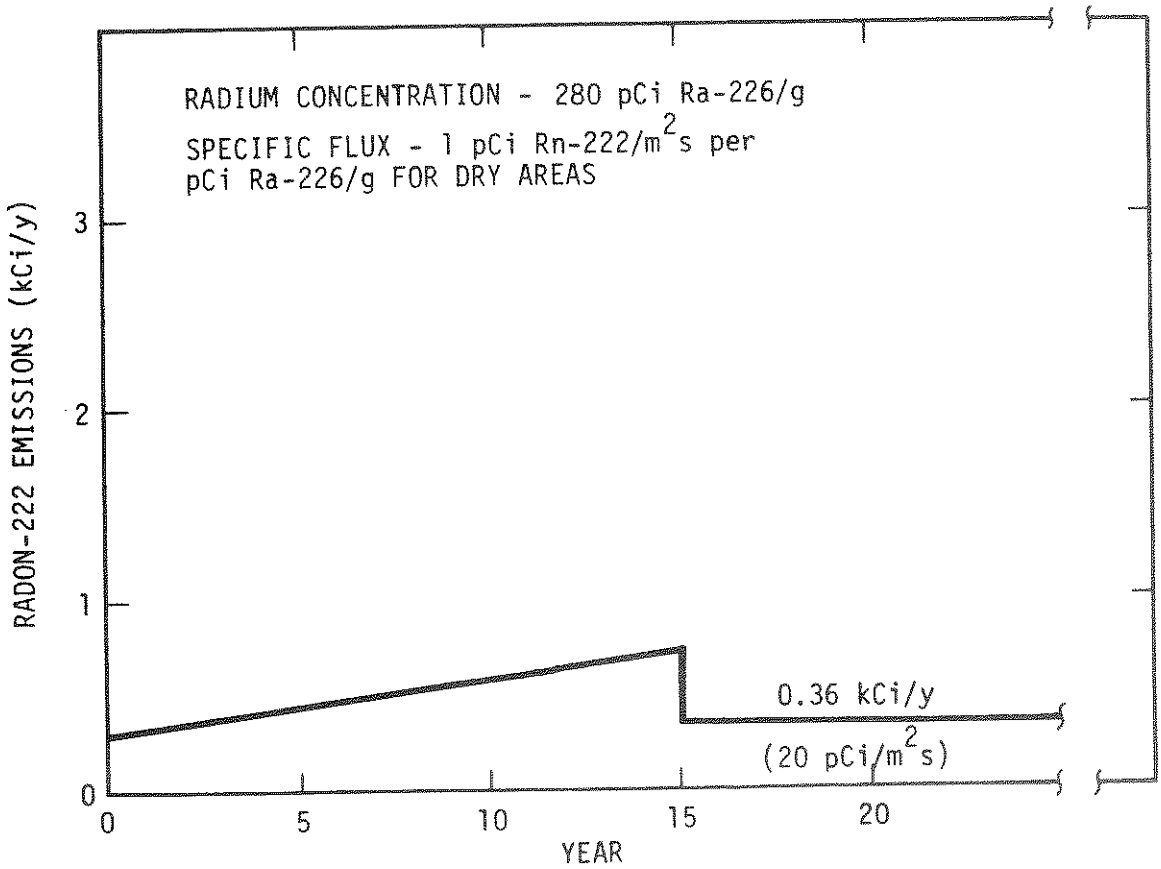

Figure 7-8. Estimated radon-222 emissions from a model continuous-disposal impoundment.

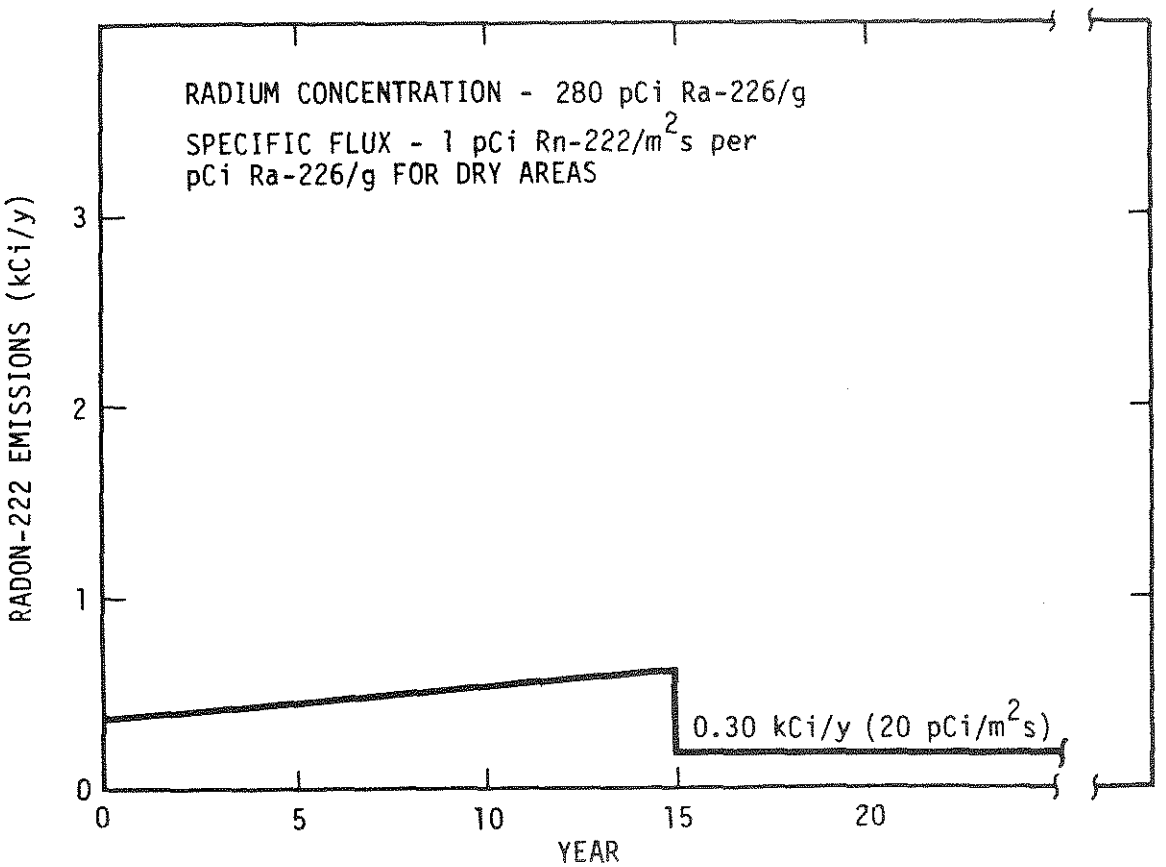

Figure 7-9. Estimated radon-222 emissions from a model continuous/single-cell disposal impoundment.

Table 7-10. Estimated costs for a model continuous disposal impoundment ($ x 10^6)[a]

Item	Below-grade trench design	Partially above-grade	
		Single-cell design	Trench design
Excavation[b]	22.75	8.14	7.24
Synthetic liner (30-mil)	3.82	3.03	3.82
Grading	0.51	0.40	0.51
Dam construction	-	2.75	18.06
Cover (3-m)	5.15	4.05	5.15
Riprap on slopes	-	1.74	2.15
Gravel cap (0.5-m)	2.54	1.99	2.99
Evaporation pond	4.80	4.80	4.80
Vacuum filter	1.46	1.46	1.46
Subtotal direct cost	41.03	28.36	36.18
Indirect cost[c]	13.13	9.08	11.57
Total cost	54.16	37.44	47.75

(a) In 1985 dollars.

(b) Below-grade impoundments are constructed so that the top of the final cover is at grade. Partially above-grade design is 6 m deep and 6 m above grade.

(c) Indirect costs are estimated to be 32 percent of direct costs.

7.4 Summary of Radon-222 Control Practices

A summary of the radon-222 emissions from new model impoundments serving an 1800 t/day mill is presented in Table 7-9. Three types of emissions are presented: operational, post-operational, and total emissions. The emissions from a model single-cell impoundment represent those with and without final cover to provide a perspective on the emission reductions.

Operational emissions are those that occur during the operating 15 yr. life of the mill plus those due to the impoundment's 5 yr. drying-out period, if applicable. For determination of the average operational emission rates presented, the total amount of emitted radon-222 was calculated and divided by the appropriate 20 or 15 yr. lifetime. Emission rates for the active and drying-out periods of phased- and continuous-disposal impoundments are not presented because these values vary with time. Tailings are being dried at various points in time in a phased-disposal system, and no 5 yr.drying-out period is required for continuous disposal.

Post-operational emissions occur at the end of an impoundment's drying-out period. After the 15-y operational period and the 5-y drying-out period of a single-cell impoundment, radon-222 emissions increase to 4.2 kCi/y with no cover. After compliance with Federal requirements, the emission rate reduces to 0.3 kCi/y. The post-operational emission rates for the model impoundments with final cover meet the Federal emission limit of 20 pCi/m^2s. The emission rate for continuous disposal (trench design) with final cover is slightly higher than the others because the tailings surface area is slightly larger.

The final column of Table 7-11 presents cumulative emissions over various time periods. Emissions over these different time periods are the sum of those from the operational phase of an impoundment as well as those occurring after final cover (if applicable). All impoundments with final cover meet an emission limit of 20 pCi/m^2s; therefore, variations in emissions from the various covered impoundments are due to different operational emissions and small differences in the tailings surface areas.

Cost estimates for constructing new model tailings impoundments are summarized in Table 7-12. The partially above-grade single-cell impoundment cost, $\$29.7 \times 10^6$, is the lowest cost alternative, but most of the costs are incurred during initial construction. Its completely below-grade counterpart costs are estimated to be $\$41.3 \times 10^6$. The difference is largely due to increased excavation costs. Phased and continuous disposal impoundments are more costly, but the costs are spread out over the life of the impoundment.

Table 7-11. Summary of estimated radon-222 emissions from new model tailings impoundments[a]

Alternative	Operational emissions (kCi/y)			Post-operational emissions (kCi/y)		Cumulative emissions total (kCi)		
	Active (15 y)	Dry-out (5 y)	Average	Uncovered	With final cover[b]	20 y	40 y	60 y
1. Single cell[c]	0.8	2.5	1.2[d]	NA	0.30	25	31	37
2. Phased disposal	NA	NA	0.7[d]	NA	0.33	13	20	27
3. Continuous disposal								
(trench)	NA	NA	0.5[e]	NA	0.36	10	17	24
(single-cell)	NA	NA	0.5[e]	NA	0.30	9	15	21
4. No action (single cell without cover)	0.8	2.5	1.2[d]	4.2	NA	25	108	191

NA - Not applicable.

(a) Emission estimates based on a specific flux of 1 pCi/m^2s radon-222 per pCi radium-226 per g tailings and a radium-226 concentration of 280 pCi/g.

(b) Final cover to meet 20 pCi/m^2s standard.

(c) Assumes 20% of the impoundment area is dry beach during the 15-y active life; remainder of area is water-covered.

(d) Based on 20-y life: 15 y active, and 5 y drying out.

(e) Based on 15-y life.

Table 7-12. Summary of estimated costs for new model tailings impoundment (1985 $ x 10^6)

	Single-cell		Phased-disposal		Continuous-disposal		
						Partially above grade	
	Below grade	Partially above grade	Below grade	Partially above grade	Below grade	Single-cell	Trench
Direct cost	31.3	22.5	36.2	31.5	41.0	28.3	46.2
Indirect cost	10.0	7.2	11.6	10.0	13.1	9.1	14.8
Total cost	41.3	29.7	47.8	41.5	54.1	37.4	61.0

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Chapter 8: SUMMARY AND COMPARISON OF WORK PRACTICES

A number of alternatives are available to reduce radon-222 emissions and subsequent risks from tailings disposal. Both timing and the disposal method effect emissions. The control alternatives, their emissions, costs, and potential benefits are presented in this chapter on a comparable basis by using the model tailings impoundment described in Chapter 7.

8.1 Single-Cell Impoundments

The base case assumes disposal of tailings in a single cell impoundment similar to current practice at many mills. This nominal 50 ha (125 ac) impoundment (actually 47 ha or 116 acres) has a 15 year active life. The surface area is 80 percent wet or ponded during this active period and average radon-222 emissions are 0.8 k Ci/y. Emissions then increase during a 5-year drying period to 4.2 kCi/y. Emissions after this time depend on when the impoundment is covered to comply with Federal and/or state regulations. For illustrative purposes time periods of 0, 20, and 40 years are used before final cover is applied. The total cost for constructing and eventually covering a single cell impoundment is the same, but since the final cover is applied at different times in this example, the net present value of this cost is different.(a) The longer the cover cost is postponed, the smaller the net present value. A summary of radon-222 emissions and costs for single cell impoundments are presented in Table 8-1.

In Base Case I the impoundment is dry and uncovered for 40 years. This example case yields the highest emissions and least cost since nothing is done for 40 years after the impoundment is full and dry (60 years from start). In Base Case II no cover is applied for 20 years after the impoundment is full and dry (40 years from start). Initially emissions are the same as the first example, but greatly reduced during the 40- to 60-year period since final earth cover is applied. Costs are increased by $700,000 since the cover cost is incurred 20 years sooner. Covering the impoundment as soon as possible after it is full reduces radon-222 emissions still further and increases the net present value cost by about $2,500,000 when compared with Base Case I.

(a) Net present value = current cost x $[1/(1 + 0.05)^{n}]$ at a 5 percent discount rate and where n = years in which cost is incurred.

Table 8-1. Emission and cost comparison for single cell impoundment with final cover applied at 0, 20, and 40 years after reaching capacity

Work practice	Cumulative radon-222 emissions (kCi) 0-20 y	20-40 y	40-60 y	0-60 y	NPV costs[a] (10^6)
Cover 40 years after full - Base Case I	25	83	83	191	33.9
Cover 20 years after full - Base Case II	25	83	6	114	34.6
Cover when full	25	6	6	37	36.4

[a] At 5 percent discount rate.

The risks incurred by leaving a model impoundment uncovered can be estimated from the radon-222 emission rate and assuming the model impoundment has an impact in proportion to that of the current licensed mills as shown below:

$$\text{Risks from model impoundment} = \frac{\text{nationwide risks}}{\text{total emissions}} \times \text{emissions from model impoundment}$$

Based on the current estimated emission rate of 138 kCi/y from licensed mill impoundments and a nationwide fatal cancer rate of 2.34 committed fatal cancers per year (based on 760 deaths per million person WLM), deaths at other emission rates can be estimated.

For the single cell model impoundments deaths and benefits (deaths avoided) were estimated for a 60-year period as shown in Table 8-2. Benefits are determined by comparing with the Base Case I, i.e., not covering for 40 years. When compared with the cover in 20 years case, the benefits of covering immediately when full are reduced to 1.3 deaths avoided over a 60-year period.

8.2 Phased Disposal

Phased disposal provides a means of reducing emissions since the smaller areas involved in each cell at any given time are easier to keep flooded during operation and standby periods. Also, during the drying phase less tailings are exposed. Two model phased disposal impoundments with the same capacity as the large single cell impoundment were characterized to estimate emissions, cost, and potential benefits. A 6-cell, 20-acre-per-cell, and a 3-cell, 40-acre-per-cell impoundment were used as models. Average emissions during a 20-year operational period are 0.7 and 0.6 kCi/y for the 20 acre and 40-acre cell size, respectively. Average radon-222 emissions after being completely covered with earth are similar at 0.33 and 0.31 kCi/y for the 20-acre and 40-acre cells, respectively. The total costs of a 6-cell, 20-acre-per-cell design and a 3-cell, 40 acre cell design are similar but the net present value for the 40-acre-per-cell design is less since some costs are postponed compared with the 20-acre-per-cell design.

The emissions and cost data for below grade phased disposal model impoundments are summarized in Table 8-3. Radon-222 emissions are very similar and the NPV for the 40-acre/cell impoundment is about $1,500,000 less than the 20 acre/cell design.

Committed fatal cancers for the model phased disposal impoundments were also estimated as shown in Table 8-4. Only a very slight difference in estimated deaths is seen, and this would be expected since emissions are very similar.

Table 8-2. Comparison of estimated deaths and benefits for a single cell model impoundment with final cover applied at 0, 20, and 40 years after reaching capacity

Benefits, Work practice	Nationwide deaths,[a] 0-60 y	0-60 y
Base Case I - Cover 40 years after full	3.5	--
Base Case II - Cover 20 years after full	2.1	1.4
Cover when full	0.7	2.8

[a] Based on 760 deaths per million person WLM.

Table 8-3. Emissions and costs for model phased disposal impoundments

Work practice	Radon-222 emissions (kCi)				NPV costs[a] ($ x 10^6)
	0-20 y	20-40 y	40-60 y	0-60 y	
6-cell, 20-acre/cell	13	7	7	27	36.1
3-cell, 40-acre/cell	12	6	6	24	34.6

[a] At 5 percent discount rate.

Table 8-4. Comparison of estimated death for model phased-disposal impoundments

Work practices	Nationwide deaths,[a] 0-60 y
20 acre - 6 cell design	0.5
40 acre - 3 cell design	0.4

[a] Based on 760 deaths per million person WLM.

8.3 Continuous Disposal

Dewatering and continuously covering tailings is an attractive but untried method for tailings disposal in this country. By exposing only a relatively small beach area, radon-222 emissions are reduced during operation and a long drying period is not required prior to final cover. A model continuous disposal below-grade, trench type impoundment with the same capacity as the single cell conventional impoundment was used to estimate emissions and cost. Average emissions during the operational period are 0.5 kCi/y and drop to 0.36 kCi/y after the final beach area is covered at the 15-year point. As shown in Table 8-5, cumulative emissions over a 60-year period are 24 kCi. Based on this emission rate, committed fatal cancers from this work practice at a model impoundment amount to 0.4 over a 60-year period. Assuming that costs are incurred at the beginning of each of three 5-year periods, the net present value cost for a below-grade trench impoundment is about $\$43 \times 10^6$.

8.4 Comparison of Work Practices

Work practices for new model tailings impoundments are summarized in Table 8-6 in order to compare their radon-222 emissions, net present value cost, and the resulting health effects attributed to each model impoundment. The single-cell impoundment with cover applied when dry has the highest emissions during its operating life and thus, the highest cumulative emissions. This higher emission rate results in a higher health risk. Phased disposal yields lower emissions during the operating period and thus lower cumulative emissions. Costs are similar to the single-cell impoundment and cumulative health effects are lower. Continuous-disposal emissions are very similar to phased disposal and health effects are thus also similar. Net present value costs for this trench type of disposal are $\$43 \times 10^6$; higher than single-cell or phased-disposal alternatives.

Table 8-5. Emissions and cost of model below-grade trench type continuous disposal impoundment

Cumulative radon-222 emissions (kCi)				
0-20 y	20-40 y	40-60 y	0-60 y	NPV cost[a] ($ x 10^6)
10	7	7	24	43.3

[a] At 5 percent discount rate.

Table 8-6. Comparison of work practices for new model tailings impoundments

Work practice	Cumulative radon-222 emissions (kCi) 0-20 y	20-40 y	40-60 y	0-60 y	NPV of work practice @ 5% discount ($ x 10^6)	Committed fatal cancers[a] 0-60 y
1. Single cell covered when full (20 y from start)	25	6	6	37	36.4	0.6
2. Phased disposal 20-acre cells	13	7	7	27	36.1	0.5
3. Phased disposal 40-acre cells	12	6	6	24	34.6	0.4
4. Continuous disposal (trench-type)	10	7	7	24	43.3	0.4

(a) Nationwide, based on 760 deaths/10^6 person WLM. Assumes model plant is at average location of existing mills.

When compared with an uncovered single-cell impoundment, all the work practices yield similar benefits in the form of avoided deaths. Costs of these alternative work practices are also similar except for continuous disposal which is about $\$9 \times 10^6$ higher. Tables 8-7 and 8-8 present a comparison between the alternative work practices and a base case single cell impoundment uncovered for 40 years and also 20 years respectively. Depending on the base case selected, benefits of about 1.4 to 2.8 deaths avoided can be realized for a model impoundment over a 60-year period when alternative work practices are used.

Table 8-7. Comparison of cost and benefits between model Base Case I and new work practices

Work practice	Difference in NPV from base case ($ x 10^6)	Deaths avoided[a] 0-60 y
Base Case I Single cell covered 40 y after full (60 y from start)	--	--
1. Single cell covered when full (20 y from start)	2.5	2.8
2. Phased disposal 20-acre cells	2.2	3.0
3. Phased disposal 40-acre cells	0.7	3.1
4. Continuous disposal (trench-type)	9.4	3.1

[a] Nationwide basis.

Table 8-8. Comparison of cost and benefits between model Base Case II and new work practices

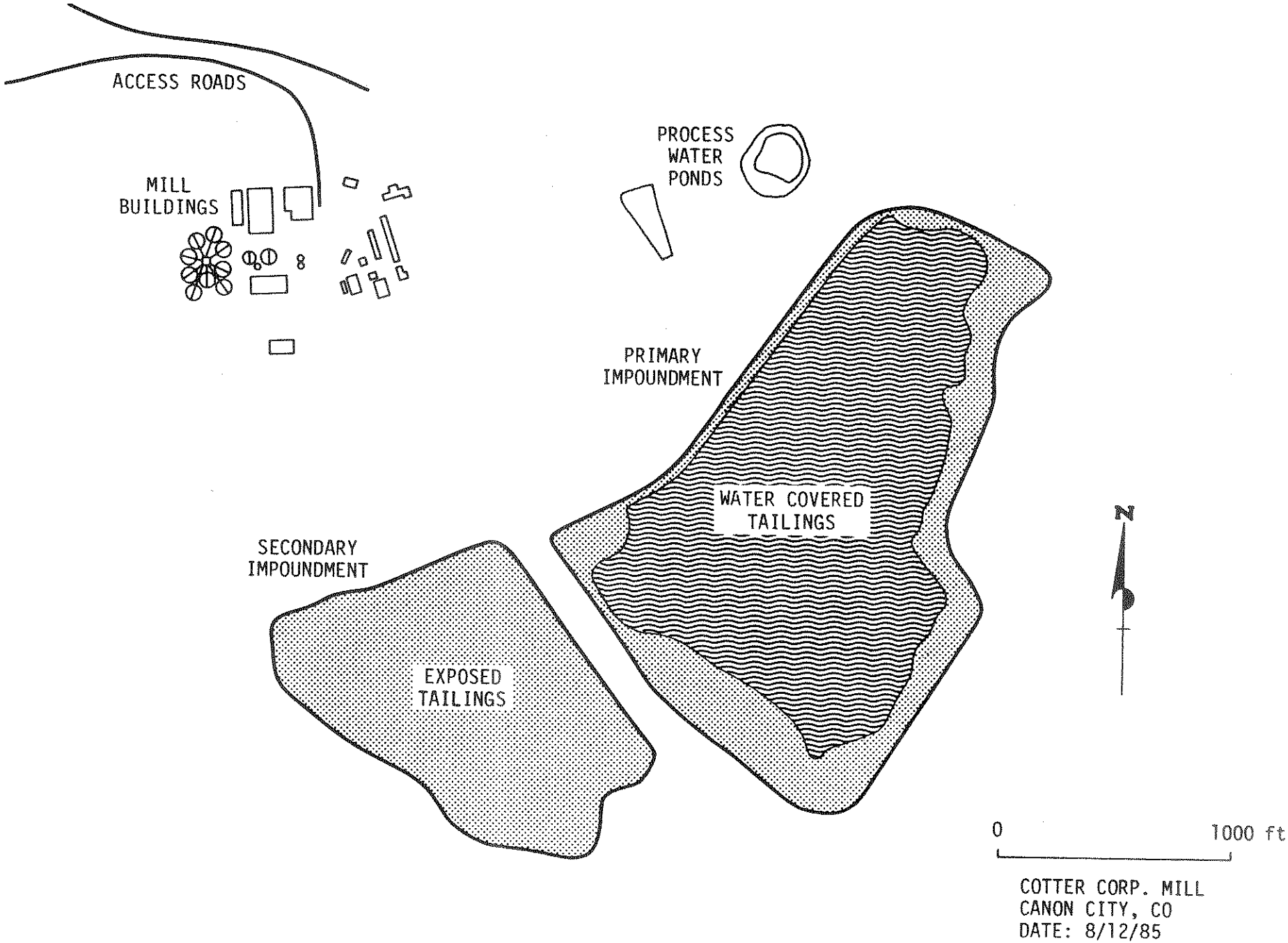
Work practice	Difference in NPV from base case ($ x 10^6)	Deaths avoided[a] 0-60 y
Base Case II Single cell covered 20 y after full (40 y from start)	--	--
1. Single cell covered when full (20 y from start)	1.8	1.4
2. Phased disposal 20-acre cells	1.5	1.6
3. Phased disposal 40-acre cells	-	1.7
4. Continuous disposal (trench-type)	8.7	1.7

[a] Nationwide basis.

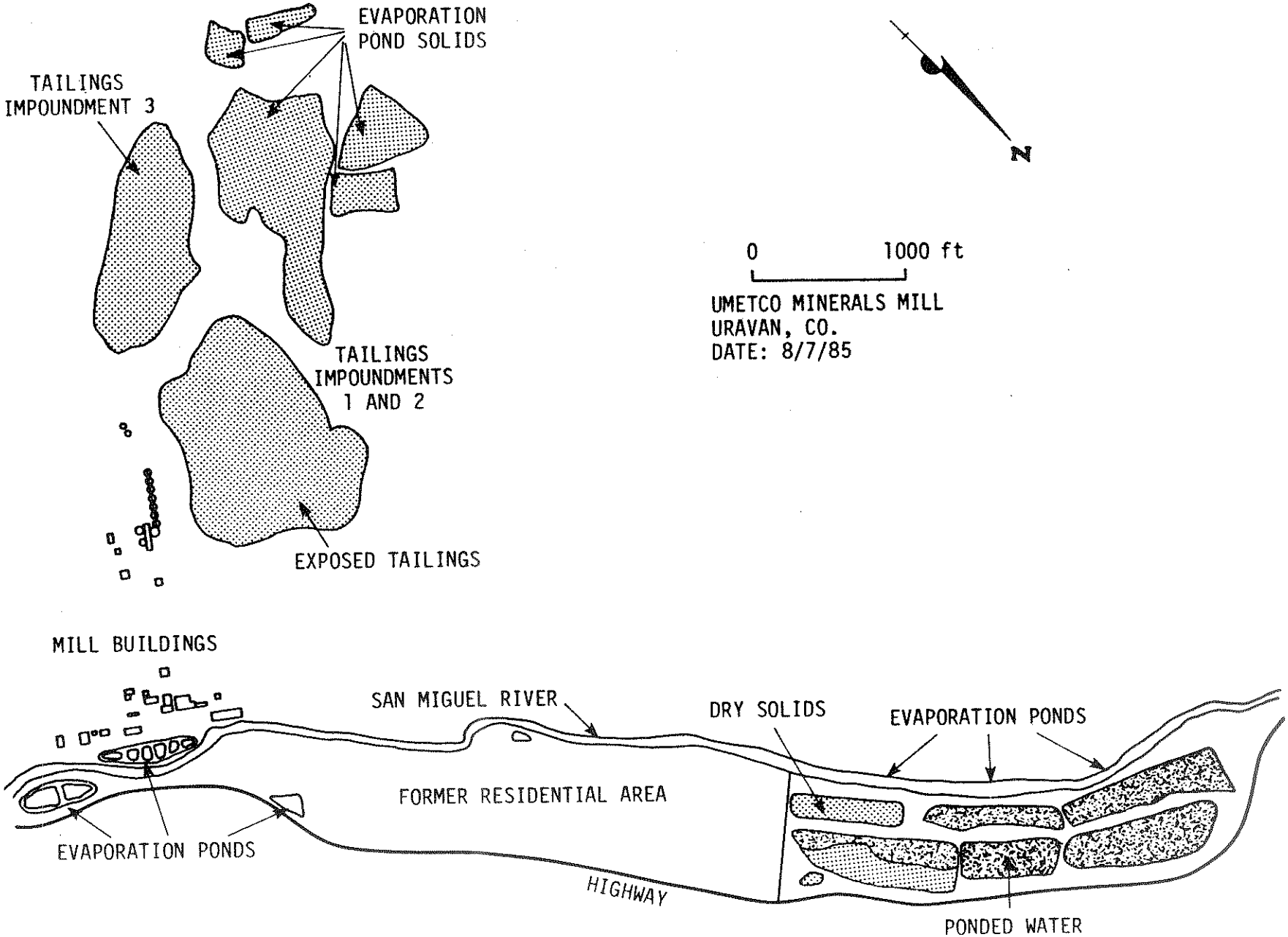
APPENDIX A

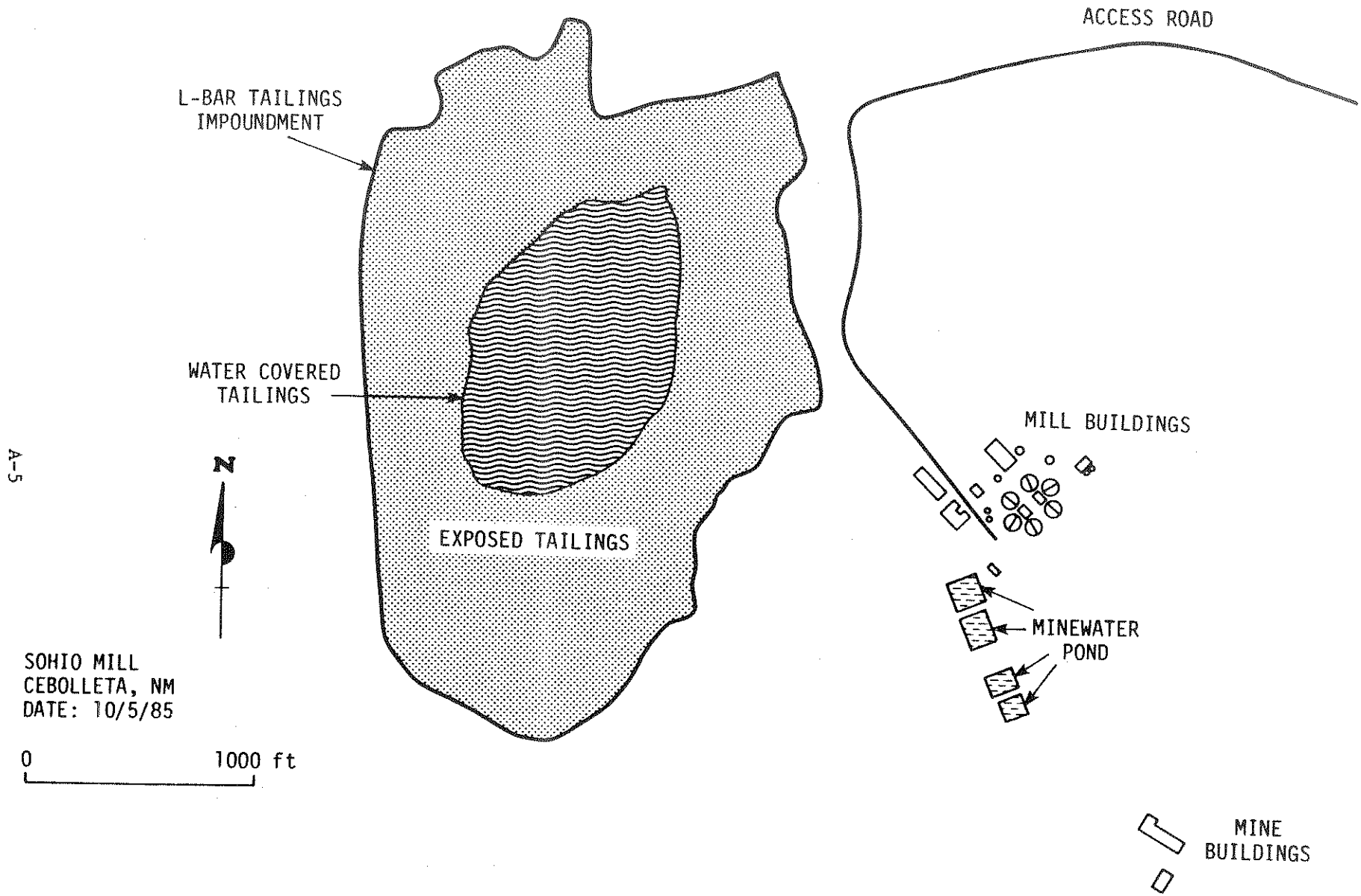
DIAGRAMS OF URANIUM MILL SITES AND TAILINGS IMPOUNDMENTS

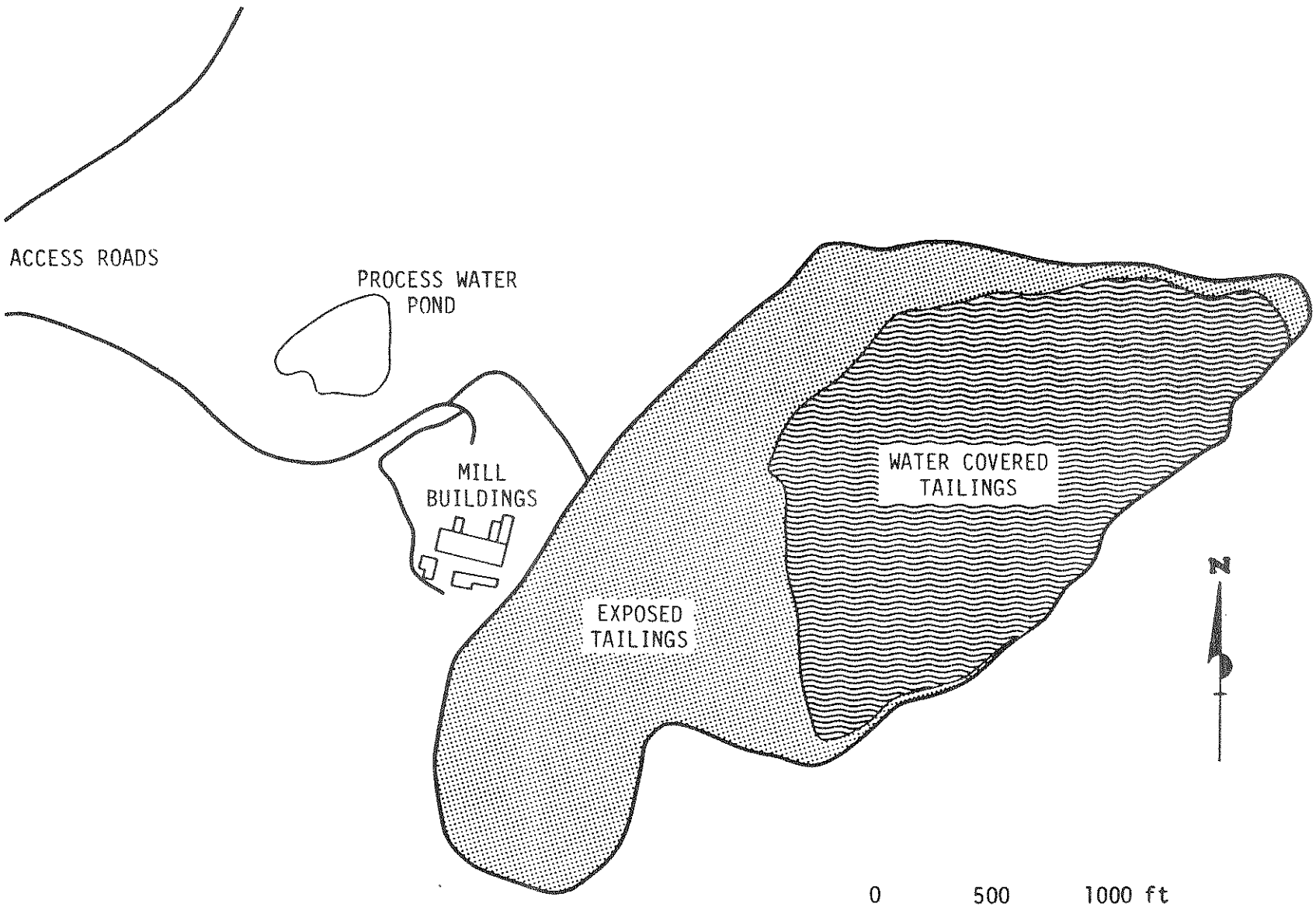
Diagrams of each of the 20 licensed uranium mill sites that were included in this evaluation are presented in this appendix. These diagrams were adapted from aerial photographs taken by the Office of Radiation Programs. The diagrams are presented to show the relative location of the tailings impoundments, mill structures, and other important site features. Approximate scales and the dates of the aerial photograph are indicated on each diagram.



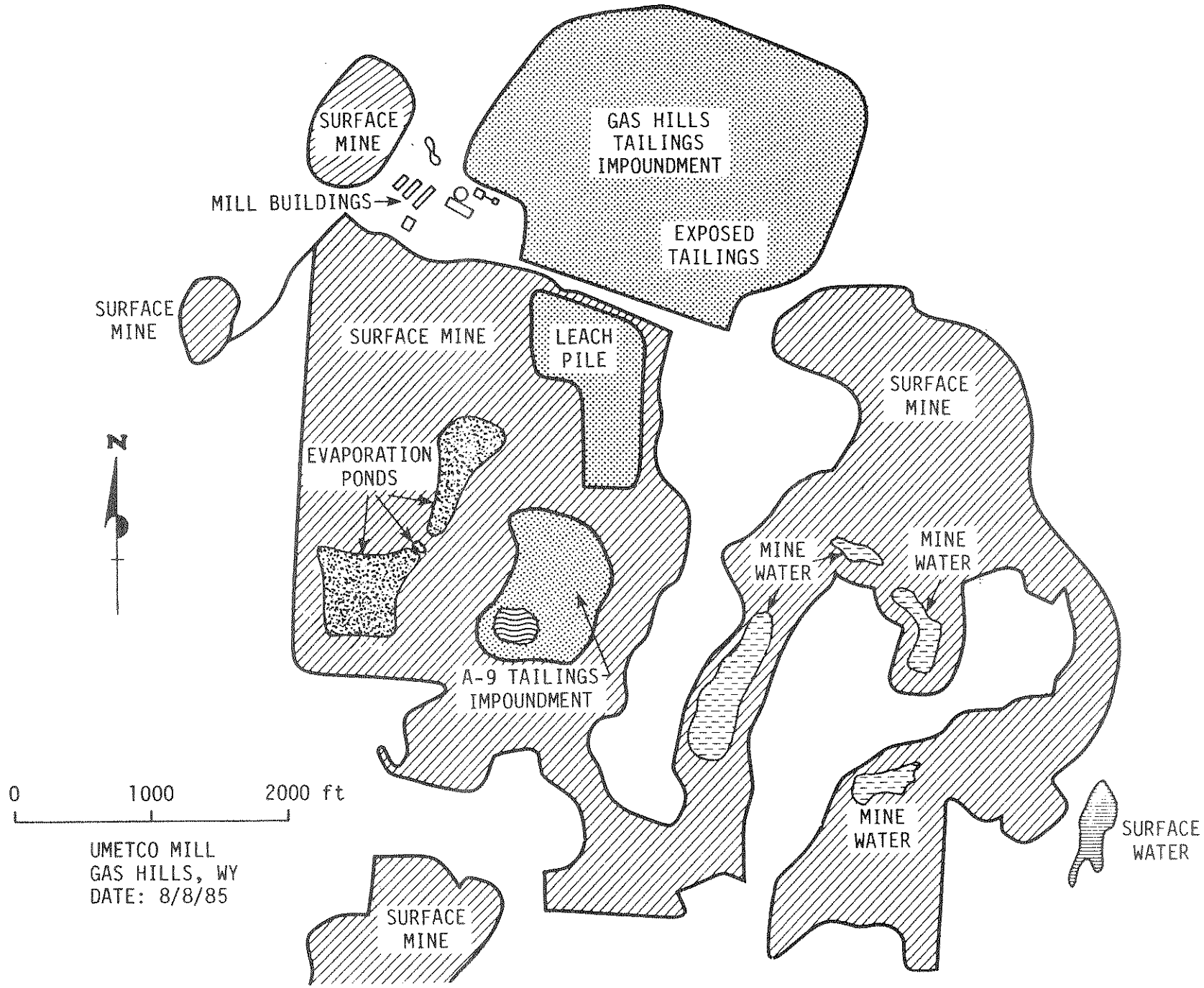
COTTER CORP. MILL
CANON CITY, CO
DATE: 8/12/85

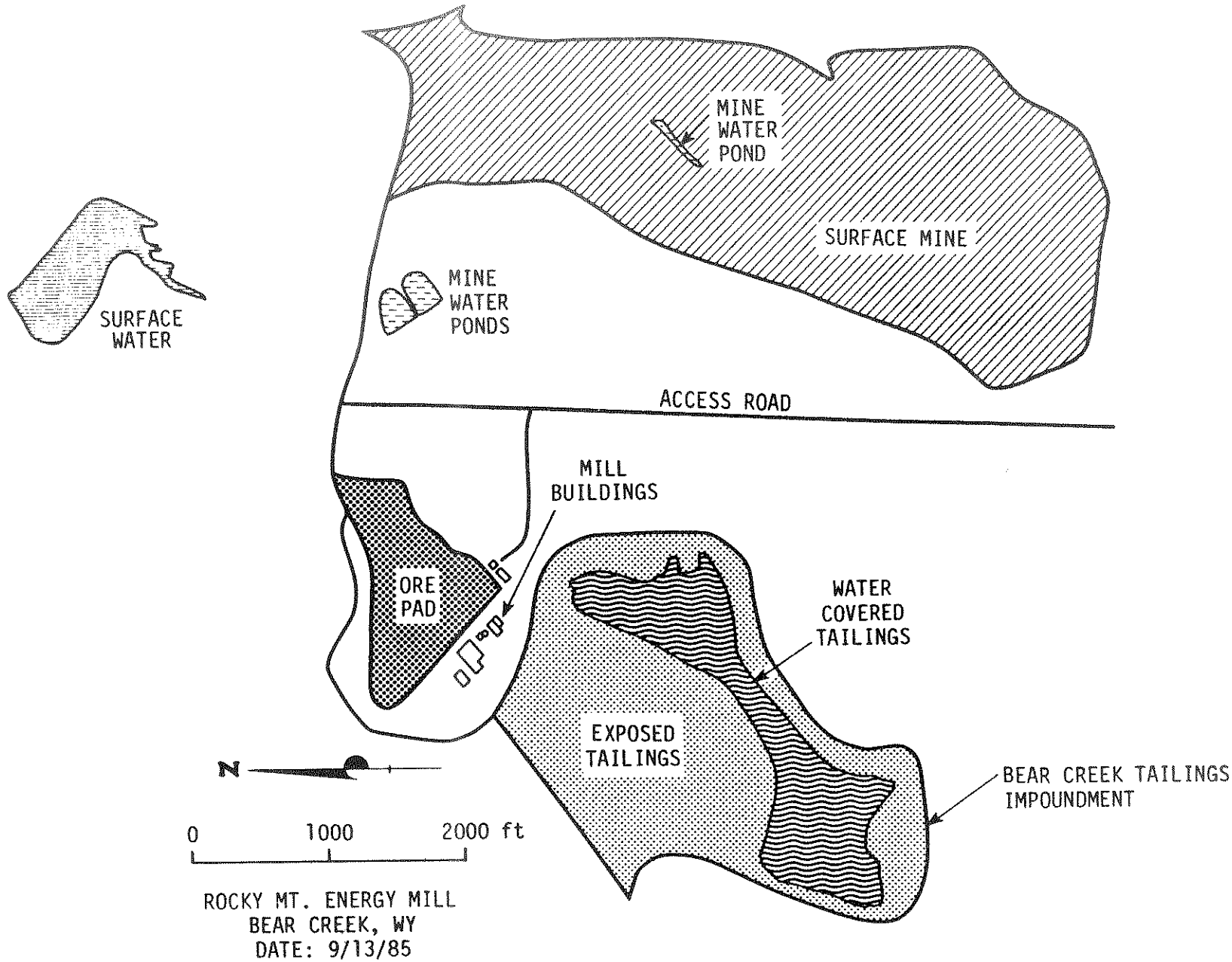

EVAPORATION
POND SOLIDS
TAILINGS
IMPOUNDMENT 3
TAILINGS
IMPOUNDMENTS
1 AND 2
EXPOSED TAILINGS
N
0
1000 ft
UMETCO MINERALS MILL
URAVAN, CO.
DATE: 8/7/85
MILL BUILDINGS
SAN MIGUEL RIVER
DRY SOLIDS
EVAPORATION PONDS
FORMER RESIDENTIAL AREA
EVAPORATION PONDS
HIGHWAY
PONDED WATER


ACCESS ROAD
L-BAR TAILINGS IMPOUNDMENT
WATER COVERED TAILINGS
EXPOSED TAILINGS
MILL BUILDINGS
MINEWATER POND
N
SOHIO MILL
CEBOLLETA, NM
DATE: 10/5/85
0
1000 ft
MINE BUILDINGS

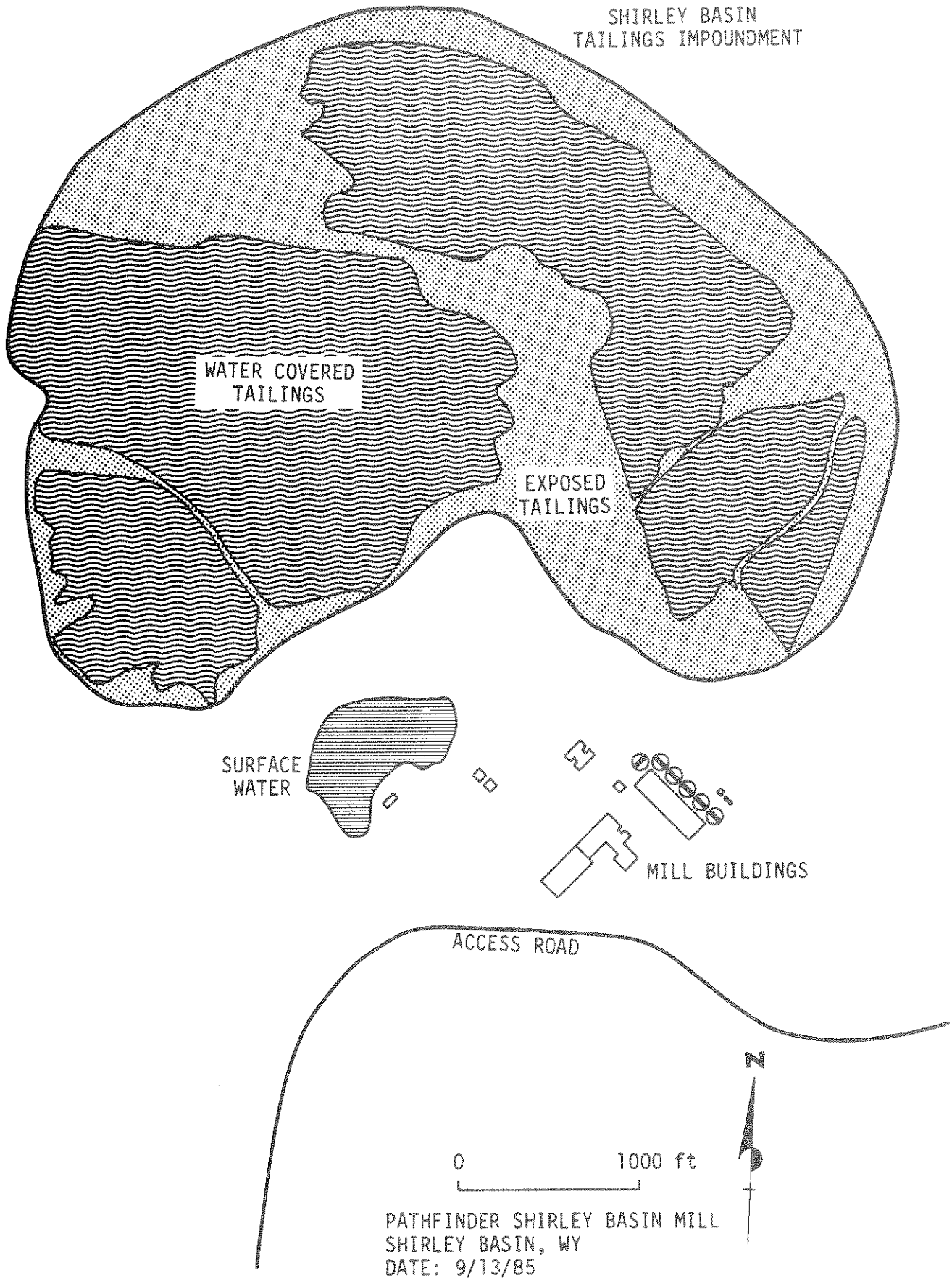


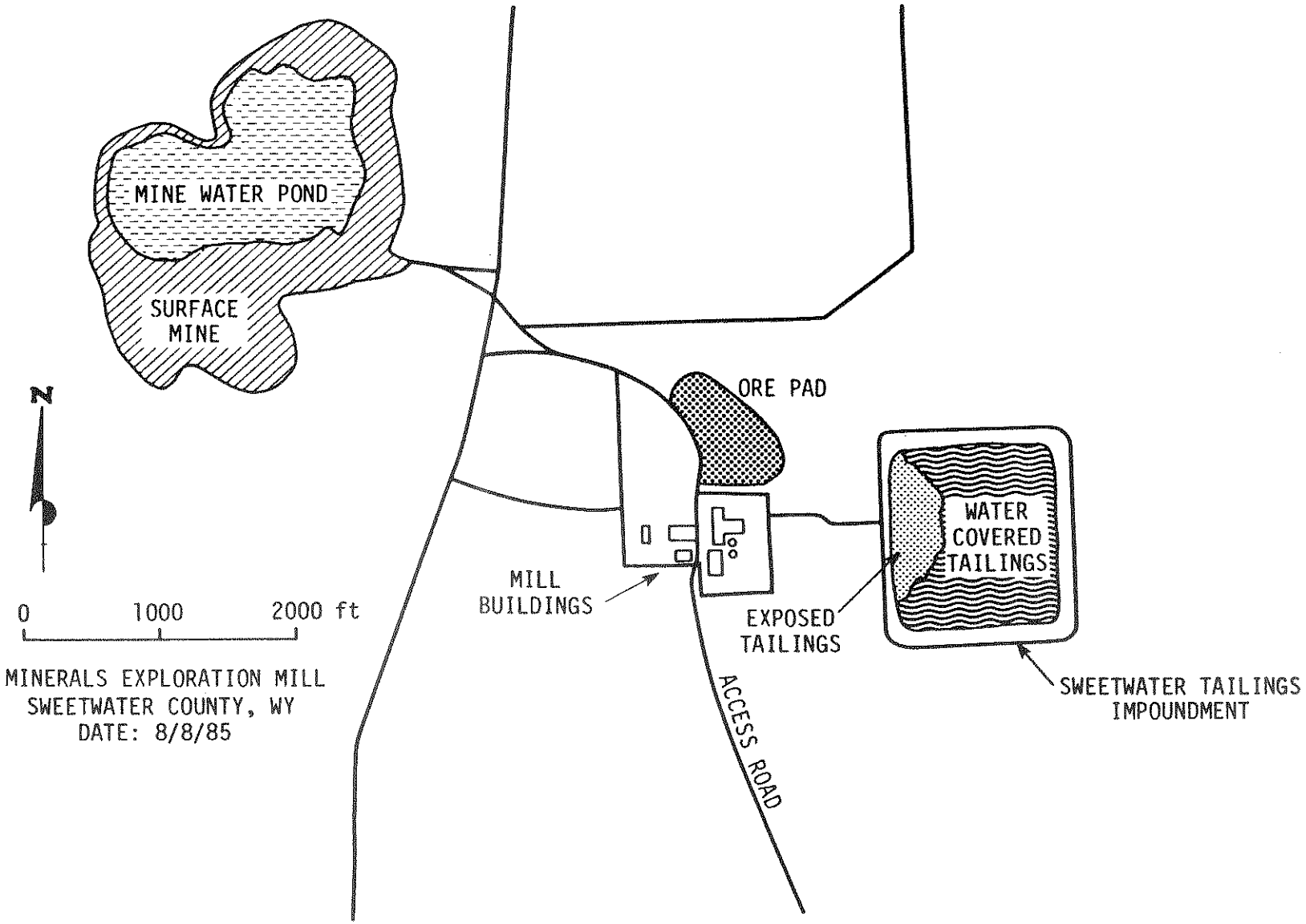
WESTERN NUCLEAR MILL
JEFFREY CITY, WY
DATE: 8/8/85


SURFACE MINE
GAS HILLS TAILINGS IMPOUNDMENT
MILL BUILDINGS
EXPOSED TAILINGS
SURFACE MINE
SURFACE MINE
LEACH PILE
SURFACE MINE
N
EVAPORATION PONDS
MINE WATER
MINE WATER
A-9 TAILINGS IMPOUNDMENT
0
1000
2000 ft
UMETCO MILL
GAS HILLS, WY
DATE: 8/8/85
MINE WATER
SURFACE WATER
SURFACE MINE



ROCKY MT. ENERGY MILL
BEAR CREEK, WY
DATE: 9/13/85


SHIRLEY BASIN
TAILINGS IMPOUNDMENT
WATER COVERED
TAILINGS
EXPOSED
TAILINGS
SURFACE
WATER
MILL BUILDINGS
ACCESS ROAD
N
0
1000 ft
PATHFINDER SHIRLEY BASIN MILL
SHIRLEY BASIN, WY
DATE: 9/13/85


MINE WATER POND
SURFACE MINE
N
0
1000
2000 ft
MINERALS EXPLORATION MILL
SWEETWATER COUNTY, WY
DATE: 8/8/85
ORE PAD
MILL BUILDINGS
EXPOSED TAILINGS
WATER COVERED TAILINGS
SWEETWATER TAILINGS IMPOUNDMENT
ACCESS ROAD

APPENDIX B

COST ESTIMATES FOR EXISTING AND MODEL NEW URANIUM MILL TAILINGS IMPOUNDMENTS

Appendix B: COST ESTIMATES FOR EXISTING AND MODEL NEW URANIUM MILL TAILINGS IMPOUNDMENTS

This Appendix presents the approach, assumptions, and bases used to generate the cost estimates of Chapter 7. For existing impoundments, the most recent available site-specific information was used to estimate the cost of interim control and final reclamation measures. For new tailings impoundments, model impoundments were designed, which formed the basis of the cost estimate.

All costs are presented in 1985 dollars, which have not been discounted. Both direct and indirect costs are included. In general, direct costs represent labor, equipment, and material costs. A total of 32 percent was added to this figure to cover indirect cost items such as engineering, insurance, contingency, etc. Table B-1 presents information on the indirect cost factors used in preparation of the cost estimates.

B.1 Existing Impoundments

Detailed data on each existing site were obtained from various sources (DOE82, EPA85, NRC84, PEI85). Two types of work practice control measures were considered for control of radon-222 from existing uranium mill tailings impoundments: interim control and final reclamation.

Interim Control

Interim control involved placing 1 meter of earth on the surface of all dry tailings areas of an impoundment. For sand tailings dams, the amount of soil required to cover the embankment slopes was also included. Interim control is considered a temporary measure; therefore, neither the costs of reclamation of the source of cover soil (borrow pits) nor the costs of impoundment erosion control were included. A unit cost of $\$4.35/yd^3$ ($\$7.00/m^3$) was used to estimate the cost of placing the interim cover. This includes the direct costs of excavation, hauling, spreading, and compacting the cover.

Final Reclamation

Measures for effecting final reclamation of existing uranium mill tailings impoundments are those required to reduce the radon-222 flux to 20 pCi/m^2s and to place the impoundment in a state of permanent, long-term stability.

Table B-1. Indirect cost factors used in the cost estimation of uranium mill tailings impoundments

Indirect cost item	Percentage	
	Range	Value used
Engineering and design	2.5 - 6.0	5.0
Insurance	0.1 - 0.82	0.5
Performance bond	0.39 - 1.2	0.5
Permits	0.5 - 2.0	1.0
Overhead and profit	10 - 15	10.0
Contingency at conceptual stage	15 - 20	15.0
Total		32.0

Source: "Means Site Work Cost Data 1985," 4th Annual Edition, R.S. Means Co., Inc.

No credits for earth covers that may have previously been placed for interim control measures were considered to be of help in achieving final reclamation. Final reclamation was assumed to be possible immediately after an impoundment had dried. No cost for attaining dry-out was assumed. The measures taken and the costs of final reclamation depend on the type of impoundment and its size.

An estimate of the cost of covering each impoundment with sufficient earth to reduce the radon-222 flux to 20 pCi/m^2s was based on the radium-226 concentration of the tailings. Costs of reclaiming a borrow pit (source of the earth for cover) and placing an 18-inch thick gravel cap on top also were included for each impoundment. For impoundments that are constructed of sand tailings dams, the costs for regrading slopes to 5:1(H:V) and protection of the slopes' earthen cover with 18 inches of riprap were also included. For these cost estimates, it was assumed that the slopes of each dam constructed of tailings originally had 1:1 (H:V) slopes. These slopes would be reshaped to 5:1 (H:V) before placement of the cover and riprap. As discussed earlier, indirect costs were then added to the direct costs to obtain the total cost of final reclamation of existing impoundments.

B.2 New Tailings Impoundments

Four types of model impoundments were defined for estimation of the costs of constructing new uranium mill tailings impoundments: single-cell, phased-disposal, continuous-disposal, and continuous/single-cell disposal impoundments. Costs of the first three types of impoundments were estimated for below-grade placement of tailings and for partially below-grade placement. Only partially (50 percent) below-grade placement of tailings was considered for the model continuous/single-cell disposal impoundment.

Each model impoundment was assumed to have 2:1 (H:V) interior sloping sides, to contain a 12-meter depth of tailings, and to have 6 meters of tailings below grade and 6 meters above-grade (in the case of the partially below-grade impoundment). This arrangement ensures the comparability of the cost estimates for the various impoundments. Each model impoundment is designed or sized to handle the production output of the model mill over its 15-year life (NRC80), which is estimated to be 8.4×10^6 t of tailings with a volume of 5.25×10^6 m^3.

Single-Cell Impoundments

The single-cell impoundments are large, square impoundments. For the below-grade impoundment, 15 meters of earth is excavated so that the final level of the impoundment, which will contain a 12 meter depth of tailings and be covered with 3 meters of earth, is at grade. For the partially below-grade single-cell impoundment, a depth of 6 meters of tailings is below-grade; therefore, the top of the impoundment after final cover is 9 meters above grade. Each type of impoundment has a 30-mil synthetic liner and a drainage system to facilitate dewatering when the impoundment has reached capacity. For the partially below-grade impoundments, embankments are constructed from the excavated material, which is also used for the final cover. The embankments are 9 meters high, have a 6-meter berm, and have interior and exterior slopes of 2:1 and 5:1, respectively. The exterior of the embankment is covered with riprap for erosion protection. An 18-inch gravel cap is placed atop the final cover of each type of impoundment for protection. The total estimated costs for the below-grade and the partially below grade single-cell impoundments are $\$41.3 \times 10^6$ and $\$29.7 \times 10^6$ (1985 dollars), respectively. The difference is largely due to the additional excavation required for a below-grade impoundment.

Phased Disposal Impoundments

The phased-disposal impoundment consists of a series of small impoundments or cells that are constructed sequentially, filled, and brought to final reclamation over the life of the model mill. The six cells are similar in design to the single-cell impoundment, but the capacity of each is just one-sixth of the total tailings quantity.

Unlike the model single-cell impoundment, an evaporation pond is included in the cost estimate of phased-disposal impoundments. The impoundment surface area available for evaporation is much smaller; therefore, an evaporation pond is required. The estimate includes both the cost of construction and the cost of closure of the evaporation pond at the end of the mill's life.

Excavation to a depth of 6 meters for the partially below-grade phased-disposal impoundment does not provide sufficient earth to construct the dam and to place a 3-meter earth cover over the tailings. Thus, the costs of obtaining

additional earth and reclaiming a borrow pit are included in the cost of the dam construction. The total estimated costs for the below-grade and the partially below-grade phased disposal impoundments are 47.8×10^6 and 41.5×10^6 (1985 dollars), respectively.

Continuous Disposal Impoundments

A series of 10 rectangular trenches are included in the model continuous-disposal impoundments. As in phased disposal, the trenches would be constructed sequentially, filled, and covered over the life of the model mill. Unlike phased disposal, however, the tailings are dewatered to allow for almost immediate placement of the cover. The estimate includes the cost of a vacuum filter to dewater the tailings. An evaporation pond (larger than that required for the phased-disposal model) is also needed. The tailings are dewatered prior to disposal; therefore, no drainage system is necessary.

The volume excavated is insufficient to meet the earth requirements for the partially below-grade continuous-disposal impoundment dam. The shortfall is made up by hauling earth from a borrow pit, which is later reclaimed. These costs are included in that of the dam construction. The total estimated costs for the below-grade and the partially below-grade continuous-disposal impoundments are 54.2×10^6 and 61.0×10^6 (1985 dollars), respectively.

Continuous/Single Cell Disposal Impoundment

The design of the continuous/single-cell disposal impoundment includes a single, partially below-grade impoundment for placement of dewatered tailings, as opposed to a series of trenches. Such a design substantially lowers the estimated cost of the dam construction, as it eliminates individual embankments between trenches and the need to haul in additional earth. The total cost of 37.4×10^6 (1985 dollars) is essentially the same as that estimated for the partially below-grade single-cell impoundment except that an evaporation pond and vacuum filter are still required because the tailings must be dewatered.

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PEI85 PEI Associates, Inc., "Radon-222 Emissions and Control Practices for Licensed Uranium Mills and Their Associated Tailings Piles, Final Report", prepared for the U.S. Environmental Protection Agency, Office of Radiation Programs, Document No. PEI 3642-6, June 1985 (revised November 1985).

APPENDIX C

EVALUATION OF INTERIM COVER AS A CONTROL OPTION

CONTENTS

Chapter 1: INTRODUCTION

The use of an earthen cover on the dry portion of inactive tailings impoundments can potentially reduce radon-222 emissions by restricting the diffusion of this gas long enough to allow decay. In developing the background information for the proposed standard, the option of using a temporary or interim earthen cover evolved as a possible work practice standard. This cover would be placed on dry portions of impoundments that are not in use. The cover would be about 1 foot or 1 meter in depth (depending on the selected option). If and when the impoundment returned to active use, tailings would be dumped on top of the earth cover. Other methods of reducing radon-222 emissions include water cover, and synthetic or asphalt covers. Maintaining a water cover causes potential ground water and, at some sites, dam stability problems. If a mill is on standby, water cover will be difficult to maintain due to evaporation. Synthetic or asphalt covers have not been evaluated over longer time periods on a large scale and their true effectiveness is not known. Thus, only a limited number of viable options are available for reducing radon-222 emissions from existing tailings impoundments, namely:

> Apply a relatively shallow earthen (interim) cover over the dry areas when the impoundments are not in use (i.e., standby).
>
> Discontinue tailings disposal in current impoundments and apply final cover per existing standards.

Various schedules can be used with either of these options as described in the Federal Register Notice of February 21, 1986.

An analysis of these alternatives for reducing radon-222 indicated that the application of an interim earthen cover appeared to be a cost effective option if an impoundment was not used again. This option is therefore being reevaluated to better assess its practicability, effectiveness and cost.

Chapter 2: TECHNICAL ISSUES

2.1 Introduction

Interim earthen covers of 0.3 or 1 m having 8 percent moisture content theoretically reduce radon-222 emissions by about 37 and 62 percent, respectively. The actual effectiveness of such interim covers has never been demonstrated on licensed tailings impoundments. Additionally, while use of earthen covers is a demonstrated control technology at inactive uranium mill tailings sites, it has never been used on a short term basis to limit radon-222 emissions from licensed tailings impoundments on active or standby status. Therefore the evaluation of interim cover is based on best engineering judgment and not practical experience. However, the use of thick (3 m) earth covers to control radon-222 and provide long-term stabilization of inactive tailings piles is demonstrated technology. The evaluation of interim cover, particularly estimation of its effectiveness in controlling radon-222, is based on research conducted under the UMTRCA program.

Several characteristics of the impoundments impact the potential use of interim cover. Site-specific characteristics such as evaporation rates, dam construction, phreatic level, availability of cover material, presence of liners, expected length of standby periods, remaining capacity and expected mill life must be considered on a site by site basis.

Uranium mill tailings are deposited as a slurry in tailings impoundments. Three major types of impoundments currently exist: those where coarse tailings are used as dam construction material (11 impoundments representing 32 percent of total tailings area); those using earthen dams (22 impoundments representing 65 percent of the total area); and below-grade impoundments (5 impoundments representing about 3 percent of the total). As discussed in later sections, impoundment construction affects the applicability of interim cover. Additionally, climate plays an important role in determining how much time is required to allow an impoundment to dry sufficiently before interim cover can be applied. For example, some tailings impoundments are located in arid areas (i.e., New Mexico) relatively wet areas (i.e., Texas, Washington) and areas that experience severe winter weather (i.e., Wyoming). The geology beneath an impoundment also impacts the time required for drying. The geologic settings vary from porous underlayments (sandy soils of New Mexico) to relatively impermeable bases (clay foundations in Texas). For example, impoundments in New Mexico would dry relatively quickly because of seepage through the bottom coupled with high evaporation rates while the Panna Maria

impoundment in Texas would require a longer drying period because of the impermeable base that would inhibit dewatering by seepage and the relatively high rainfall rate. There are also several operational aspects that must be evaluated when considering interim cover. For example, annual maintenance, periodic inspections, enforcement, and loss of capacity must be included in the evaluation. Each of these items are discussed in the following sections.

2.2 Effectiveness of Interim Cover

The effectiveness of any earthen cover depends mainly on its moisture content and depth, and the homogeneity and integrity of the cover layer. The effectiveness of an earth cover was estimated in the Draft BID by using diffusion equations which take into account the cover material and tailings density, porosity, specific gravity and moisture content, and by assuming these properties do not vary throughout the cover or tailings, or with time. These idealized conditions would not typically be achieved in practice and the actual effectiveness would probably be less than the calculated effectiveness. The applicability of the basic diffusion equation to relatively shallow earth covers, such as 0.3 m, is also questionable.

The key variable effecting the effectiveness of an earthen cover of given depth in controlling radon-222 is its moisture content. An example of this variation is shown in Figure 2-1. For a 1-meter depth of cover with 12 percent moisture, about 20 percent of the radon-222 released from the tailings surface would still emanate from the cover. If the cover material dries out to 6 percent, about 47 percent of the radon-222 from the tailings would emanate from the cover. Thus, the emissions increased by a factor of 2.35 (47/20) or the effectiveness decreased by about 33 percent. Similar losses in effectiveness are evident for all depths of earth cover. However, a thicker cover will not dry out as completely or quickly as a thin cover, and soils with a higher silt and clay content will retain more moisture much longer than a sandy soil.

In addition to the cover material's moisture content, the overall integrity of the cover must be maintained in order to reduce radon-222 emanations. Wind and rain erode an earth cover, thus reducing its depth and subsequent effectiveness. In addition, cracks from freeze-thaw cycles, subsidence, or burrowing animals decrease a shallow cover's effectiveness. When final reclamation is implemented, gravel, rip-rap, or vegetation cover, and additional grading and runoff control are included to decrease erosion and ensure the long-term integrity of the cover. These items are not included in interim earth covers since, by definition, they are not designed as long-term control techniques.

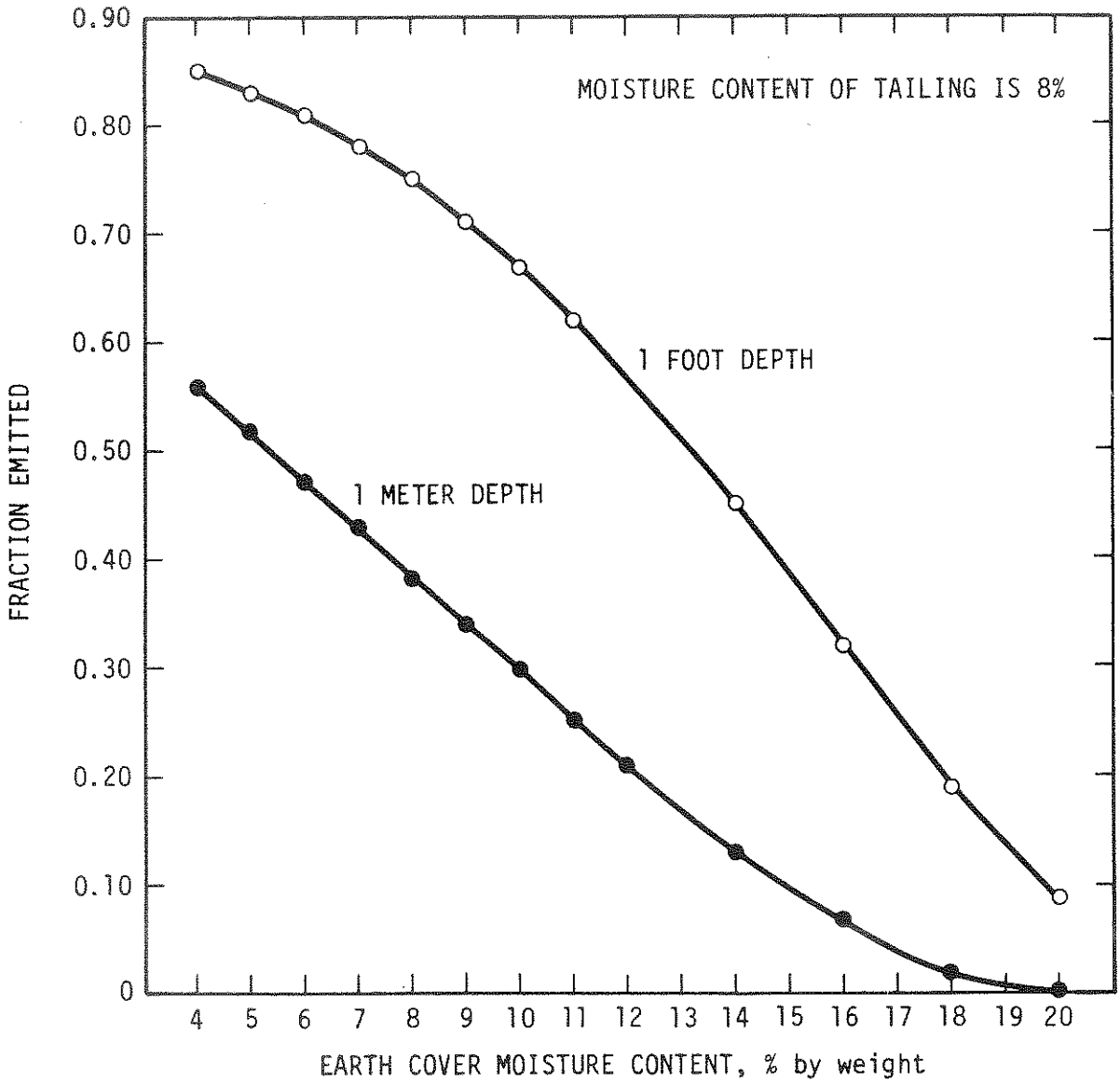

Figure 2-1. Variation in earth cover effectiveness with moisture content.

The combination of surface drying, erosion, and loss of integrity reduces the interim cover's effectiveness. This loss in effectiveness would be especially evident in a shallow cover of only 0.3 m. The exact decrease in effectiveness is not known and cannot be calculated readily since these factors are highly variable and site-specific. The loss in effectiveness can be offset by frequent maintenance of the earth cover, as discussed under Operational Aspects.

2.3 Applicability of Interim Cover

Limitations regarding the placement of interim cover are associated with physical conditions of the tailings. The water content of the tailing and the slope of the surface are controlling factors. Tailings must be dry in order to support earthmoving equipment and the cover itself. Tailings are dewatered and dried by seepage from the impoundment and by evaporation. (The time required to achieve sufficient dryness is discussed in Section 2.4.) The tops of tailings impoundments are essentially flat, and if thoroughly dry, would pose no difficulty to placement of interim cover. However, 11 impoundments at 6 mill sites are constructed with dams made of coarse tailings (Type 1 impoundments). The outer faces of these dams are steep (approximately 2.5:1, H:V). Placement of interim cover on these dams would be difficult because of the steep slope. In addition, seepage through the dams could cause instability and slumping of the interim cover. Conversely, the interim cover could cause the phreatic surface to rise in the dam by inhibiting seepage through the dam. This occurrence could cause a decrease in the stability of the dam itself.

In evaluating the applicability of interim cover, three distinct situations currently exist on tailings impoundments. These conditions and how they affect the applicability of interim cover are addressed below.

Interim Cover on Dams Constructed of Tailings

The faces of these dams are at a slope of about 2.5:1 (H:V), it probably would not be possible to apply and maintain interim cover to these steep areas without recontouring the impoundment. Recontouring would result in a significant loss of storage capacity. Additionally, it would be very difficult to compact cover material placed on such a slope. Uncompacted material would be subject to more rapid wind and water erosion.

These slopes (300 acres, total) represent 8 percent of total area and 15 percent of currently dry areas.

20 percent of this sloped area is at impoundments that have been filled to capacity (Uravan). These impoundments would more logically apply final cover.

12 percent of this sloped area is at impoundments at sites that have indicated decommissioning will begin soon (L-Bar and Churchrock). These impoundments would more logically apply final cover.

31 percent of the total sloped area is at one major impoundment (Homestake), that is a 4 sided structure, with steep slopes (2 to 2.5:1) that would be most difficult to place interim cover on without recontouring.

Coarse tailings are reported to have lower Ra-226 content than the slimes. Therefore, these areas have a lower source term than the tops of the impoundments.

Piezometers and movement benchmarks used to monitor the stability of these dams would have to be extended and their use uninterrupted during application of interim cover.

It would be necessary to provide drainage between the tailings and the earthen cover to allow any seepage through the dam to escape without building up a hydrostatic head that could cause dam failure. Seepage through these dams is inherent to their design and must be maintained. A drainage system, such as a blanket drain, would also provide a permeable path for radon-222 migration, making at least the lower portion of the cover less effective.

Interim Cover on Tops of Unlined Type 1 and Type 2 Impoundments

Tops of Type 1 and 2 unlined impoundments account for 75 percent of the total tailings area.

Current dry areas on top of these piles equal 44 percent of the total and 73 percent of the currently dry areas.

These areas are flat and if thoroughly dry, interim cover could be placed easily.

The length of time required for drying prior to placement of cover is site-specific and will vary depending on impoundment design, climate, and hydrogeology. Some impoundments, particularly those in climates characterized by high net evaporation and permeable soils (e.g., New Mexico) would dry sufficiently in a relatively short time,

1 year for example. Heavy equipment could access most of the area at that time. Other sites having lower evaporation, more rainfall/snowfall and/or less permeable soils that limit seepage could require considerably longer to dewater and dry (5 to 10 years for example).

Placement of 0.3-meter cover on these dry areas is demonstrated technology and is an NRC recommendation during standby to control windblown tailings.

Interim Cover on Lined Type 2 and Type 3 Impoundments

Tops of lined impoundments represent 14 percent of the total area.

Dry areas on lined impoundments make up 11 percent of currently dry areas.

Issue of lost capacity is more important on these impoundments because their construction cost is greater.

The dry out period will be longer than in unlined piles because seepage is limited.

Evaporation Ponds

In addition to tailings impoundments, several mills use evaporation ponds for water management. Decant water from the tailings impoundments and often mine pump-out water and seepage from the tailings impoundment is pumped to these evaporation ponds. Some tailings slimes and dissolved radium-226 are carried along with the water and are deposited in these ponds. Upon drying, these solids emit radon-222. Interim cover was applied to dry areas of evaporation ponds in the Draft BID. In the current evaluation, interim cover is not applied to evaporation ponds because: 1) these ponds receive water from sources other than tailings impoundments and would need to remain in service during standby periods; 2) the quantity of tailings present and their contribution to the site's source term are not accurately known; 3) these ponds will eventually be excavated and the material placed on the tailings impoundments prior to reclamation; and 4) these ponds are lined to prevent seepage. Movement of heavy equipment on these ponds could destroy the integrity of the liners.

Summary of Applicability

Because of the significant uncertainties and perceived difficulties and complications associated with the application of

interim cover to the outward faces of dams constructed of coarse tailings, in addition to the relatively lower source term of these areas, the current evaluation of interim cover assumes that these slopes remain uncovered. All other tailings surfaces can be covered as soon as they are dry enough to support earthmoving equipment and the cover itself. In this evaluation of interim cover, it is assumed that dry areas of evaporation ponds are not covered for the reasons stated above.

2.4 Timing of Interim Cover

The evaluation of interim cover includes several assumptions that are based on best engineering judgment, regarding the timing of interim cover applications (i.e., when can interim cover be applied). The assumptions are specified below:

Dry areas (as specified in Table 4-2 of the BID) of tailings impoundments that are on standby status or that have been filled to capacity can be covered immediately.

Wet and ponded areas of tailings impoundments that are on standby status or that have been filled to capacity will dewater and dry over a 5-year period, at which time it is assumed interim cover could be applied.

Interim cover is not applied to operating impoundments. The method of placing tailings in impoundments is to discharge from several points around the perimeter or to move the discharge point around the perimeter; in either case interim cover would not be compatible with these operations. These impoundments receive interim cover when they go to standby status (i.e., dry areas covered immediately, wet and ponded areas covered in 5 years).

The useful life of an interim cover is limited by return to active status at which time the earthen cover is covered with new tailings. In the current evaluation, impoundments would become active sometime between 1990 and 1995 and a second application of interim cover would be made in the year 2000.

It was initially assumed for the base case that an inactive impoundment would remain uncovered for 40 years. This appears unrealistic and a shorter time period of no more than 20 years is more representative.

2.5 Operational Aspects

The effectiveness of an unmaintained interim cover in limiting the escape of radon-222 can be expected to deteriorate with time. The rate of deterioration is highly site-specific. It depends upon many variables such as frequency and intensity of precipitation and wind, characteristics of the interim cover (e.g., moisture content, type of soil, compaction, grade, etc.), and drainage basin considerations (e.g., run-on and run-off). To prevent or minimize deterioration of interim covers, maintenance practices would be employed. Annual maintenance would include periodic regrading or placement of additional cover material. Additionally, periodic inspections of the interim cover system would be required to ensure its integrity. Such expenses are estimated to be 5 percent of the capital cost of the interim cover per year.

One important aspect regarding interim cover is the issue of lost capacity. An interim cover of 1 meter applied over a tailings impoundment that is on standby status results in a loss of tailings capacity equal to the cover volume. If interim cover is applied more than once (i.e., a covered impoundment goes from standby to operational status and back to standby), the effect of lost capacity is multiplied. Information received from the NRC on the capacity of existing piles and the capacity loss associated with an application of interim cover is presented in Table 2-1. Some impoundments would have no remaining capacity if interim cover were applied, while others would lose as little as 9 percent of their remaining capacity. Information on the remaining capacity at other sites is not currently available.

Table 2-1. Lost capacity associated with a single application of interim cover (0.9 m) over the entire impoundment in nonagreement states[a] (1000 tons)

Mill	Current tailings	Licensed quantity of tailings	Quantity of interim cover - 0.91 meter thick (% of remaining capacity)
White Mesa	1,500	5,137	1,958 (54)
La Sal	2,954	5,041	205 (10)
Moab	10,600	15,600	1,176 (24)
Shootaring Canyon	174	5,000	411 (9)
Gas Hills (Pathfinder)	11,762	20,468	793 (9)
Split Rock	7,700	8,000	500 (100)
Gas Hills (UMETCO)	9,600	9,900	1,023 (100)
Bear Creek	4,100	5,700	882 (55)
Shirley Basin	6,800	8,800	1,364 (68)
Sweetwater	3,900	9,100	1,764 (34)

(a) NRC Uranium Field Office, Denver, Colorado, April 1986. Information on remaining capacity of impoundments in agreement states was not available.

REFERENCES FOR CHAPTER 2

ORNL 83 Oak Ridge National Laboratory, "Guidance for Disposal of Uranium Mill Tailings: Long-Term Stabilization of Earthen Cover Materials," Prepared for U.S. Nuclear Regulatory Commission, NUREG/CR-3199, ORNL/TM-8685. October 1983.

*U. S. GOVERNMENT PRINTING OFFICE 1986; 621-735/60533

EPA 520/1-86-009
August 1986

Radon - 222 Emissions from Licensed Uranium Mill Tailings

Background Information Document

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Radiation

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Final Rule for Radon - 222 Emissions from Licensed Uranium Mill Tailings

Response to Comments

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

EPA 520/1-86-011

RESPONSE TO COMMENTS

RULE FOR RADON-222 EMISSIONS FROM LICENSED URANIUM MILL TAILINGS

August 15, 1986

Office of Radiation Programs
U.S. Environmental Protection Agency
Washington, D.C.

Table of Contents

Section 1: INTRODUCTION

In this document EPA responds to comments received on the proposed rulemaking "National Emission Standards for Hazardous Air Pollutants; Standards for Radon-222 Emissions from Licensed Uranium Mill Tailings," published in the Federal Register on February 21, 1986 (51 FR 6382-6387).

Subsequent to the announcement of the proposed rule, a public hearing was held on March 25, 1986 in Denver, Colorado (51 FR 8205). The comment period was held open until April 28, 1986.

In addition to requesting comments on the proposed alternative work practices, the Agency specifically asked for comments pertaining to the following questions:

1. Is it feasible to dewater tailings, as would be required under a continuous disposal alternative?

2. What is the maximum period for design licensing and construction?

3. Is the size limit of 20 acres for phased disposal reasonable?

4. Are current or potential ground water problems severe enough to warrant termination of pumping tailings into unlined impoundments?

5. Are there any unidentified public health or environmental problems associated with evaporation ponds?

6. Are interim controls for tailings piles a practical alternative?

7. Is it reasonable to assume for a reference case, a 40-year lag before compliance with UMTRCA?

8. To what extent should the timing of UMTRCA requirements be factored into the choice of a control option?

Copies of written documents and transcripts of the hearing are available for inspection and copying at EPA's Central Docket Section, West Tower Lobby, Gallery One, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. The docket number is A-79-11. (A fee may be charged for copying).

Major concerns and issues arising from written and oral comments on the proposed rulemaking are summarized. Each commenter is identified by a letter and number after the comment. EPA's response to the comment then follows. In the interest of clarity and economy, some comments are paraphrased, and some closely related comments are combined. A list of the commenters and their identification numbers is given in Appendix A.

Section 2: LEGAL AND PROCEDURAL ISSUES

Comment 2.1: There is no need for regulation under the Clean Air Act because existing standards, regulations contained in the Atomic Energy Act and Uranium Mill Tailings Radiation Control Act and license conditions administered by NRC and Agreement States adequately protect the public from risk due to radon-222 (D-2, D-5, D-6, D-12, D-13, D-19, D-22).

Response: The Agency feels that there is a significent risk to individuals living near active uranium mill tailings piles. According to our model calculations, the risk may be as high as 1 in a 100. The concentration limit of 3 pCi/l at the boundary of a mill established by NRC regulations may not provide an ample margin of safety for the local population. The number of committed fatal cancers per year to the local, regional and national populations may be as high as 2 to 9 due to the operating tailings piles depending on how dry the piles become.

Comment 2.2: Confusion exists over the application of this proposed regulation because the definition of "licensed site" is unclear. Sites which are currently licensed by agreement states that are undergoing remedial action by DOE under Uranium Mill Tailings Radiation Control Act should not be included within the definition of licensed sites (D-9).

Response: This rule has no affect on existing licensed piles that are undergoing remedial action leading to final closure, or to sites being reclaimed by the DOE. However, it does apply to all sites that are not reclaimed and hold a license from the NRC or one of its agreement States.

Comment 2.3: EPA should not consider the cost and technical feasibility of regulation under Section 112 of the Clean Air Act. The congressional mandate directs EPA to adopt standards based exclusively on protection of public health (D-20).

Response: Section 112 of the Act requires EPA to establish emission standards for hazardous air pollutants that protect public health with an "ample margin of safety." EPA has interpreted that language to require standards that protect against significant or unreasonable public health risks. Similarly, Section 112 is construed to require standards that do not necessarily eliminate all public health risks, but minimize those risks without causing unreasonable social or economic impacts.

The merit of the Agency's interpretation is well demonstrated in the context of regulating carcinogens (such as radionuclides). EPA agrees with the current scientific consensus that there is no threshold level below which a carcinogen poses no risk to health. Consequently, to control a carcinogen so that it poses absolutely no health risk would require a standard permitting no emissions; yet such a standard could, and often would, prove beyond the technological or financial capacity of the affected industry to implement.

The benefits of a particular industry or activity may make some health risk reasonable to bear if eliminating the risk would entail significant societal harm. EPA believes that Congress intended that section 112 standards give primary emphasis to protecting public health, but not at all costs; instead, Congress sought standards which minimized risks to public health posed by a pollutant without causing unreasonable economic and societal consequences. Both the legislative history of the Clean Air Act and the Courts support such a common sense approach to setting standards for harzardous pollutants. See Industrial Union Department, AFL-CIO v. American Petroleum Institute, 448 U.S. 607, 642 (1980); Ethyl Corp. v. EPA, 541 F. 2d 1 (D.C. Cir. 1976), cert. den. 426 U.S. 941 (1976); H.R. Rep. No. 95-294, 95th Congress, 1st Sess. 43-51, 127.

Comment 2.4: The Administrative Procedures Act was violated by EPA by failing to provide adequate notice of its proposed rule. The EPA has not set forth the terms or substance of the proposed rule or a description of the subjects or issues involved with sufficient specificity to allow reasonable public comment (D-12).

Response: EPA maintains that the notice of proposed rulemaking provided sufficent detail of the issues involved and the possible regulatory actions to allow for reasonable public comment. This judgment is supported by the extent and detail of the public comment EPA has received on this rule.

Comment 2.5: Radionuclides should not be regulated under Section 112 of the Clean Air Act until a legal challenge to EPA's listing of radionuclides as a hazardous air pollutant is resolved (D-12).

Response: EPA has listed radionuclides as hazardous air pollutants under Section 112. In addition, under the terms of an order of the U.S. District Court of California, EPA must act with respect to uranium mills by August 15, 1986. Given this deadline, foregoing action at this time is not a legally available option.

Comment 2.6: EPA should consider alternative work practices and regulatory programs that more fully address localized or site specific circumstances (D-19).

Response: EPA has considered other alternative work practices but there are difficulties with all of them. For example, water covers would prevent radon emission but this would likely cause ground water contamination problems at most sites. The Agency feels it is proposing a rule that provides sufficient flexibility to protect the public health and safety. EPA is legally unable to propose site-specific criteria.

Comment 2.7: The proposed rule may impose regulations that are duplicative of and yet inconsistent with existing EPA and NRC rules (D-22).

Response: It is true that there are inconsistencies with several of the proposed alternatives as to which Federal agency will implement the new rule. The language of the final rule will correct this. The Agency is committed to work closely with NRC to avoid duplication of effort.

Comment 2.8: Mill operators should comply with the standard within 90 days as required by Section 112 (c) of the CAA unless an extension is granted on a site by site basis (D-20).

Response: Under Section 112(c)(1)(B) EPA may grant a waiver permitting a period of up to two years if necessary for the installation of controls. This waiver need not be site specific. The purpose of this waiver is to provide existing licensed operators the necessary time to meet the work practice standard. EPA believes it is not practical to design, license and build new mill tailings impoundments within two years. Much of this delay is occasioned by the many Atomic Energy Act requirements and NRC licensing procedures, and by the practicalities of constructing a new impoundment. Therefore, EPA will require mill tailings pile owners to comply to a strict schedule and build new impoundments as quickly as practical but within a maximum of 6 years. As a result, EPA believes that Section 112(c)(1)(B) is not applicable to these circumstances.

Comment 2.9: Ground water quality should not be considered in regulating radon-222 under Section 112 of the Clean Air Act (D-1, D-3, D-5, D-6, D-7, D-8, D-19, D-21).

Response: This rule does not regulate ground water. Ground water contamination is controlled by pre-existing

regulations prepared under the Uranium Mill Tailings Radiation Control Act. EPA has considered the effects of ground water on the environment and industry under this rule. However, if water cover is maintained or expanded in order to limit radon-222 emissions to the atmosphere, the potential for impacting ground water increases because of the greater hydraulic head. The Agency is also concerned that extended use of existing unlined piles could increase ground water impact problems.

Comment 2.10: The provision of the rule which requires owners to "begin negotiating a reclamation plan and an agreement to implement the plan with the NRC within one year..." would not be binding on NRC unless it is addressed in the EPA-NRC Memorandum of Understanding. (D-22)

Response: It is anticipated that the EPA-NRC Memorandum of Understanding will have to be updated as a result of this new rule.

Comment 2.11: There is an inconsistency between the EPA-NRC Memorandum of Understanding and the proposed rule as to which agency has implementation authority (D-22).

Response: This inconsistency will be corrected in the final rule. EPA will not usurp NRC implementation authority under this rule.

Comment 2.12: The basis for granting exemption under 61.252(b)(2) should be extended to include facilities in compliance with 40 CFR 192 secondary standard (D-21).

Response: The Agency has determined that existing impoundment designs of 40 acres or less that have a liner meeting the specifications of 40 CFR 246.221 will be provided an exemption from the schedule requirements. This liner requirement assures that the impoundment has the capability to retain water, thereby keeping tailings wet and greatly reducing radon-222 emissions.

3.1 Use of Interim Earth Cover and Design of New Impoundments

Comment 3.1.1: Interim cover is not practical at operating sites because tailings are discharged from the perimeter of an impoundment. Thus fresh tailings may be discharged onto interim covers. Operation of earth-moving equipment on wet areas is difficult. Fugitive dust from the cover material may be a problem. It is impractical to place interim cover on steep slopes of tailing sands. Interim cover on dams would interfere with monitoring of their stability. In addition, covering drains of these dams could impact their stability (D-1, D-3, D-8, D-12, D-18, D-19, D-21, D-22, D-23).

Response: The option of applying an interim earth cover to dry areas of tailings impoundments was reevaluated in the final Background Information Document (BID) and Economic Analysis (EA) to better assess its practicality, effectiveness, and cost. A detailed discussion of these aspects associated with interim cover has been incorporated into the BID both in Chapter 7 and Appendix C. Because of the significant uncertainties and difficulties associated with application of interim cover to dams constructed of coarse tailings, a revised explanation has been made. The revised evaluation assumes slopes remain uncovered, areas that are currently dry would be covered immediately, that a 5 year drying period is required before wet or ponded areas could be covered and that evaporation ponds would not be covered. The Agency concluded on the basis of this revised evaluation that interim cover is inappropriate as a generally applicable work practice.

Comment 3.1.2: There is no need for EPA to require an immediate earth cover to decrease radon-222 emissions at existing impoundments. The NRC and/or Agreement States, through licensing procedures, will force use of interim covers on a site-by-site basis when appropriate (D-3).

Response: The NRC does require application of an interim cover on impoundments on standby status to limit windblown tailings. While a thin cover (i.e. 1 foot) of coarse material may effectively limit fugitive emissions, its effectiveness in controlling radon-222 emissions is minimal. In contrast, the BID assumes that the cover material is a 1 meter thick homogeneous, silty, clay soil with an 8 percent moisture content. The function of this interim cover is to control radon-222 emissions whereas the basic function of the NRC's interim cover is to limit the quantity of tailings particles that are blown by wind from the impoundment. The EPA is not requiring an interim cover in the final rule.

Comment 3.1.3: Any regulation of the design of future tailings impoundments to achieve a reduction in radon-222 emissions should allow flexibility for site-specific considerations and not dictate one type of design (D-3, D-7, D-12, D-18, D-19, D-23).

Response: The standard will allow more than one type of technology to be used. It also allows for site-specific considerations in the design of future impoundments through petitions to the Administrator, if the proposed designs are sufficient to protect the public health and safety of nearby populations.

Comment 3.1.4: The industry has minimal experience with dewatering sands and no experience with dewatering slimes. Dewatered slimes would not be stable enough to support the cover. Therefore, continuous disposal is not practical from an operational standpoint (D-12, D-19).

Response: Tailings dewatering systems have been used successfully at nonferrous ore beneficiation mills. Although continuous disposal has never been actually practiced on uranium mill tailings in the United States, it has been proposed by industry as the preferred method of tailings disposal at three sites. A proposed mill on the East coast submitted plans for above grade, continuous disposal of dewatered tailings including a 40 foot thick cap. This operation was licensed but never constructed. Additionally, the Anaconda mining company proposed disposal of dewatered tailings in trenches with continuous covering as an alternative at the Bluewater mill. This option was never put into practice because of the downturn in uranium production. Pioneer Uravan also submitted plans for continuous disposal using belt filters. Umetco Minerals has proposed the use of dewatering and continuous disposal at the Uravan mill. The EPA believes that these proposals submitted by industry demonstrate that continuous disposal can be a viable option.

Comment 3.1.5: Earth cover is preferred as an interim cover, rather than water, for existing piles since it would reduce the potential for ground water contamination (D-15).

Response: EPA agrees that earth is the preferred cover material. The concern with potential ground water contamination was stated both in the BID and in the proposed standard. The use of water cover to control radon-222 emissions is most feasible at lined impoundments during relatively short stand-by periods.

Comment 3.1.6: Contrary to EPA's evaluation, the single-cell approach is more advantageous than either phased or continuous disposal impoundment design. It has less total surface area and provides better long-term containment (D-12).

Response: The single cell tailings impoundment design does have less total surface area than the other alternatives as shown in the BID. However, during operations and particularly during stand-by periods, the single cell impoundment has more exposed surface area from which radon-222 would be emitted. Additionally, when operations cease, the single cell impoundment would require dewatering and covering of the total impoundment area at one time. The phased and continuous impoundments have only a fraction of their total surface area exposed during operations and at closure. Thus, there is less potential for radon-222 emissions to escape if final closure is delayed for any reason. Similarly, if an extended stand-by period occurs during the life of the mill, less surface area of tailings is exposed with the phased and continuous alternatives. Each alternative is believed to provide the same degree of long term containment.

3.2 Dewatering Tailings and Phased Disposal

Comment 3.2.1: Technology to dewater tailings is believed to exist, but increased energy and manpower to accomplish this are probably too costly to be economically feasible (D-1, D-3, D-18).

Response: EPA believes this option can be economically feasible based on proposals for continuous disposal from the industries and on the evaluation presented in the BID.

Comment 3.2.2: A 20 acre cell for phased disposal is acceptable but the economic impact to operators due to this option must be assessed (D-1).

Response: The 20 acre cell size for the phased tailings disposal alternative was determined to be an acceptable size as described in the BID. The cost comparison of this option to the others is presented in the BID. Additionally, the final BID includes an evaluation of a three cell phased disposal option, each cell having about 40 acres. In the final rule we are requiring that tailings piles be no greater than 40 acres.

3.3 Other Types of Cover

Comment 3.3.1: Lead sheeting is being investigated as a possible cover for tailings impoundments (D-4).

Response: EPA will follow the progress of this investigation. Since the technology is not proved at this time, the Agency has not considered this as an alternate cover in their analysis.

Comment 3.3.2: A work practice standard related to maximizing the wet area of a tailings impoundment to reduce radon-222 would be acceptable at some sites (D-8, D-21).

Response: Such a practice was incorporated into the EPA's consideration of interim cover. Sites with lined impoundments and operational practices that keep tailings flooded during normal operations effectively control radon-222 emissions during operations. These practices are site specific and could not be used at most existing impoundments.

3.4 Groundwater Considerations

Comment 3.4.1: Maintaining a water cover on a lined impoundment has the following disadvantages: it would not allow reclamation in the shortest time, there may not be enough water to keep the impoundment flooded, a full impoundment has increased risk of failure, and the hydraulic head increases potential for leaks (D-18,D-22).

Response: The EPA agrees with the comment. For the reasons cited in this comment and in the response to comment 3.1.5, the preferred cover material in most cases is earth. However, a lined impoundment does retain more water as a result of normal operations. This extra water cover then reduces the radon-222 emissions.

Comment 3.4.2: Present and potential ground water contamination at uranium mills is not severe enough to justify shutdown of all unlined tailings impoundments (D-19).

Response: EPA is not considering the closure of tailings impoundments based on groundwater contamination under this rule. Ground water quality is already protected at licensed uranium tailings sites by existing EPA regulations. The radon emissions from existing tailings piles is of primary concern.

Comment 3.4.3: The NRC stated that recent literature indicates that a water cover may not be as effective in reducing radon emissions as previously thought (D-22).

Response: Recent technical assissments of radon emission rates from tailings indicate that radon emissions from tailings covered with less than one meter of water, or merely saturated with water, are about 2% of emissions from dry tailings. Tailings covered with more that one meter of water are estimated to have a zero emissions rate. The Agency believes this calculated difference between 0% and 2% is negligible. The Agency used an emission rate of zero for all tailings covered with water or saturated with water in estimating radon emissions.

3.5 Timing of Standard

Comment 3.5.1: One commenter stated that the assumption of a 40-year period between the end of an impoundment's useful life and compliance with Uranium Mill Tailings Radiation Control Act (UMTRCA) requirements is reasonable (D-1). Several other commenters, however, stated that EPA's assumption of 40 years is excessive (D-6, D-8, D-12, D-15, D-18, D-19).

Response: A 40-year time period between the end of an impoundments useful life and compliance with UMTRCA is believed by the EPA to represent a "worst-case" scenario. Reclamation may be accomplished under NRC's or the Agreement State's direction in a shorter time period. However, the Agency has evaluated the cumulative impacts (i.e. health effects) over this extended time to serve as a point of reference. The Agency has evaluated in the final Economic Analysis a 20 year period. This time period is being used in our calculations of costs and benefits for the final rule.

Comment 3.5.2: Permits for new tailings management processes can be obtained in 1 year (D-1, D-21). Implementing and permitting new technologies may take substantially longer (D-21). The entire process of acquisition, design, licensing and construction is more like 6.5 years (D-8, D-18, D-19). It also could take more than 10 years (D-12).

Response: Based on the comments received from the NRC, Agreement States, and individual companies, EPA realizes that three years for constructing and operating a new tailings pile is too short a time. The Agency now considers 6 years as the time needed to design, permit, and construct a new tailings impoundment.

Comment 3.5.3: Setting a time limit on use of existing tailings impoundments would preclude utilizing full capacity and have adverse economic impacts on operators (D-3, D-6, D-12).

Response: The EPA is aware that setting a time at which the use of existing impoundments would cease would have economic impacts. The Economic Analysis includes this cost of lost capacity in the evaluation of the different time frames considered. However, it is difficult to evaluate these costs since the future of the industry is uncertain.

3.6 Evaporation Ponds

Comment 3.6.1: Properly designed (i.e., lined) and constructed evaporation ponds provide adequate protection for public health and the environment (D-1, D-12, D-18, D-19).

Response: Since phased and continuous tailings disposal methods require evaporation ponds, any health or environmental problem associated with the ponds is important. The Agency agrees that adequate health and environmental protection is provided with a properly designed pond.

3.7 Source Term Estimates

Comment 3.7.1: EPA assumed that radium-226 is evenly distributed; however, coarser sands are much lower in radium-226 content and yield lower radon-222 emissions (D-6).

Response: The Agency is aware that radium-226 is not uniformly distributed in the tailings. The fines contain much higher radium-226 and the sands contain less radium-226. Data on the variations of flux and radium over the surface of individual piles is not known at this time. Reported radium-226 concentrations represent average values reported by milling companies and are based on their measurements and/or estimates. This is considered to be the best available data.

Comment 3.7.2: The area of tailings and/or radium-226 contents used in BID are not correct (D-6, D-8).

Response: Tailings areas were based on aerial photographs taken in the late summer of 1985. Radium-226 concentrations were based on the milling company's measurements or previous EPA estimates and are considered to be the best available data. Corrections to this data does not affect the overall results by more that 10%.

Comment 3.7.3: More accurate site-specific emanation factors should be used as opposed to using the relationship of 1 pCi/m^2s per pCi Ra-226/g tailings (D-12, D-13, D-14).

Response: Site-specific emanation factors were not used because most of the information needed to estimate these factors, such as moisture content, porosity, density, and emanating power, are not known for each site. The Agency thus used a conservative factor of 1 pCi/m^2s per pCi Ra-226/g of tailings for all dry areas and a factor of zero for wet areas.

Comment 3.7.4: Water may not be as effective in reducing radon-222 as previously thought (D-21).

Response: As stated in the response to Comment 3.7.3, the Agency believes that the use of a conservative emanation factor adequately approximates the overall rate. We acknowledge that water may not be 100 percent effective as a radon-222 control.

3.8 Mill Descriptions

Comment 3.8.1: Site-specific corrections im mill and tailings impoundment descriptions should be made (D-11, D-19).

Response: Corrections in mill and impoundment descriptions will be made in the final BID where appropriate based on comments from the industry.

3.9 Alternative Standards

Comment 3.9.1: A site-specific alternative standard based on radium-226 content and a risk of 1 in a million should be set for each mill to determine the allowable exposed surface area (D-20).

Response: Setting a site-specific standard for each mill requires detailed knowledge about its size, radium-226 content of the tailings, and information on local meteorology and topography. The radium-226 content of the tailings also varies widely, especially between the sands and fines fractions. The Agency has not accepted the proposition that the standard must reduce risk to a level of 1 in a million. EPA believes that it must protect the public with an ample margin of safety which is met by the final rule.

Comment 3.9.2: An emission standard should also be implemented to monitor emissions (D-15, D-22).

Response: The Agency did consider an emission standard. It was felt that boundaries could be changed to comply with an emission standard which is not an acceptable practice under the Clean Air Act. Also, methods to determine emissions from tailings piles also have not been sufficiently developed to provide accurate and consistent measurements of radon emissions.

Section 4: RISK ASSESSMENT

4.1 Risk Modeling and Estimates

Comment 4.1.1: Risks from radon-222 are very approximate and overestimated. Lower relative risk coefficients should be used. EPA should stress the low side of the risk which is zero (D-2, D-5, D-6, D-8, D-12, D-19, D-21).

Response: Scientific evidence does not support the idea of a threshold at low doses below which the risk coefficient for cancer induction by radon daughters approaches zero. On the contrary, laboratory studies of *in vitro* cell transformation and of cancer induction in animals indicate that the risk per unit dose of alpha radiation is maximal at low doses and dose rates. Epidemiological studies of miners exposed to radon also show a decreasing risk coefficient at higher doses and dose rates.

For any carcinogen, however potent, there will always be a dose level below which it becomes practically impossible to directly demonstrate harm in a human population. In particular, it may never be possible to observe harmful effects of radiation at dose levels comparable to natural background or below. Risk estimates in this dose region are derived through empirical extrapolations and theoretical calculations based on the entire body of relevant scientific evidence.

It remains the view of EPA that a risk coefficient of 1%-4%/WLM, is reasonable in light of current evidence from epidemiological studies of miners. This view has been endorsed by an independent group of experts, the Radiation Advisory Committee of the Agency's Science Advisory Board.

The substantially lower risk estimates which have been suggested are in general either based (1) solely on analysis of the U.S. miner data set, failing to take into account the evidence for decreasing risk per unit dose at high doses and the probable upward bias in dose estimates or (2) on model assumptions which do not seem prudent in light of current evidence (e.g., an absolute risk coefficient which decreases over time).

It should also be noted that in extrapolating its risk estimates from miners to the general public, EPA employs an "exposure equivalent", which corrects for the lower average breathing rate in the latter. This correction effectively implies about a 40% reduction in the risk estimate for average

members of the general public. Some recent dosimetric calculations, however, suggest that radon daughter deposition in the lung may vary only slightly with breathing rate. As a result, there can be little support for the contention that the range of risk coefficients used by EPA represent a substantial overestimate in light of current evidence.

Comment 4.1.1a: The linear nonthreshold hypothesis and relative risk model have not been affirmed (D-19).

Response: The statement referred in the Draft BID was meant to convey the point that recent evidence has lent support to these assumptions. The word "affirm" was too strong, and the statement has been modified accordingly.

Comment 4.1.2: Radon-222 exposure from mill tailings on a regional and national level is overshadowed by background radon-222 sources. Therefore, making regional and national risk estimates is meaningless because it is indistinguishable from other sources (D-2, D-5, D-6, D-7, D-8, D-21).

Response: It is acknowledged that radon exposures from mill tailings, at locations distant from mill tailings sites, are small compared to exposures from other sources. It does not, however, follow that it is meaningless to calculate exposure and risk due to emissions from such sites. These calculations are based on procedures generally regarded as sufficiently accurate to support a rulemaking. The significance of the risk is based on the absolute value of the risk and the practicality of control measures.

Comment 4.1.3: The calculated individual lifetime exposure risks are not realistic because: (1) people do not live at the point of maximum exposure for a lifetime; (2) tailings are covered in less than a lifetime; and (3) risk estimates are questionable because they are based on assumptions for radon-222 emissions, lifetime exposures, occupancy figures, nearby populations, and WLM-to-risk factors that are all high (D-2, D-5, D-6, D-12, D-19, D-21).

Response: The Agency has noted that "Estimates of risks to nearby individuals must be interpreted cautiously, as few people generally spend their whole lives at such locations." (draft BID, p. 6-1). The assumptions used to estimate occupancy and risk factors are documented in Chapter 2, those for radon-222 emissions in Chapter 5, and those for population exposed in Chapter 6 of the draft BID. EPA believes these assumptions are a reasonable basis for a rulemaking.

Shorter periods of exposure, as might be associated with an active pile, do not necessarily change conclusions about the associated risk in a direct proportionality, although shortening the time of exposure does diminish the risk. Risk is related to age at first exposure and duration of exposure. Exposures of 5 years or more generally constitute an appreciable proportion of the risk of lifetime exposure (see table below).

Percent of Lifetime Risk for Lifetime Exposures Accumulated in Shorter Time Periods

Age at first Exposure	Duration of Exposure				
	5 yrs	10 yrs	20 yrs	30 yr	Lifetime
Birth	11%	25%	47%	61%	100%
25 years	8%	16%	29%	41%	50%
40 years	8%	14%	23%	28%	29%

If tailings are uncovered for at least 20 years,the difference between the risk associated with the pile for that time period or for 70 years or more (lifetime) is less than a factor of two.

Comment 4.1.5: EPA should base any radon-222 standard on actual measured exposure near tailings impoundments (D-5, D-6).

Response: Due to time constraints we have not been able to gather sufficient data on actual exposure measurements to individuals near tailings piles. Exposures based on models have been used for developing the standard. A population study was conducted by EPA in 1983 to determine actual populations near active uranium mills.

Comment 4.1.6: Effective radon-222 decay product equilibrium factors are incorrect because they are based on a simple model that ignores atmospheric removal processes such as plate-out (D-12, D-19, D-21).

Response: The outdoor equilibrium fraction used by EPA is limited to 0.85 in order to take into consideration atmospheric removal processes. The outdoor equilibrium value used to calculate the effective equilibrium fraction is for the released radon-222 which has been transported to the location under consideration. This value can be substantially greater than a measured equilibrium fraction since that value is influenced by the equilibrium fractions for all sources of radon-222.

Comment 4.1.7: EPA has not, but should, include the risk from radon-222 exposure due to windblown tailings around the mill sites (D-18).

Response: The radon-222 exposure from windblown tailings was not considered as a source because it is believed to be small compared to exposures due to radon-222 from the pile. Also, an extensive field study would be necessary to obtain data necessary to make this correction.

Comment 4.1.8: Exposure and dose should be evaluated on a site-specific basis over the estimated life of each tailings impoundment. The model used disregards concentration differences resulting from average wind rose data at each site (D-21).

Response: Meterological data (wind rose and stability arrays) were not available for each tailings impoundment. Meterological data from representative nearby reporting areas was used for each site. Obtaining site special meterological data for each individual site would have imposed unacceptable time delays and financial burdens on performing a timely risk assessment.

4.2 Significance of Risk

Comment 4.2.1: Significance of the radon effects from mill tailings on total population is negligible. There are no proven adverse health effects (D-2, D-3, D-6, D-8, D-12, D-13, D-19).

Response: Adverse health effects due to radon-222 emissions from mill tailings piles cannot be directly measured because of the very high incidence of lung cancer attributable to other causes. However, it would be imprudent to regulate exposure to carcinogens on that basis. It is the position of EPA that, based on current scientific evidence, excess lung cancers can result from radon-222 emitted by tailings piles and that the numbers of cancers calculated in the BID are a reasonable estimate.

Comment 4.2.2: Under Section 112 of the Clean Air Act, EPA must prove a significant risk of harm to public health before a standard is implemented. EPA has failed to prove that radon-222 emissions pose risk sufficient to justify regulation under CAA (D-6, D-12, D-19).

Response: EPA maintains that the record supports its contention that radon-222 emissions pose a sufficent public health risk. Our model indicates that persons living near an active uranium mill tailings pile may have a risk of 1 in 100 of developing lung cancer over their lifetime. It is estimated that the number of fatal cancers to the local, regional and national populations may be as high as 2 to 9 deaths due to the operating piles.

4.3 Risk Levels

Comment 4.3.1: Nearby individuals are to be protected from excess risk as well as large populations. The standard must be, but is not, sufficient to reduce each individual's risk attributable to emission from the mill and tailings to a de minimis level of 1 in a million (D-20).

Response: The Agency feels that reducing the risk to 1 in a million for radon-222 is too low a level to be practical and that the Clean Air Act does not require EPA to protect all individuals at a 1 in a million risk level. The Agency's position in this matter is discussed in the response to Comment 2.3.

Comment 4.3.2: Risks should not be compared with general population cancer risks but instead with lung cancer risk for a prudent person who has avoided exposure to high risk contaminants (e.g., cigarette smoke) in the course of his or her daily life (D-20).

Response: There is some evidence that non-smokers are at lower risk from radon exposure than smokers. This has been implicitly assumed by EPA in adopting a relative risk model in which exposures to radon daughters act multiplicatively with other carcinogens in inducing lung cancer. Thus, as the baseline rate of lung cancer in the U.S. has risen, primarily due to the effects of cigarette smoking, EPA has revised its estimates of the number of radon daughter induced lung cancers upward proportionally.

Based on the EPA model, individuals at low risk for lung cancer (e.g., non-smokers) would have the same relative increase in their risk from a given exposure to radon as would individuals at high risk for the disease (e.g., heavy cigarette smokers). Therefore, the proposed standard is, from the standpoint of absolute risk, more protective of individuals in the former group.

Comment 4.3.3: The NRC stated it continues to believe the existing release limits and interim stabilization practices to be adequate to protect public health and safety under their legislative mandates (D-22).

Response: The existing release limits are the concentration limits listed in the Commission's rule 10 CFR 20. The concentration limit for radon-222 is 3 pCi/l in this rule for any uncontrolled area. A person exposed to this concentration for their entire lifetime would incur a risk of about one in one hundred. The Agency judges that the regulatory standards established by this regulation are necessary to meet the requirements of Section 112 of the Clean Air Act. EPA believes

that the phased management scheme of this standard provides significant additional health benefits in keeping with the "ample margin of safety" provision of Section 112. This is shown in the following table on cost-effectiveness estimates:

Alternative Work Practice Standards for Controlling Radon-222 Emissions from Existing Piles
(Assumes Low Yellowcake Demand Scenario and 20 year Baseline)

Alternative	Benefits[b] (Lung Cancers Averted)	Costs[c] ($ M)	Cost Effectiveness Estimates[a] Average Costs Discounted[e]	Average C and B Discounted[f]	Incremental[d] Costs Discounted[e]	Incremental[d] C and B Discounted[f]
1. Status Quo	0 (0%)[g]	0 (0)				
2. New Tech. in 15 years	31 (25%)	64 (0)	2	7	2	7
3. New Tech. in 10 years	50 (40%)	166(33)	3	10	5	13
4. New Tech. in 5 years	65 (52%)	279(78)	3	11	8	13
1. Status Quo	0 (0%)[g]	0 (0)				
2. Interim[h] Cover	36 (29%)	131	4	8	4	8

(a) Expressed as $M per fatal lung cancers averted; benefits expressed as midrange of estimates; benefits at high confidence level would be twice shown and C/B would be half.
(b) 124 Lung cancers in absence of controls; benefits expressed in fatal lung cancers avoided in 100 years.
(c) Present value costs for early disposal and replacement capacity, in millions of 1985 dollars, discounted at 5%, ( ) are replacement capacity costs only.
(d) Incremental to above alternative.
(e) Costs discounted at 5%, benefits not discounted.
(f) Costs and benefits discounted at 5%.
(g) Percent of the 124 cancers in absence of controls.
(h) Incremented to Status Quo (option # 1).

Section 5: ECONOMIC ANALYSIS

Comment 5.1: Proposed rules will have significant adverse effects on industry's ability to contain costs and threaten the industry's future. The costs of complying with the proposed regulation is unreasonable. Therefore the regulation should be rejected (D-3, D-5, D-6, D-7, D-12, D-19, D-21).

Response: Control measures to meet the provisions of the final rule do have significant impact on the conventional uranium mining and milling industry. As stated in the Economic Analysis for this rulemaking, EPA projects that this impact, although significant, will not threaten the viability of this industry. The EPA also feels that the costs are reasonable in relation to the benefits derived and consistent with previous Agency actions.

Comment 5.2: EPA should calculate cost benefit ratio to justify a standard (D-3, D-5).

Response: EPA's policy is not to establish a dollar value on life, or on the morbidity effects of cancer. Therefore, in the case of radiation risks, costs and benefits are not expressable in commensurate units, so a cost benefit ratio is not calculated.

Comment 5.3: EPA's uranium production projections are fundamentally flawed. The number of future mills and projected volume of tailings are vastly overestimated. As a result, EPA has not established an appropriate model for evaluating any of its regulatory proposals (D-12).

Response: It is agreed that it is difficult to predict the future of the conventional uranium mining and milling industry. In addition to all unknowns associated with the projected future of the nuclear power industry is the inability to foresee how Congress will react to the present problems of this industry.

As stated in the Economic Analysis, EPA has assumed that imports will continue to be a significant factor in the market for uranium fuel, but that they will not take over the entire market. Thus the domestic fuel production remains viable. This implicitly assumes that Congress does act to restrict imports sufficiently to maintain a viable, conventional,

domestic mining and milling industry. In the model used for the Economic Analysis, EPA assumes that the domestic conventional mining and milling industry attains viability within a short time (1 to 3 years) and maintains this viability well into the future. We do not, however, assume that the industry ever becomes large, or flourishes in a manner similar to its structure in 1979-1980. The growth rates assumed are low, somewhat below the Department of Energy's low growth projection through the year 2000. EPA than assumes only modest growth beyond the year 2000.

Comment 5.4: EPA's standard threatens the economic value of the uranium ore in the ground because it threatens the viability of the conventional uranium mining and milling industry (D-6).

Response: It is true that the economic value of much of the uranium ore in the ground is dependent upon the viability of the conventional uranium mining and milling industry, and if this industry does not maintain viability, the value of this ore will disappear. This is true in the presence or absence of EPA's standard. As stated previously, EPA has projected that the conventional mining and milling industry will attain viability and be sufficiently strong to absorb the costs of the regulations proposed under this rulemaking.

Comment 5.5: If EPA requires interim cover on existing piles, the volume of this cover threatens the economic value of the remaining capacity of these piles (D-6).

Response: The Nuclear Regulatory Commission has estimated that a one meter interim cover on all piles will use up approximately fifty percent of the total remaining capacity of all existing mill tailing plies (EPA BID). However, the total remaining capacity on these piles is much larger than needed to sustain the industry at the growth rates projected by EPA in its economic analysis. Therefore, lost capacity on existing piles does not threaten the overall viability of the milling industry. However, the viability of some individual mills with little remaining capacity on their piles are threatened. EPA is not requiring interim cover in its final rulemaking.

Comment 5.6: The cost of EPA's standard is not justified on the basis of the cancers prevented (D-2).

Response: Uncontrolled emissions from uranium mill tailings piles impose significant risk of concer to those persons residing in close proximity to the piles and to the U.S. population. The benefit to be derived from this standard is the reduction in this risk. The costs and benefits of reducing the risk to the U.S. population for alternative control levels were compared in establishing this standard. The costs per health effect averted for this standard are in accord with EPA practice and with other standards promulgated under the Clean Air Act. An additional benefit that cannot be quantified, therefore cannot be considered in a benefit-cost evaluation, is that controls significantly reduce the risk to maximally exposed individuals (those residing near the piles), thereby reducing the disparity in the range of risks imposed on the population.

The Agency does expect that extensions would be granted for mills having piles smaller than 200 acres and having no people living within 5 kilometers of the pile. Such mills are remote enough to present small risks to maximally exposed individuals and are small enough to present very small risks to regional and national populations.

APPENDIX A

LIST OF COMMENTERS

A.1 Introduction

The following is a list of the commenters whose comments were responded to in this document. The identification number used in this document is the same number used by the EPA Docket Section (except that the Docket number A-79-11, Category: VIII is deleted from each number). Where there are missing sequential numbers, it means that the document material was not a letter of comment but some other reference material.

A.2 Commenter Listing

Comment No	Category	Date Docketed
D-1	Wyoming Department of Environmental Quality	3/13/86
D-2	State of Utah Department of Health	4/01/86
D-3	Pathfinder Mines Corp.	4/04/86
D-4	St. Joe Minerals Corp.	4/02/86
D-5	The Colorado Mining Association	4/22/86
D-6	Umetco Minerals Corp.	4/22/86
D-7	State of Wyoming Office of the Governor	4/24/86
D-8	Chevron Resources Company	4/24/86
D-9	Hecla Mining Company	4/24/86
D-11	Atlas Minerals	4/28/86
D-12	Kerr-McGee Corp. and Quivira Mining Company	4/28/86

Comment No	Category	Date Docketed
D-13	Rocky Mountain Energy	4/28/86
D-14	Hamel and Park for AMC	4/30/86
D-15	The Navajo Nation	4/30/86
D-18	New Mexico Environmental Improvement Division	4/30/86
D-19	American Mining Congress (AMC)	4/30/86
D-20	Environmental Defense Fund	5/02/86
D-21	Texas Dept. of Health	5/16/86
D-22	U.S. Nuclear Regulatory Commission (NRC)	5/28/86
D-23	U. S. Department of the Interior	7/10/86

*U.S. GOVERNMENT PRINTING OFFICE: 1986—621-735/60534

From:	Thornton, Marisa on behalf of Collections.SubW
To:	Thornton, Marisa
Subject:	Fw: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents
Date:	Monday, January 09, 2017 11:12:53 AM

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:37 PM
To: Collections.SubW
Subject: FW: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

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From: Nesky, Anthony
Sent: Tuesday, November 22, 2016 4:31 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

I have already uploaded Volume 2. Could I trouble you for the link to the 1989 RTC?

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov

From: Schultheisz, Daniel
Sent: Tuesday, November 22, 2016 4:29 PM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Subject: RE: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

Here are the response to comments document and the BID from the 1986 rulemaking. I guess I don't have the 1989 RTC saved, but did have it open online. It's in NEPIS. I can find it along with the 1989 risk assessment (BID Volume 2) if you don't want to look.

The link to the White Mesa reports on the State of Utah website is http://www.deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm. Look under "Reports" and select "Annual Tailings Wastewater Sampling Report." The 2014 and 2015 reports are the ones to put in the docket.

From: Nesky, Anthony

Sent: Tuesday, November 22, 2016 3:51 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

This is a good time for me to maintain the Docket. Please send me the other two documents that you wanted posted there.

Tony Nesky
Center for Radiation Information and Outreach
Tel: 202-343-9597
nesky.tony@epa.gov

From: Thornton, Marisa on behalf of Collections.SubW
To: Thornton, Marisa
Subject: Fw: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents
Date: Monday, January 09, 2017 11:12:37 AM
Attachments: 1989 NESHAPs RTC.pdf

From: Schultheisz, Daniel
Sent: Thursday, December 22, 2016 3:37 PM
To: Collections.SubW
Subject: FW: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

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From: Schultheisz, Daniel
Sent: Tuesday, November 22, 2016 4:46 PM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Subject: RE: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

Attached. I decided to save it.

From: Nesky, Anthony
Sent: Tuesday, November 22, 2016 4:31 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: RE: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

I have already uploaded Volume 2. Could I trouble you for the link to the 1989 RTC?

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From: Schultheisz, Daniel
Sent: Tuesday, November 22, 2016 4:29 PM
To: Nesky, Anthony <Nesky.Tony@epa.gov>
Subject: RE: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

Here are the response to comments document and the BID from the 1986 rulemaking. I guess I don't

have the 1989 RTC saved, but did have it open online. It's in NEPIS. I can find it along with the 1989 risk assessment (BID Volume 2) if you don't want to look.

The link to the White Mesa reports on the State of Utah website is http://www.deq.utah.gov/businesses/E/energyfuels/whitemesamill.htm. Look under "Reports" and select "Annual Tailings Wastewater Sampling Report." The 2014 and 2015 reports are the ones to put in the docket.

From: Nesky, Anthony
Sent: Tuesday, November 22, 2016 3:51 PM
To: Schultheisz, Daniel <Schultheisz.Daniel@epa.gov>
Subject: Volume 2 Risk Assessment submitted to the Docket; please send me the other documents

This is a good time for me to maintain the Docket. Please send me the other two documents that you wanted posted there.

Tony Nesky
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