

**ENVIRONMENTAL PROTECTION AGENCY****40 CFR Part 50**

[EPA-HQ-OAR-2007-1145; FRL-9449-1]

RIN 2060-A072

**Public Hearing for Secondary National Ambient Air Quality Standards for Oxides of Nitrogen and Sulfur****AGENCY:** Environmental Protection Agency (EPA).**ACTION:** Announcement of public hearing.

**SUMMARY:** The EPA is announcing a public hearing to be held for the proposed rule titled “Secondary National Ambient Air Quality Standards for Oxides of Nitrogen and Sulfur” which was published in the **Federal Register** on August 1, 2011. The hearing will be held in Arlington, Virginia on Thursday, August 25, 2011.

**DATES:** The public hearing will be held on August 25, 2011. Please refer to **SUPPLEMENTARY INFORMATION** for additional information on the public hearing.

**ADDRESSES:** *Hearing.* The hearing will be held at the following location: Potomac Yard Conferencing Center, First Floor Conference Room South, Room S-1204-06), Office of Pesticides Programs, 1 Potomac Yard, 2777 S. Crystal Drive, Arlington, Virginia 22202, phone: 703-347-8930.

**Note:** All persons entering the Potomac Yard Conferencing Center must have a valid picture ID such as a driver's license and go through federal security procedures. All persons must go through a magnetometer and all personal items must go through x-ray equipment, similar to airport security procedures. After passing through the equipment, all persons must sign in at the guard station and show their picture ID.

*Comments.* Written comments on this proposed rule may also be submitted to the EPA electronically, by mail, by facsimile, or through hand delivery/courier. Please refer to the notice of proposed rulemaking published in the **Federal Register** on August 1, 2011, (76 FR 46084) for the addresses and detailed instructions for submitting written comments.

A complete set of documents related to the proposal is available for public inspection at the EPA Docket Center, located at 1301 Constitution Avenue, NW., Room 3334, Washington, DC between 8:30 a.m. and 4:30 p.m., Monday through Friday, excluding legal holidays. A reasonable fee may be charged for copying. Documents are also

available through the electronic docket system at <http://www.regulations.gov>.

The EPA Web site for the rulemaking, which includes the proposal and information about the public hearing, can be found at: [http://www.epa.gov/ttn/naaqs/standards/no2so2sec/cr\\_fr.html](http://www.epa.gov/ttn/naaqs/standards/no2so2sec/cr_fr.html).

**FOR FURTHER INFORMATION CONTACT:** If you would like to speak at the public hearing or have questions concerning the public hearing, please contact Mrs. Sherry Russell at the address given below under **SUPPLEMENTARY INFORMATION**.

Questions concerning the “Secondary National Ambient Air Quality Standards for Oxides of Nitrogen and Sulfur” proposed rule should be addressed to Rich Scheffe, U.S. EPA, Office of Air Quality Planning and Standards, Air Quality Assessment Division, (C304-02), Research Triangle Park, NC 27711, telephone: (919) 541-4650, e-mail: [scheffe.rich@epa.gov](mailto:scheffe.rich@epa.gov).

**SUPPLEMENTARY INFORMATION:** The proposal for which the EPA is holding a public hearing was published in the **Federal Register** on August 1, 2011, (76 FR 46084) and is available on the following Web site: [http://www.epa.gov/ttn/naaqs/standards/no2so2sec/cr\\_fr.html](http://www.epa.gov/ttn/naaqs/standards/no2so2sec/cr_fr.html).

The public hearing will provide interested parties the opportunity to present data, views, or arguments concerning the proposed rule. The EPA may ask clarifying questions during the oral presentations, but will not respond to the presentations at that time. Written statements and supporting information submitted during the comment period will be considered with the same weight as any oral comments and supporting information presented at the public hearing. Written comments must be postmarked by the last day of the comment period, as specified in the proposal.

The public hearing will be held in Arlington, Virginia on August 25, 2011. The public hearing will begin at 10 a.m. and continue until 7 p.m. or later, if necessary, depending on the number of speakers wishing to participate. The EPA will make every effort to accommodate all speakers that arrive and register before 7 p.m. The EPA is scheduling a lunch break from 1 until 2:30 p.m. If you would like to present oral testimony at the hearing, please notify Mrs. Sherry Russell, (C504-02) U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, e-mail (preferred method for registering): [russell.sherry@epa.gov](mailto:russell.sherry@epa.gov); telephone: (919) 541-0306 no later than 5 p.m. on August 23, 2011. She will arrange a general time slot for you to

speak. The EPA will make every effort to follow the schedule as closely as possible on the day of the hearing.

Oral testimony will be limited to five (5) minutes for each commenter to address the proposal. We will not be providing equipment for commenters to show overhead slides or make computerized slide presentations unless we receive special requests in advance. Commenters should notify Mrs. Russell if they will need specific audiovisual (AV) equipment. Commenters should also notify Mrs. Russell if they need specific translation services for non-English speaking commenters. The EPA encourages commenters to provide written versions of their oral testimonies either electronically on computer disk or CD-ROM or in paper copy.

The hearing schedule, including lists of speakers, will be posted on EPA's Web site for the proposal at [http://www.epa.gov/ttn/naaqs/standards/no2so2sec/cr\\_fr.html](http://www.epa.gov/ttn/naaqs/standards/no2so2sec/cr_fr.html) prior to the hearing. A verbatim transcript of the hearing and written statements will be included in the rulemaking docket.

**How can I get copies of this document and other related information?**

The EPA has established the official public docket for the “Secondary National Ambient Air Quality Standards for Oxides of Nitrogen and Sulfur” under Docket Number EPA-HQ-OAR-2007-1145. The EPA has also developed a Web site for the proposal at the address given above. Please refer to the proposal, published in the **Federal Register** on August 1, 2011, (76 FR 46084) for detailed information on accessing information related to the proposal.

Dated: August 2, 2011.

**Mary Henigin,**

*Acting Director, Office of Air Quality Planning and Standards.*

[FR Doc. 2011-20029 Filed 8-5-11; 8:45 am]

**BILLING CODE 6560-50-P**

**ENVIRONMENTAL PROTECTION AGENCY****40 CFR Parts 260 and 261**

[EPA-HQ-RCRA-2010-0695; FRL-9448-9]

RIN 2050-AG60

**Hazardous Waste Management System: Identification and Listing of Hazardous Waste: Carbon Dioxide (CO<sub>2</sub>) Streams in Geologic Sequestration Activities****AGENCY:** Environmental Protection Agency.**ACTION:** Proposed rule.

**SUMMARY:** The Environmental Protection Agency (EPA or the Agency) is proposing to revise the regulations for hazardous waste management under the Resource Conservation and Recovery Act (RCRA) to conditionally exclude carbon dioxide (CO<sub>2</sub>) streams that are hazardous from the definition of hazardous waste, provided these hazardous CO<sub>2</sub> streams are captured from emission sources, are injected into Class VI Underground Injection Control (UIC) wells for purposes of geologic sequestration (GS), and meet certain other conditions. EPA is taking this action because the Agency believes that the management of these CO<sub>2</sub> streams under the proposed conditions does not present a substantial risk to human health or the environment, and therefore additional regulation pursuant to RCRA's hazardous waste regulations is unnecessary. EPA expects that this amendment will substantially reduce the uncertainty associated with identifying these CO<sub>2</sub> streams under RCRA subtitle C, and will also facilitate the deployment of GS by providing additional regulatory certainty.

**DATES:** Comments must be received on or before October 7, 2011. Under the Paperwork Reduction Act, comments on the information collection provisions must be received by the Office of Management and Budget (OMB) on or before September 7, 2011.

**ADDRESSES:** Submit your comments, identified by Docket ID No. EPA-HQ-RCRA-2010-0695, by one of the following methods:

- <http://www.regulations.gov>: Follow the on-line instructions for submitting comments.

- *E-mail:* [rcra-docket@epa.gov](mailto:rcra-docket@epa.gov).

- *Fax:* 202-566-9744

- *Mail:* RCRA Docket, Environmental Protection Agency, Mailcode: 28221T, 1200 Pennsylvania Ave., NW., Washington, DC 20460. Please include a total of two copies. In addition, please mail a copy of your comments on the information collection provisions to the Office of Information and Regulatory Affairs, Office of Management and Budget, Attn: Desk Officer for EPA, 725 17th St., NW., Washington, DC 20503.

- *Hand Delivery:* Deliver two copies of your comments to EPA West Building, Room 3334, 1301 Constitution Avenue, NW., Washington, DC 20460. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

**Instructions:** Direct your comments to Docket ID No. EPA-HQ-RCRA-2010-0695. EPA's policy is that all comments

received will be included in the public docket without change and may be made available online at <http://www.regulations.gov>, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through <http://www.regulations.gov> or e-mail. The <http://www.regulations.gov> Web site is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through <http://www.regulations.gov>, your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket, visit the EPA Docket Center homepage at <http://www.epa.gov/epahome/dockets.htm>. For additional instructions on submitting comments, go to the **SUPPLEMENTARY INFORMATION** section of this document.

**Docket:** All documents in the docket are listed in the <http://www.regulations.gov> index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in <http://www.regulations.gov> or in hard copy at the RCRA Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the RCRA Docket is (202) 566-0270.

**FOR FURTHER INFORMATION CONTACT:** Ross Elliott, Office of Resource Conservation and Recovery (5304P), Environmental Protection Agency, 1200 Pennsylvania Avenue, NW., Washington, DC 20460; telephone number: 703-308-8748; fax number: 703-308-0514; e-mail address [elliott.ross@epa.gov](mailto:elliott.ross@epa.gov).

**SUPPLEMENTARY INFORMATION:**

**A. Does this action apply to me?**

This is a proposed regulation. If finalized, this rule may apply to generators, transporters, and owners or operators of treatment, storage, and disposal facilities engaged in the management of carbon dioxide streams that would otherwise be regulated as hazardous wastes under the RCRA subtitle C hazardous waste regulations as part of geologic sequestration activities. This includes entities in the following industries: Operators of carbon dioxide injection wells used for geologic sequestration; and certain industries identified by their North American Industry Classification System (NAICS) code: oil and gas extraction facilities (NAICS 211111); utilities (NAICS 22); transportation (NAICS 48-49); and manufacturing (NAICS 31-33). More detailed information on the potentially affected entities is presented in Section VI of this preamble. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

**B. What should I consider as I prepare my comments for EPA?**

1. *Submitting CBI.* Do not submit this information to EPA through <http://www.regulations.gov> or e-mail. Clearly mark the part or all of the information that you claim to be CBI. For CBI information on a disk or CD-ROM that you mail to EPA, mark the outside of the disk or CD-ROM as CBI and then identify electronically within the disk or CD-ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information so marked will not be disclosed except in accordance with the procedures set forth in 40 CFR part 2.

2. *Tips for Preparing Your Comments.* When submitting comments, remember to:

- Identify the rulemaking by docket number and other identifying information (subject heading, **Federal Register** date and page number).

• Follow directions—The agency may ask you to respond to specific questions or organize comments by referencing a Code of Federal Regulations (CFR) part or section number.

• Explain why you agree or disagree, suggest alternatives, and substitute language for your requested changes.

• Describe any assumptions and provide any technical information and/or data that you used.

• If you estimate potential costs or burdens, explain how you arrived at your estimate in sufficient detail to allow for it to be reproduced.

• Provide specific examples to illustrate your concerns, and suggest alternatives.

• Explain your views as clearly as possible.

• Make sure to submit your comments by the comment period deadline identified.

3. *Docket Copying Costs.* The Docket Center no longer has hard copies of original OSWER documents. The documents were converted to PDF format. Oversized documents were retained and may be copied. Patrons are allowed 93 free copied-pages.

Thereafter, they are charged 15 cents per page. When necessary, an invoice stating how many copies were made, the cost of the order, and where to send a check will be issued to the patron. There is also an administrative fee of \$14.00 added to the cost of the order.

Documents also are available on microfilm. The EPA/DC staff can help patrons locate needed documents and operate the microfilm machines. There is no fee for printing documents from microfilm or microfiche.

Patrons who are outside of the metropolitan Washington, DC, area can request documents by telephone, however, patrons are asked to submit requests by e-mail to ensure accuracy. The photocopying fee is the same as for walk-in patrons. There is no charge for converting microfilm/microfiche to PDF format and sending it to a customer. If an invoice is necessary, EPA/DC staff can mail one with the order.

## Preamble Outline

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  - G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks
  - H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Usage
  - I. National Technology Transfer and Advancement Act
  - J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

## I. Statutory Authority

These regulations are proposed under the authority of sections 2002, 3001–3009 and 3013 of the Solid Waste Disposal Act (SWDA) of 1970, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments of 1984 (HSWA), 42 U.S.C. 6912, 6921–6929, 6934.

## II. Abbreviations, Acronyms, and Definitions

### A. Abbreviations and Acronyms

- AoR Area of Review.  
 CAA Clean Air Act.  
 CCS Carbon Capture and Storage.  
 CERCLA Comprehensive Environmental Response, Compensation, and Liability Act.  
 CO<sub>2</sub> Carbon Dioxide.

- EOR Enhanced Oil and Natural Gas Recovery.  
 EPA Environmental Protection Agency.  
 GHG Greenhouse Gas.  
 GS Geologic Sequestration.  
 HSWA Hazardous and Solid Waste Amendments.  
 RCRA Resource Conservation and Recovery Act.  
 SDWA Safe Drinking Water Act.  
 TC Toxicity Characteristic.  
 TCLP Toxicity Characteristic Leaching Procedure.  
 UIC Underground Injection Control.  
 USDW Underground Source of Drinking Water.

### B. Definitions Used in This Preamble

*Authorized representative:* The person responsible for the overall operation of a facility or an operational unit (*i.e.*, part of a facility), *e.g.*, the plant manager, superintendent or person of equivalent responsibility.

*Carbon dioxide (CO<sub>2</sub>) stream:* Carbon dioxide that has been captured from an emission source (*e.g.*, power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process.

*Enhanced Oil or Gas Recovery (EOR/EGR):* Typically, the process of injecting a fluid (*e.g.*, water, brine, or CO<sub>2</sub>) into an oil or gas bearing formation to recover residual oil or natural gas. The injected fluid thins (decreases the viscosity) or displaces small amounts of extractable oil and gas, which is then available for recovery. This is also known as secondary or tertiary recovery.

*Supercritical CO<sub>2</sub>:* Carbon dioxide that is above its critical temperature (31.1 °C, or 88 °F) and pressure (73.8 bar, or 1070 psi). Supercritical substances have physical properties intermediate to those of gases and liquids.

## III. Background

### A. What is Geologic Sequestration?

Geologic Sequestration (GS) is the process of injecting carbon dioxide (CO<sub>2</sub>) captured from an emission source (*e.g.*, a power plant or industrial facility) into deep subsurface rock formations in order to isolate the CO<sub>2</sub>. GS is a key component of a set of climate change mitigation technologies referred to as “carbon capture and storage” or CCS. CCS can be described as a three-step process, beginning with the capture and compression of the CO<sub>2</sub> stream from fossil-fuel power plants or other industrial sources, after which the CO<sub>2</sub> stream is transported (usually in pipelines) to an on-site or off-site location, where it is then injected

underground for purposes of sequestration.<sup>1</sup>

To transport the captured CO<sub>2</sub> stream for GS, the CO<sub>2</sub> stream will typically be compressed into a supercritical fluid.<sup>2</sup> CO<sub>2</sub> exists as a supercritical fluid at approximately 1,070 pounds per square inch (psi) and 88 °Fahrenheit (F), and in this state it exhibits physical properties intermediate to those of a liquid and a gas. As mentioned, the majority of CO<sub>2</sub> is expected to be delivered to the sequestration site by dedicated pipeline;<sup>3</sup> however, transport by truck, rail, barge or supertanker may also occur, but these have been described as “logistically impractical” for large-scale CCS operations.<sup>4</sup> Whether by pipeline, or these other means, the transportation of supercritical CO<sub>2</sub> is regulated by the U.S. Department of Transportation (DOT) under regulations found in 49 CFR parts 171–180 (governing the transportation by air, rail, highway, and water) and parts 190 and 195–199 (governing the transportation of hazardous liquids and carbon dioxide by pipeline). The CO<sub>2</sub> stream is then injected into deep subsurface rock formations via one or more wells, using technologies that have been developed and refined by the oil and gas and chemical manufacturing industries over the past several decades. To sequester the CO<sub>2</sub> stream, EPA believes that many GS site owners or operators will inject the CO<sub>2</sub> stream to depths of greater than 800 meters (or 2,625 feet), for the purpose of maximizing capacity and storage, and where ambient pressure and temperature are sufficient to maintain the CO<sub>2</sub> stream in a supercritical state. December 10, 2010 (75 FR at 77233).

When injected in an appropriate receiving formation, the CO<sub>2</sub> stream is sequestered by a combination of trapping mechanisms, including physical and geochemical processes, as summarized below.

○ *Physical trapping* occurs when the relatively buoyant CO<sub>2</sub> rises in the formation until it reaches a stratigraphic zone with low fluid permeability (*i.e.*, geologic confining system) that inhibits further upward migration. Physical trapping can also occur as residual CO<sub>2</sub> is immobilized in formation pore

spaces. A portion of the CO<sub>2</sub> will dissolve into the groundwater and hydrocarbons present in the receiving formation, and CO<sub>2</sub> molecules can also attach onto the surfaces of coal and certain organic-rich shales (a process called preferential sorption), displacing other molecules, such as methane. The effectiveness of physical CO<sub>2</sub> trapping is demonstrated by natural analogs worldwide in a range of geologic settings, where CO<sub>2</sub> has remained trapped for millions of years. For example, CO<sub>2</sub> has been trapped for more than 65 million years under the Pisgah Anticline, northeast of the Jackson Dome in Mississippi and Louisiana, with no evidence of leakage from the confining formation.<sup>5</sup>

○ *Geochemical trapping* occurs when chemical reactions between the dissolved CO<sub>2</sub> and minerals in the receiving formation result in the precipitation of solid carbonate minerals.<sup>6</sup> The timeframe over which CO<sub>2</sub> will be trapped by these mechanisms depends on the properties of the receiving formation and the injected CO<sub>2</sub> stream. Research is currently ongoing to further understand these mechanisms and the time required to trap CO<sub>2</sub> under various conditions.

Additional background information on the GS of CO<sub>2</sub> streams can also be found in the final rule and associated record for the final rule for UIC Class VI wells published on December 10, 2010 (75 FR 77230).

#### *B. Why is Geologic Sequestration being considered as a climate change mitigation technology?*

Climate change is happening now, and the effects can be seen on every continent and in every ocean. While certain effects of climate change can be beneficial, particularly in the short term, current and future effects of climate change pose considerable risks to human health and the environment.<sup>7</sup> There is now clear evidence that the Earth’s climate is warming:<sup>8</sup>

○ Global surface temperatures have risen by 1.3 °F when estimated by a linear trend from 1906 to 2005.<sup>9</sup>

○ Worldwide, the last decade has been the warmest on record.<sup>10</sup>

○ Ocean temperatures and sea levels are rising and glaciers are retreating around the world.<sup>11</sup>

Most of this recent warming is very likely the result of human activities.<sup>12</sup> Many human activities (such as the combustion of fossil fuels) release greenhouse gases (GHGs) into the atmosphere. The levels of several of these gases, including CO<sub>2</sub>, have reached concentrations not seen on Earth in hundreds of thousands of years.<sup>13</sup>

In addition, fossil fuels are expected to remain the main source of energy production well into the 21st century, and increased concentrations of CO<sub>2</sub> are expected unless energy producers reduce CO<sub>2</sub> emissions to the atmosphere. For example, CCS could enable the continued use of coal in a manner that greatly reduces the associated CO<sub>2</sub> emissions, while other alternative energy sources are developed in the coming decades. CCS has the potential to be key to achieving domestic GHG emissions reductions, and as already mentioned, GS is a key component of CCS.<sup>14</sup>

GS is therefore one of a portfolio of options that could be deployed to reduce CO<sub>2</sub> emissions to the atmosphere and help to mitigate climate change. Other options include, but are not limited to, energy conservation, efficiency improvements, and the use of alternative fuels and renewable energy sources, including solar and wind power.

Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

<sup>10</sup> National Oceanic and Atmospheric Administration (NOAA) (2009a) *The Annual Global (land and ocean combined) Anomalies (degrees C)*. [ftp://ftp.ncdc.noaa.gov/pub/data/anomalies/annual.land\\_ocean.90S.90N.df\\_1901-2000mean.dat](ftp://ftp.ncdc.noaa.gov/pub/data/anomalies/annual.land_ocean.90S.90N.df_1901-2000mean.dat). Accessed April 28, 2011.

<sup>11</sup> Karl, T., J. Melillo, and T. Peterson (Eds.) (2009) *Global Climate Change Impacts in the United States*. Cambridge University Press, Cambridge, United Kingdom.

<sup>12</sup> IPCC (2007b) Summary for Policymakers. In: *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

<sup>13</sup> Karl, T., J. Melillo, and T. Peterson (Eds.) (2009) *Global Climate Change Impacts in the United States*. Cambridge University Press, Cambridge, United Kingdom.

<sup>14</sup> Report of the Interagency Task Force on Carbon Capture and Storage, August 2010, p. 14.

<sup>1</sup> Report of the Interagency Task Force on Carbon Capture and Storage, August 2010, p. 8.

<sup>2</sup> Carbon Dioxide Capture and Storage. Intergovernmental Panel on Climate Change (IPCC), 2005.

<sup>3</sup> Guidelines for Carbon Dioxide Capture, Transport, and Storage. World Resources Institute, 2008.

<sup>4</sup> CRS Report for Congress. Carbon Dioxide (CO<sub>2</sub>) Pipelines for Carbon Sequestration: Emerging Policy Issues. Paul W. Parfomak and Peter Folger. January 17, 2008.

<sup>5</sup> Carbon Dioxide Capture and Storage. IPCC, 2005.

<sup>6</sup> *Ibid.*

<sup>7</sup> National Research Council (2011) *Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia*. Washington, DC: National Academies Press.

<sup>8</sup> Karl, T., J. Melillo, and T. Peterson (Eds.) (2009) *Global Climate Change Impacts in the United States*. Cambridge University Press, Cambridge, United Kingdom.

<sup>9</sup> Trenberth, K.E. et al. (2007) Observations: Surface and Atmospheric Climate Change. In: *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth

*C. What other recent EPA rulemakings are related to CCS?*

In an effort to establish a regulatory framework that supports the future development and deployment of CCS technologies, EPA has set out a goal to provide the regulatory certainty needed to foster industry adoption of CCS. As mentioned above, EPA believes that GS is a key climate change mitigation technology. Therefore, providing a consistent regulatory approach to GS will promote its future use in the United States. Two important EPA rulemakings that directly address GS activities are requirements under the *Greenhouse Gas (GHG) Reporting Program*; and *Federal Requirements under the Underground Injection Control (UIC) Program for Carbon Dioxide (CO<sub>2</sub>) Geologic Sequestration (GS) Wells*. These are described in more detail below.

- *EPA Greenhouse Gas (GHG) Reporting Program*: The GHG Reporting Program was established under authority of the Clean Air Act (CAA) and requires reporting of GHG emissions and other relevant information from certain source categories in the United States. On October 30, 2009, EPA issued a final rule (74 FR 56260) that requires reporting by facilities with production process units that capture a CO<sub>2</sub> stream under subpart PP of the program. These facilities are required to report the amount of CO<sub>2</sub> in a stream captured, and provide information on the downstream CO<sub>2</sub> end use (e.g., food and beverage, EOR, GS, etc.). On December 1, 2010, EPA issued a final rule (75 FR 75060) that requires reporting from facilities that inject CO<sub>2</sub> underground for GS under subpart RR of the program. The rule requires facilities that inject CO<sub>2</sub> underground for GS to report basic information on CO<sub>2</sub> received for injection, develop and implement an EPA-approved site-specific monitoring, reporting and verification plan, and report the amount of CO<sub>2</sub> sequestered using a mass balance approach and annual monitoring activities.

- *EPA Class VI Underground Injection Control (UIC) Rule*: On July 25, 2008, EPA proposed to amend the UIC program (73 FR 43492) to establish a new class of injection well (Class VI) and to establish minimum Federal requirements under the Safe Drinking Water Act (SDWA) for the underground injection of CO<sub>2</sub> for the purpose of GS. The proposed requirements would ensure that GS is conducted in a manner that protects Underground Sources of Drinking Water (USDWs) from endangerment, by tailoring existing components of the UIC program to

address the unique nature of GS. On December 10, 2010, EPA finalized the new UIC Class VI injection well standards. These requirements are intended to provide certainty to industry and the public about the requirements that would apply to injection for purposes of GS, by providing consistency regarding the requirements across the U.S., and transparency about what requirements apply to permitted UIC Class VI facility owners or operators. For a more detailed discussion of these requirements, see the final rule in the December 10, 2010 **Federal Register** (75 FR 77230).

*D. RCRA Applicability to GS Activities*

In response to the July 25, 2008 proposed rule for UIC Class VI wells, EPA received a number of comments regarding the potential applicability of RCRA subtitle C to CO<sub>2</sub> streams being geologically sequestered. As a result of those comments, EPA decided to initiate work on today's proposal. EPA also considered those RCRA-related comments in the development of today's proposed rule. EPA notes, however, that should persons wish to comment on the RCRA applicability issues raised by today's proposal, it is necessary to submit comments to the docket established for today's proposed rule as described above in the **ADDRESSES** section of this **Federal Register** notice. EPA will not provide further responses to comments submitted on the UIC rule as part of this rulemaking. In addition, today's proposal is not reopening the UIC Class VI final rule, nor will EPA respond to comments related only to that rule.

At this time, EPA has little information to conclude that CO<sub>2</sub> streams would qualify as RCRA hazardous wastes, which would make them subject to EPA's comprehensive RCRA hazardous waste management regulations. However, commenters have cited the potential for RCRA hazardous waste requirements to attach to some CO<sub>2</sub> streams (i.e., some CO<sub>2</sub> streams might be classified as hazardous waste and therefore, would be subject to RCRA subtitle C), as a significant impediment to widespread deployment of CCS technologies. Today's proposal seeks to address this concern and provide regulatory clarity through a revised RCRA regulatory approach for CO<sub>2</sub> streams. Simultaneously, as discussed below, EPA expects that management in accordance with the conditions in today's proposal will provide no reduced protection to human health and the environment.

After issuance of the proposed UIC Class VI rule, EPA received public

comments that the proposed requirements were unclear as to whether the CO<sub>2</sub> stream would be a RCRA hazardous waste, and expressed concern that this created uncertainty regarding the type of permit needed for GS. Many commenters stated that a CO<sub>2</sub> stream should not be treated as a RCRA hazardous waste on the grounds that it is neither a listed hazardous waste nor exhibits a hazardous characteristic, or is even a solid waste. Other commenters, however, asserted that CO<sub>2</sub> in the presence of water could exhibit the RCRA corrosivity characteristic. Additionally, some commenters raised the issue of whether the analytic procedures used under RCRA (in particular, the toxicity characteristic leaching procedure, TCLP)<sup>15</sup> can be applied to supercritical CO<sub>2</sub> streams, and whether or not the UIC Class VI regulations would better ensure the proper management of CO<sub>2</sub> streams, compared with the RCRA subtitle C hazardous waste requirements.

EPA believes that the RCRA hazardous waste regulations can apply to CO<sub>2</sub> streams being geologically sequestered. Subtitle C of RCRA and its implementing regulations establish a "cradle to grave" regulatory scheme over certain "solid wastes" which are also "hazardous wastes." RCRA defines solid waste as "any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material \* \* \*." See RCRA 1004(27), 42 U.S.C. 6903(27). EPA has further defined the term "solid waste" for purposes of its RCRA hazardous waste regulations. 40 CFR 261.2. To be considered a hazardous waste, a material first must be classified as a solid waste. Under EPA's regulations, generators of solid waste are required to determine whether their wastes are hazardous wastes. 40 CFR 262.11. A solid waste is a hazardous waste if it exhibits any of four characteristics (ignitability, corrosivity, reactivity, or toxicity), 40 CFR 261.20–.24, or is a listed waste, 40 CFR 261.30–.33 (these include wastes from non-specific sources, such as spent solvents; by-products from specific industries; and discarded, unused commercial chemical products).

A supercritical CO<sub>2</sub> stream injected into a permitted UIC Class VI well for

<sup>15</sup> Toxicity Characteristic Leaching Procedure, or TCLP. See 40 CFR 261.24. A solid waste is defined as hazardous when a representative sample of that waste leaches a particular chemical or compound—for example, arsenic—above a specified regulatory concentration, using the TCLP.

purposes of GS is a RCRA solid waste, as it is a “discarded material” within the plain meaning of the term in RCRA § 1004(27). Courts have stated that the plain meaning of “discarded material” refers to materials that have been disposed of, abandoned or thrown away.<sup>16</sup> This clearly applies to supercritical CO<sub>2</sub> stream (which, as already stated, is rather unique in that it has properties intermediate between a liquid and a gas) injected into UIC Class VI wells, regardless of whether the material is a hazardous waste or not. An entity involved in the CCS process may generate CO<sub>2</sub> that qualifies as a solid waste under the RCRA hazardous waste regulations by making the decision to discard the material through abandonment by disposing of the material (see 40 CFR 261.2(a)(2)(i) and (b)(1)). Once the decision is made that the supercritical CO<sub>2</sub> stream will be sent to a UIC Class VI well for discard, EPA considers this material to be a solid waste. This decision may be made upstream of the injection well facility. As discussed above, EPA’s regulations require that generators of a solid waste determine whether their wastes are hazardous wastes, and if so, manage them in accordance with EPA’s RCRA hazardous waste regulations. 40 CFR 262.11.

One commenter to the UIC proposed rule suggested that the captured CO<sub>2</sub> stream was exempt from the RCRA hazardous waste regulations under the exemption for “fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste, generated primarily from the combustion of coal or other fossil fuels,” also referred to as the “Bevill exemption.” (See 40 CFR 261.4(b)(4).)

EPA studied the fossil fuel combustion wastes as directed by Congress, and published two Reports to Congress,<sup>17</sup> and issued two Regulatory Determinations on the management and use of coal and other fossil fuel combustion products, one on August 9, 1993 and a second one on May 22, 2000 (58 FR 42466 and 65 FR 32214, respectively). CO<sub>2</sub> captured for purposes of GS was not included in either of these Regulatory Determinations, or in

<sup>16</sup> The proposed rule is not intended to affect the status of CO<sub>2</sub> that is injected into wells other than UIC Class VI wells. For example, CO<sub>2</sub> that is used for enhanced oil or gas recovery (EOR/EGR) in other than UIC Class VI wells, where some sequestration may occur in the process of recovering gas or oil, is beyond the scope of this proposal.

<sup>17</sup> Report to Congress: Wastes from the Combustion of Coal by Electric Utility Power Plants, February 1988, EPA-530-SW-88-002; and Report to Congress: Wastes From the Combustion of Fossil Fuels, Vol. 1 & 2, U.S. EPA, March 1999, EPA-530-S-99-010 and EPA-530-R-99-010.

the underlying studies upon which these determinations were based. The Agency has consistently interpreted the § 261.4(b)(4) exemption as only encompassing those wastes that were studied, and EPA did not study CO<sub>2</sub> that has been captured for GS. Therefore, EPA believes that the CO<sub>2</sub> streams discussed in today’s proposed rule are not included within the Bevill exemption under § 261.4(b)(4).<sup>18</sup>

EPA notes that CO<sub>2</sub> streams are not listed RCRA hazardous wastes (*i.e.*, CO<sub>2</sub> streams are not specifically identified as one of the hazardous wastes listed in 40 CFR part 261, subpart D). However, the CO<sub>2</sub> stream would be a hazardous waste if it exhibits any of the hazardous characteristics in 40 CFR part 261, subpart C, or, is mixed with a listed hazardous waste. See § 261.3(a)(iv). Under the UIC Class VI final rule, injection site owners and operators must determine whether the CO<sub>2</sub> stream is hazardous under the RCRA regulations, and if so, injection of the CO<sub>2</sub> stream may only occur in a UIC Class I hazardous waste injection well.<sup>19</sup> Conversely, UIC Class VI wells cannot be used for the injection of RCRA hazardous wastes. Today’s proposal, if finalized, would allow CO<sub>2</sub> streams that would otherwise qualify as RCRA hazardous wastes to be managed in a Class VI well, provided that they meet the conditions of this proposed rule.

As already noted, commenters to the UIC Class VI proposed rule also raised questions about the appropriateness and feasibility of applying the RCRA hazardous waste characteristics to CO<sub>2</sub> streams and, in particular, the Toxicity Characteristic (TC). See § 261.24. Some commenters stated that the TCLP test method associated with the TC could not be used on materials other than solids or liquids, and that EPA would have to develop new testing regulations and guidelines specifically for evaluating supercritical CO<sub>2</sub>. Commenters also stated that the TC regulation was inappropriate for CO<sub>2</sub> streams because the TC was “\* \* \* designed to assess the threat waste

<sup>18</sup> EPA notes that even if CO<sub>2</sub> streams from the combustion of fossil fuels were exempt from regulation as hazardous waste under § 261.4(b)(4)—which it does not believe to be the case—the Bevill exemption would only apply to CO<sub>2</sub> generated from the combustion of materials in boilers to generate steam for the purpose of generating energy, and not to other CO<sub>2</sub> streams generated from other sources.

<sup>19</sup> As already mentioned, a hazardous waste determination must be made when a waste is first generated (§ 262.11); however, knowing whether a solid waste is a hazardous waste is necessary at any point during the management of that waste, in order for persons to ensure that they are in compliance with the hazardous waste requirements if and when they are managing hazardous waste. See 40 CFR 261.3(b)(3) and 45 FR 33096 (May 19, 1980).

would have in a municipal landfill disposal scenario, a scenario that \* \* \* is inherently inapplicable to uncontained supercritical CO<sub>2</sub>.” Many commenters also expressed concern over the uncertainty in determining how the RCRA hazardous waste regulations, including the hazardous waste identification issues described here, apply to CO<sub>2</sub> streams being sequestered in UIC Class VI wells.

In light of these comments, EPA reiterates that no hazardous waste listings apply specifically to CO<sub>2</sub> streams; therefore, a CO<sub>2</sub> stream could only be defined as a hazardous waste if it exhibits a hazardous waste characteristic as defined in 40 CFR part 261, subpart C.<sup>20</sup> Regarding the feasibility of testing CO<sub>2</sub> streams, EPA acknowledges the commenter’s concern, but also notes that the hazardous waste regulations allow generators to apply their knowledge—in lieu of testing—of the hazard characteristic of a waste, in light of the materials or processes used, to determine whether that waste is a characteristic hazardous waste under RCRA.<sup>21</sup> 40 CFR 262.11(c)(2). EPA also notes that methods exist for sampling and analyzing gaseous emissions in order to identify and quantify hazardous constituents that may be present.<sup>22</sup> Regarding whether a TCLP leach test can be applied to a supercritical CO<sub>2</sub> stream, EPA notes that the TC regulation, and the TCLP test method, allow for measurement of total constituent concentrations in a waste, in lieu of running the leach test, and under certain circumstances even require it (such as where wastes are liquids that contain less than 0.5% solids).<sup>23</sup> However, EPA acknowledges the commenters’ underlying concerns related to RCRA characterization, and requests comment on this issue.

#### E. CO<sub>2</sub> Stream Characterization

As noted above, EPA is proposing to conditionally exclude from the

<sup>20</sup> It is also possible that a CO<sub>2</sub> stream could become a hazardous waste if it is mixed with a listed hazardous waste, or, mixed with a characteristic hazardous waste and the resultant mixture exhibits a characteristic of hazardous waste. This is commonly referred to as the “mixture rule.” See 40 CFR 261.3. We note that today’s proposed exemption includes the condition that prohibits the mixing of CO<sub>2</sub> streams with hazardous waste.

<sup>21</sup> Any persons claiming that a waste is non-hazardous, based on knowledge in lieu of testing, should be prepared to substantiate this claim.

<sup>22</sup> *E.g.*, EPA notes that existing analytical test methods, such as SW-846 Methods 0060, 0010, and 0031, are available to quantify the levels of various hazardous constituents in gaseous streams, although sampling a supercritical CO<sub>2</sub> stream may require particular sampling protocols.

<sup>23</sup> See SW-846, Method 1311, Section 2.1.

definition of hazardous waste CO<sub>2</sub> streams captured, transported (or otherwise delivered to) and injected into permitted UIC Class VI wells for purposes of GS. At this time, EPA has little information to conclude that CO<sub>2</sub> streams would qualify as RCRA hazardous wastes, which would make them subject to EPA's comprehensive RCRA hazardous waste management regulations. Today's proposal is intended to provide clarity for deployment of CCS under conditions that EPA believes would not present a substantial risk to human health and the environment. However, EPA acknowledges that at this time, it does not have full knowledge of the range of possible CO<sub>2</sub> stream compositions. Today's proposed conditional exclusion is based upon EPA's existing knowledge of the composition of CO<sub>2</sub> streams, and its analysis that compliance with the existing standards and regulations designed to prevent any exposure of CO<sub>2</sub> (and any associated impurities) would render additional regulation under RCRA subtitle C unnecessary.

Nevertheless, EPA is proceeding with this proposal, and notes that the UIC Class VI regulations include requirements that the owner or operator of the injection well provide an analysis of the physical and chemical characteristics of the CO<sub>2</sub> stream, both during permit application and periodically during operation (See 40 CFR 146.82, 146.90 and 146.91). The permit-issuing authority is also authorized under EPA's UIC permit regulations to add any additional conditions to the permit, as necessary, to assure compliance with applicable SDWA requirements (40 CFR 146.52(b)). Under this authority, the UIC Program Director (EPA or a State permitting authority) may add specific testing or chemical/waste limitations to the permit to prevent endangerment of USDWs, or to assure that unauthorized wastes are not injected with the CO<sub>2</sub> stream.

EPA has reviewed estimates of CO<sub>2</sub> stream composition that were calculated using information, such as the composition of flue gas from the burning of fossil fuels and other likely sources, existing flue gas emission control technologies (e.g., electrostatic precipitators and scrubbers), and data from applied capture technology.<sup>24</sup> These estimates indicate that captured CO<sub>2</sub> could contain (based upon the information used in developing those estimates) low concentrations of

hazardous constituents (e.g., estimated concentrations expressed in parts per million by volume, or ppmv, are: 0.0022–0.0097 arsenic, 0.0462–0.4623 barium, 0.0002–0.0085 cadmium, 0.0016–0.0171 chromium, 0.0022–0.0028 mercury, 0.0011–0.0045 lead, and 0.0074–0.0244 selenium). EPA notes that these contaminants derived from the combustion flue gas are relevant to the TC regulation in § 261.24.<sup>25</sup> These estimates also indicate that the types of impurities and their concentrations would likely vary by facility, coal composition, plant operating conditions, and pollutant removal and carbon capture technologies.

EPA solicited comment in the July 25, 2008 proposed UIC Class VI rule on the presence of impurities in CO<sub>2</sub> streams, but did not receive any analytical data on the composition of captured CO<sub>2</sub> streams in response. As various CCS pilot projects<sup>26</sup> move forward and continue to generate information, EPA expects the amount of available analytical data on captured CO<sub>2</sub> to increase. In addition, EPA expects that data will become available under the recently promulgated UIC Class VI regulations. As discussed above, the final UIC Class VI regulations require that prior to issuance of a permit, the owner or operator of the well must submit to the Director<sup>27</sup> proposed operating data for the proposed GS site, including an analysis of the chemical and physical properties of the CO<sub>2</sub> stream (40 CFR 146.82(a)(7)(iv)). The UIC rule also requires that, throughout the operational life of the Class VI well, the injected CO<sub>2</sub> stream be analyzed by owners or operators with sufficient frequency to yield data representative of its physical and chemical characteristics (40 CFR 146.90(a)). Owners or operators must also submit semi-annual reports that include any changes to the

<sup>25</sup> Ibid, Table 13b. EPA notes that the presence of hazardous constituents or contaminants does not automatically mean that a CO<sub>2</sub> stream is a hazardous waste.

<sup>26</sup> See Exhibits 1 and 2 in EPA's analysis of the potential costs and benefits associated with this action, entitled *Assessment of the Potential Costs, Benefits, and Other Impacts of the Conditional Exclusion from the RCRA Definition of Hazardous Waste for CO<sub>2</sub> Streams Managed in UIC Class VI Wells for the Purposes of Geologic Sequestration, as Proposed*. A copy of this document is available in the docket established for this action.

<sup>27</sup> As used here in the context of the UIC program, "Director" means the person responsible for permitting, implementation, and compliance of the UIC program. For UIC programs administered by EPA, the Director is the EPA Regional Administrator or his/her authorized representative; for UIC programs in Primacy States, the Director is the person responsible for permitting, implementation, and compliance of the State, Territorial, or Tribal UIC program. 40 CFR 144.3.

physical, chemical, and other relevant characteristics of the CO<sub>2</sub> stream from the proposed operating data (40 CFR 146.91(a)(1)). While guidance is still being developed regarding these requirements, at a minimum, the physical characteristics of the CO<sub>2</sub> stream will include temperature and pressure, while the chemical characteristics will include pH, carbon dioxide purity (as a percent), as well as concentrations of non-CO<sub>2</sub> constituents (either in ppmv or in percent). These non-CO<sub>2</sub> constituents may include, but are not limited to, sulfur dioxide (SO<sub>2</sub>), hydrogen sulfide (H<sub>2</sub>S), nitrous oxides (NO<sub>x</sub>), carbon monoxide (CO), methane (CH<sub>4</sub>), other hydrocarbons, water vapor (H<sub>2</sub>O), as well as certain contaminants, that are also defined as hazardous contaminants in 40 CFR 261.24, such as arsenic, mercury, and selenium. EPA expects that these data will provide an indication of any impurities that may be present, their concentrations, and whether such impurities might alter the corrosivity or other properties of the CO<sub>2</sub> stream after injection.

EPA today requests analytical data on the physical and chemical characteristics of captured CO<sub>2</sub>, including the concentrations of hazardous contaminants, CO<sub>2</sub> content, information on the type of CO<sub>2</sub> capture process used, and how the samples were collected and analyzed. This data will allow EPA to gain a better understanding of the nature and characteristics of captured CO<sub>2</sub> streams.

#### IV. Detailed Discussion of This Proposed Rule

EPA is proposing to revise the regulations for hazardous waste management under RCRA to exclude from the definition of hazardous waste CO<sub>2</sub> streams that would otherwise be defined as hazardous, when these CO<sub>2</sub> streams are managed under certain conditions. The Agency believes that this amendment to the RCRA hazardous waste rules, if finalized, will substantially reduce the uncertainty associated with defining and managing these CO<sub>2</sub> streams under RCRA subtitle C. For the reasons discussed below, EPA believes that the management of these CO<sub>2</sub> streams in accordance with the proposed conditions does not present a substantial risk to human health and the environment. These proposed conditions include, but are not limited to, compliance with the existing regulatory regimes governing the transportation of the CO<sub>2</sub> stream, and its injection in a UIC Class VI permitted well.

<sup>24</sup> Apps, J.A., *A Review of Hazardous Chemical Species Associate with CO<sub>2</sub> Capture from Coal-Fired Power Plants and Their Potential Fate in CO<sub>2</sub> Geologic Storage*, Lawrence Berkeley National Laboratory, March 2006.

### A. Authority for Conditional Exclusion From RCRA Subtitle C Requirements

EPA has previously interpreted RCRA section 3001(a) to authorize the issuance of “conditional exemptions” from the requirements of subtitle C, where it determines that “a waste might pose a hazard only under limited management scenarios, and other regulatory programs already address such scenarios.” 62 FR at 6636 (February 12, 1997); 66 FR at 27222–27223 (May 16, 2001). Today’s proposal takes a similar approach to those earlier rules.

Section 3001(a) provides the Agency with flexibility to consider the need for regulation in deciding whether to list or identify a waste as hazardous. Specifically, RCRA section 3001(a) requires that EPA, in determining whether to list a waste as a hazardous waste, or to otherwise identify a waste as a hazardous waste, decide whether a waste “should be subject to” the requirements of subtitle C. Hence, RCRA section 3001 authorizes EPA to determine when subtitle C regulation is appropriate. EPA has consistently interpreted section 3001 of RCRA to give it broad flexibility in fashioning criteria for hazardous wastes to enter or exit the subtitle C regulatory system. EPA’s longstanding regulatory criteria for determining whether wastes pose hazards that require regulatory control incorporate the idea that a waste that is otherwise hazardous may not present a hazard if already subject to adequate regulation. (See, e.g., 40 CFR 261.11(a)(3)(x), which requires EPA to consider action taken by other governmental agencies or regulatory programs based on the health or environmental hazard posed by the waste.)

EPA’s interpretation is further supported by the text of RCRA sections 1004(5), and 3002–3004, and RCRA’s legislative history. This interpretation has also been upheld upon judicial review. See, e.g., *Military Toxics Project v. EPA*, 146 F.3d 948 (D.C. Cir. 1998) (upholding conditional exemption for storage of military munitions, based on EPA determination that such wastes are subject to binding standards that meet or exceed RCRA standards, in addition to an institutional oversight process).

The statutory definition of hazardous waste, section 1004(5)(B), informs EPA’s interpretation that EPA may consider good management practices in determining the need to regulate waste as hazardous. That section defines a ‘hazardous waste’ as “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical or infectious

characteristics may \* \* \* (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” (Emphasis added.) EPA has interpreted the statutory definition as incorporating the idea that a waste that is otherwise hazardous does not require regulation so long as it is properly managed. For example, EPA’s standards for listing hazardous wastes require consideration of a waste’s potential for mismanagement. See 40 CFR 261.11(a)(3)(vii) (incorporating the language of RCRA section 1004(5)(B) and requiring EPA to consider “plausible types of improper management”).

The statute also directs EPA to regulate hazardous waste generators (RCRA § 3002(a)), transporters (RCRA § 3003(a)) and treatment, storage and disposal facilities (RCRA § 3004(a)) “as may be necessary to protect human health and the environment.” By extension, the decision of when a waste should be subject to the regulatory requirements of subtitle C is a question of whether such regulatory controls are necessary to protect human health and the environment.

Thus, where a waste might pose a hazard only under limited management scenarios, and other regulatory programs already address such scenarios, EPA is not required to classify a waste as hazardous waste subject to regulation under subtitle C. At least three decisions by the U.S. Court of Appeals for the D.C. Circuit provide support for this approach to regulating wastes as hazardous waste only where necessary to protect human health and the environment. In *Military Toxics Project v. EPA*, 146 F.3d 948 (D.C. Cir. 1998), the court upheld a conditional exemption whereby the storage and transportation of certain military munitions are not considered hazardous waste subject to regulation under RCRA subtitle C, provided the munitions are stored and transported in compliance with regulations issued by the Department of Defense and the Department of Transportation, respectively. See 40 CFR 266.203, 266.205. The court ruled that EPA’s interpretation of RCRA as authorizing a conditional exemption is “a permissible construction of the statute.” 146 F.3d at 958. The court cited its own precedent as recognizing ““that Congress intended the agency to have substantial room to exercise its expertise in determining the appropriate grounds for listing,”” *id.* (citing *NRDC v. EPA*, 25 F.3d 1063, 1070 (D.C. Cir. 1994)), and concluded that, although the military munitions

rule “does not involve the listing regulations at issue in *NRDC v. EPA*, we think the principle at work there also supports the conditional exemption at issue here.” *Id.*

In *NRDC v. EPA*, the court held that EPA appropriately used its discretion in relying on several existing regulatory frameworks governing used oil in determining not to list certain used oils as a hazardous waste. *NRDC*, 25 F.3d at 1071. Similarly, in *Edison Electric Institute v. EPA*, 2 F.3d 438 (D.C. Cir. 1993), the court upheld a temporary exemption from subtitle C for petroleum-contaminated media based on the fact that the potential hazards of such materials are already controlled under the underground storage tank regulations under RCRA subtitle I. In reaching its decision, the court considered the fact that the subtitle I standards could prevent threats to human health and the environment to be an important factor supporting the exemption. *Id.* at 453.

The legislative history of RCRA subtitle C also supports this interpretation, stating that “the basic thrust of this hazardous waste title is to identify what wastes are hazardous in what quantities, qualities, and concentrations, and the methods of disposal which may make such wastes hazardous.” H. Rep. No. 94–1491, 94th Cong., 2d Sess. 6 (1976), reprinted in *A Legislative History of the Solid Waste Disposal Act, as Amended*, Congressional Research Service, Vol.1, 567 (1991) (emphasis added). Finally, as discussed above, in proposing this conditional exemption from RCRA, EPA is in part relying on the regulatory controls for Class VI wells, under the UIC program of the SDWA, 42 U.S.C. 300f *et seq.* EPA notes that such reliance is also consistent with the direction provided in section 1006(b) of RCRA, which directs EPA to integrate the provisions of RCRA, for purposes of administration and enforcement and to avoid duplication, to the maximum extent practicable, with those of certain other statutes, including the SDWA, to the extent that it can be done in a manner that is consistent with the goals and policies of both RCRA and the other relevant statute(s).

### B. CO<sub>2</sub> Streams Managed Prior to Underground Injection

Under the subtitle C hazardous waste program, the generator requirements (40 CFR part 262) contain provisions designed to ensure that hazardous wastes are properly managed by persons who generate the wastes. This is accomplished through certain requirements governing the temporary



storage (*i.e.*, accumulation) of hazardous wastes, in units, such as tanks or containers, at the site of generation. These requirements include technical requirements for the tanks or containers, and time limits on hazardous waste storage, if the waste is to be sent off-site to a treatment, storage or disposal facility.<sup>28</sup> These requirements also include recordkeeping and reporting, and certain pre-transport requirements, such as packaging, labeling, and preparing a hazardous waste manifest to accompany the waste. Generators must also notify EPA of their hazardous waste management activity, and obtain an EPA identification (ID) number. Likewise, hazardous waste transporters (*e.g.*, persons transporting waste, including over the highway or by rail) have certain requirements in 40 CFR part 263, to ensure that the hazardous wastes are properly transported to a hazardous waste treatment, storage, or disposal facility. These transporter requirements include notifying EPA and obtaining an EPA ID number, recordkeeping, and compliance with the hazardous waste manifest. EPA notes that under the RCRA subtitle C regulations, a hazardous waste manifest is not required for hazardous wastes sent off-site via pipeline.<sup>29</sup>

For CO<sub>2</sub> streams that are captured, compressed, and transported to a UIC Class VI well, EPA believes that the full set of subtitle C generator and transporter requirements are not necessary, because they do not provide any additional protection over existing regulatory requirements. Regarding the generator requirements, EPA believes that the process of capturing and compressing CO<sub>2</sub> prior to delivery to a UIC Class VI facility via a pipeline, as the Agency understands it, will not involve storage at the generator facility (*i.e.*, at the CO<sub>2</sub> source), but rather will occur in a continuous fashion (capture process → compression/dehydration → pipeline insertion). Once in the pipeline, EPA believes the applicable DOT requirements (which apply to supercritical CO<sub>2</sub> streams regardless of whether or not these materials meet the definition of hazardous waste) will ensure that CO<sub>2</sub> streams are managed in

a manner that addresses the potential risks to human health and the environment that these materials may pose, prior to arrival at a Class VI injection well facility.

#### 1. CO<sub>2</sub> Streams Generated at Capture Sites

While certain technologies for removing (capturing) CO<sub>2</sub> have been in use commercially for over 60 years (*e.g.*, natural gas processing, production of food-grade CO<sub>2</sub>), research has been underway to develop more cost-effective technologies to capture CO<sub>2</sub> for purposes of CCS. Regardless of the capture technology that is ultimately implemented, information currently available to EPA indicates that once the CO<sub>2</sub> stream is captured at the source (*e.g.*, coal-fired power plant), it will be dehydrated (to meet pipeline specifications preventing corrosion) and compressed (to match designated pipeline pressures) in preparation for transport, primarily via CO<sub>2</sub> pipeline.<sup>30 31</sup>

However, evaluating in more detail how CO<sub>2</sub> streams will be managed at the CO<sub>2</sub> source prior to GS in a UIC Class VI facility, and what regulations or other standards might apply to these activities in lieu of the RCRA generator standards, has proven somewhat difficult based on a review of the literature. This is either because many of the newer capture technologies are still in the developmental stages, or because the more established capture technologies used in commercial CO<sub>2</sub> capture have not yet been scaled up to large facilities, such as coal-fired power plants. Nonetheless, EPA attempted to assess how captured CO<sub>2</sub> streams would be managed in the context of the RCRA generator requirements identified above (*e.g.*, EPA notification, standards for tanks or containers, time limits for on-site storage, recordkeeping and reporting, packaging, labeling, manifesting, etc.).

First, it is unclear from existing information sources whether captured CO<sub>2</sub> has been or will be stored at the generator site prior to insertion into a pipeline, so EPA examined the feasibility of storing captured CO<sub>2</sub> streams at the source, since storage is a hazardous waste management activity of concern at RCRA generator sites

generally.<sup>32</sup> EPA looked at estimates of CO<sub>2</sub> capture rates both in the CCS projects currently underway, as well as future scenarios where CO<sub>2</sub> capture is deployed at full scale. A review of commercially-available CO<sub>2</sub> capture facilities in 2009 identified 17 facilities, with CO<sub>2</sub> capture rates ranging from 50,000 metric tons/year to 3.63 million metric tons per year.<sup>33</sup> According to the 2010 CCS Task Force Report, the largest of these capture rates (3.63 million metric tons/yr) is close to the volume of CO<sub>2</sub> required for capture at electric utility generating plants. It is also estimated that a 500MW (megawatt) coal-fired power plant emits close to 3 million metric tons of CO<sub>2</sub> per year.<sup>34</sup> Similarly, the Mountaineer, West Virginia CCS project, which is currently capturing 100,000 metric tons CO<sub>2</sub>/year, will eventually scale up to 1.5 million metric tons of CO<sub>2</sub> per year from an emission slipstream representing 235MW. See 75 FR 32171, June 7, 2010. An annual CO<sub>2</sub> capture rate of 1.5 million metric tons translates to approximately 4,100 metric tons CO<sub>2</sub> per day, or (at temperatures and pressures close to supercritical) 34,000 cubic meters, which is approximately 9 million gallons of CO<sub>2</sub> per day. Even the smallest annual capture rate mentioned above (50,000 metric tons per year) equates to approximately 137 metric tons of CO<sub>2</sub> per day, or 1,142 cubic meters, which is approximately 301,568 gallons per day.

Based on these estimates, the volume of CO<sub>2</sub> streams either being captured, or anticipated to be captured, are quite large, and would require pressure vessels (*i.e.*, tanks engineered for pressurized material) of inordinate size at the low end of these estimates, and are not likely to exist or be practicable at the upper end of these estimates. Therefore, EPA does not envision these large volumes of captured CO<sub>2</sub> streams being stored on-site, and instead assumes that the CO<sub>2</sub> streams will be dehydrated, compressed, and either injected on-site, or sent off-site, in a continuous fashion. EPA believes that even if the CO<sub>2</sub> were defined as a hazardous waste, under the scenario described above, where captured CO<sub>2</sub> streams are delivered in a continuous fashion to either on-site injection wells,

<sup>28</sup> The generator regulations in 40 CFR part 262 provide for limited, temporary on-site hazardous waste storage (accumulation) without a RCRA permit or being subject to the interim status standards, provided certain conditions are met (see § 262.34). While generators are not required to send hazardous waste off-site for disposal, they often do so because they do not wish to engage in RCRA-permitted hazardous waste activity on-site.

<sup>29</sup> This is because use of the hazardous waste manifest is triggered by the transport of hazardous waste (see discussion in Section IV.B.2. in this preamble, including Footnote 41).

<sup>30</sup> DOE/NETL's Carbon Capture R&D Program for Existing Coal-Fired Power Plants, DOE/NETL-2009-1356, February 2009.

<sup>31</sup> Figueroa, Jose D. *et al.*, 2008. *Advances in CO<sub>2</sub> capture technology—the U.S. Department of Energy's Carbon Sequestration Program*, International Journal of Greenhouse Gas Control 2, 2008 (9–20).

<sup>32</sup> The term “store” or “storage” used throughout this preamble refers to the holding of waste for a temporary period above ground, and does not refer to the placement of CO<sub>2</sub> streams in underground formations through the process of GS. See 40 CFR 260.10.

<sup>33</sup> CCS Task Force Study, August, 2010, Appendix A.

<sup>34</sup> Carbon Dioxide Capture and Storage. Intergovernmental Panel on Climate Change (IPCC), 2005, p. 61.

or to a pipeline for off-site injection (and presumably in a totally-enclosed manner, due to the need to maintain proper pressures) there would not be any substantive<sup>35</sup> RCRA subtitle C requirements applicable to this activity. EPA notes that there are no RCRA hazardous waste standards for pipelines, unless the pipelines are ancillary to a regulated hazardous waste tank, which does not appear to be the case here.<sup>36</sup>

Regarding other generator requirements, such as notification to EPA of hazardous waste activity, and recordkeeping and reporting, EPA believes there will be equivalent notice and reporting for facilities engaged in CO<sub>2</sub> capture for purposes of GS. The new GHG reporting requirements promulgated on October 30, 2009 (74 FR 56260) will provide information to the Agency regarding individual facilities engaged in CO<sub>2</sub> capture activities. Under 40 CFR part 98, subpart PP, of the GHG rule, facilities with production process units that capture a CO<sub>2</sub> stream must annually report certain information to EPA, such as the amount of CO<sub>2</sub> in the stream captured, and information on the fate of the CO<sub>2</sub> stream (*i.e.*, the downstream 'end use' of the CO<sub>2</sub>), including GS. See 40 CFR 98.426. The GHG rule also requires comprehensive recordkeeping, and records that must be retained for three years. See § 98.3(g) and § 98.427. EPA points out that these GHG requirements apply irrespective of whether a facility claims the RCRA exclusion being proposed today, if finalized.

Therefore, with respect to generators of CO<sub>2</sub> streams, EPA believes there would not be any additional protection to human health or the environment through the RCRA hazardous waste regulations of these operations. Absent any storage, the regulation of the movement of captured CO<sub>2</sub> streams from the point of capture to either an on-site UIC Class VI injection well, or to an off-site DOT-regulated pipeline (discussed below), would not be significantly different in the presence or absence of today's proposed conditional exclusion. While it is not clear what would be the procedure during maintenance or upset

<sup>35</sup> "Substantive" as used here describes those requirements that are directly related to storage, transportation, treatment, or disposal, and not notification or biennial reporting.

<sup>36</sup> EPA notes that there are no stand-alone RCRA hazardous waste standards for pipelines only; rather, EPA regulates hazardous waste "tank systems" which includes technical standards for piping where that piping is ancillary to hazardous waste tanks. See 40 CFR 260.10 for the definition of tank system; see also July 14, 1986 **Federal Register** for discussion of ancillary equipment, 51 FR at 25441.

circumstances (such as if the capture process could not function), EPA assumes that the source emissions would be diverted for release under the facility's Clean Air Act permit.

EPA requests information on whether EPA's estimates for captured CO<sub>2</sub> volumes are accurate and reasonable, and whether the CO<sub>2</sub> that is captured could be stored on-site prior to being sent elsewhere for GS or any other purpose; if so, EPA requests detailed information on the duration and method of storage, and what existing regulatory or voluntary controls and standards apply to such storage. EPA also requests information on the units and processes involved after the CO<sub>2</sub> is captured, and before it is either injected on-site, or sent off-site. Finally, EPA requests comment and information on the procedures that have been or are expected to be used during maintenance and upset circumstances of the carbon capture system.

## 2. Transportation of CO<sub>2</sub> Streams to UIC Class VI Injection Well

While there may be instances where captured CO<sub>2</sub> streams are injected on-site, most generators will likely transport their captured CO<sub>2</sub> streams to UIC Class VI wells located off-site, and therefore EPA considered the transportation of CO<sub>2</sub> streams under today's proposed conditional exclusion. Carbon dioxide itself is listed under the DOT regulations as a Class 2.2 hazardous material (non-flammable gas). See definitions in 49 CFR 172.101 and 173.115(b). By this designation as a hazardous material, CO<sub>2</sub> becomes subject to regulations established by DOT for the safe and secure transportation of hazardous materials in commerce. DOT's Pipeline Hazardous Materials Safety Administration (PHMSA) is charged with overseeing the movement of hazardous materials, including CO<sub>2</sub>, over all modes of transportation. For purposes of this proposal, EPA examined existing requirements for pipeline, and non-pipeline, modes of transportation.

*Pipeline Transport*—EPA presumes that pipeline transport of CO<sub>2</sub> streams will be the principal mode of transport for CCS activities, either using existing or newly-built pipelines. For example, in 2008, a Congressional Research Service report stated that "[t]ransporting captured CO<sub>2</sub> in relatively limited quantities is possible by truck, rail, and ship, but moving the enormous quantities of CO<sub>2</sub> implied by a widespread implementation of CCS technologies would likely require a dedicated interstate pipeline

network."<sup>37</sup> In the United States, there are approximately 3,600 miles of dedicated CO<sub>2</sub> pipelines, carrying about 50 million metric tons of CO<sub>2</sub> per year, primarily for EOR activities in the oil and gas industry.<sup>38</sup> Experience and knowledge gained by the oil and gas industry, which has used CO<sub>2</sub> pipelines over the past 35 years to transport large volumes of CO<sub>2</sub> to oil fields, is directly applicable to carbon capture and GS operations and, thus, there is much experience with this activity.

Pipeline transportation of CO<sub>2</sub> is subject to the PHMSA requirements in 49 CFR part 195, which apply to pipeline facilities used in the transportation of hazardous liquids or supercritical CO<sub>2</sub>.<sup>39</sup> As defined in 49 CFR 195.2, carbon dioxide is "a fluid consisting of more than 90 percent carbon dioxide molecules compressed to a supercritical state," which would include supercritical CO<sub>2</sub> streams transported for purposes of CCS. The requirements in 49 CFR part 195 govern pipeline design, construction, operation and maintenance, and emergency response planning, and EPA believes that by addressing these areas, the PHMSA requirements are consistent with the RCRA subtitle C goal of preventing releases in order to protect human health and the environment.

Additionally, PHMSA's goal is to improve the overall integrity of pipeline systems and reduce risks. See January 10, 2011 **Federal Register** (76 FR 1504). To evaluate risk adequately, the Hazardous Liquid and Gas Transmission Pipeline Integrity Management (IM) requirements were created (49 CFR 195.450 and § 195.452), which supplement PHMSA's safety regulations mentioned above. The goal of the IM requirements is to identify and evaluate the physical and operational characteristics of each individual pipeline system, in order to ensure the quality of pipeline integrity in areas with a higher potential for adverse consequences (high consequence areas or HCAs).<sup>40</sup> In addition, PHMSA's IM

<sup>37</sup> CRS Report for Congress. Carbon Dioxide (CO<sub>2</sub>) Pipelines for Carbon Sequestration: Emerging Policy Issues. Paul W. Parfomak and Peter Folger. January 17, 2008.

<sup>38</sup> CRS Report for Congress. Regulation of Carbon Dioxide (CO<sub>2</sub>) Sequestration Pipelines: Jurisdictional Issues. Adam Vann and Paul W. Parfomak. April 15, 2008.

<sup>39</sup> The pipeline transportation of carbon dioxide and hazardous liquids are both regulated under the same regulatory framework. "Hazardous liquids," for purposes of 49 CFR part 195, are defined by DOT as petroleum, petroleum products, and anhydrous ammonia, and are not the subject of this proposed rule. 49 CFR 195.2.

<sup>40</sup> HCAs include populated areas, and other areas particularly vulnerable to pipeline releases, such as

requirements promote a more rigorous and systematic management of pipeline integrity and risk by operators; maintain the government's prominent role in the oversight of pipeline operator integrity plans and programs; and increase the public's confidence in the safe operation of the nation's pipeline network. EPA believes that these requirements, which focus on preventing releases that might affect human populations and ecologically-sensitive areas, further support the conclusion in today's proposal that additional regulation of pipeline transportation under RCRA subtitle C is not necessary in order to protect human health and the environment.

With respect to there being no requirement to use a hazardous waste manifest under today's proposal for CO<sub>2</sub> streams that are conditionally excluded, it is important to note that under the RCRA subtitle C regulations, moving hazardous waste off-site through a pipeline does not trigger the use of a manifest, because pipelines are not included in the definition of "transportation" under RCRA subtitle C.<sup>41</sup> With respect to the use of a manifest, because the applicable requirements would not change under either the existing RCRA subtitle C regulations, or when managed in accordance with today's proposed conditional exclusion, there is no change in protection to human health and the environment under today's proposed rule. In fact, EPA notes that were CO<sub>2</sub> streams to be subject to RCRA subtitle C as hazardous waste, they would not be regulated any differently under the part 195 regulations that are applicable to supercritical CO<sub>2</sub> streams. Consultations with PHMSA staff indicate that whether a CO<sub>2</sub> stream is defined as hazardous waste under RCRA subtitle C (in this instance, if it were to exhibit a RCRA characteristic) does not change the technical and other requirements applicable to the transportation of supercritical CO<sub>2</sub> under PHMSA.<sup>42</sup>

Finally, EPA notes that it may be the case that some pipelines used to transport CO<sub>2</sub> are not subject to the DOT requirements, because they are located on-site at the generator facility or at the UIC Class VI facility. See, e.g., 49 CFR

195.1(b)(8). EPA requests information on how these pipelines are currently regulated, including any design and operating standards that apply to such pipelines. As discussed earlier in today's preamble, EPA assumes that in the typical case, captured CO<sub>2</sub> will not be stored at the generator facility, and will be transferred in a continuous manner either to an on-site or off-site UIC Class VI well. EPA is not proposing to apply RCRA subtitle C requirements to these pipelines as a condition of today's proposed rule (as stated earlier, absent storage of hazardous waste by generators, piping alone would not be subject to subtitle C regulation in any event); but EPA still requests comment on the appropriateness of applying the RCRA subtitle C standards to these non-DOT regulated pipelines.

*Non-Pipeline Transport*—While EPA expects that pipelines will be the most commonly used transportation method for moving supercritical CO<sub>2</sub> from its source to a UIC Class VI injection well, other forms of transportation other than pipeline (e.g., highway, rail) are still possible. Supercritical CO<sub>2</sub> streams being transported by means other than by pipeline must comply with applicable DOT hazardous materials transportation regulations, which address (for these modes of transportation) requirements, such as packaging, labeling, marking, placarding, emergency response, training, and shipping documentation. These regulations are found in 49 CFR parts 100–180 (hazardous materials regulations). EPA believes that these DOT requirements will adequately address risks to human health and the environment from the transportation of CO<sub>2</sub> and, therefore, additional RCRA subtitle C requirements specifically relating to transportation will not provide substantially more protection.

Where a hazardous waste manifest would otherwise be required for transporting CO<sub>2</sub> streams that meet the definition of hazardous waste, under today's proposed conditional exclusion, no hazardous waste manifest would be required. While the DOT hazardous materials shipping paper ensures that important information regarding the CO<sub>2</sub> stream accompanies the shipment, and that persons offering the CO<sub>2</sub> stream for transport must keep copies of the DOT shipping paper for two years, there is no tracking feature provided by the DOT shipping paper (as is the case for a hazardous waste manifest). EPA believes, however, that today's proposed rule will provide adequate incentive to ensure that the CO<sub>2</sub> stream is delivered to a UIC Class VI facility (for example, as discussed later in today's preamble,

EPA is proposing a condition requiring generators to certify that any CO<sub>2</sub> stream, which they claim to be excluded from RCRA subtitle C, has been delivered to a UIC Class VI facility). EPA believes that this proposed certification statement, which must be signed by the generator, provides a strong incentive to ensure delivery to the designated UIC Class VI facility; this is because generators who claim the exclusion, but fail to ensure delivery of their CO<sub>2</sub> stream that is hazardous to a Class VI facility, risk losing the exclusion and invoking the full hazardous waste requirements. Nonetheless, EPA notes that this certification statement does not provide the same type of tracking as a hazardous waste manifest would provide. Therefore, EPA requests comment on the extent to which non-pipeline transportation will be used specifically for transporting CO<sub>2</sub> streams to UIC Class VI facilities, and whether the use of the certification statement, together with compliance with applicable DOT hazardous material transportation requirements, are effective substitutes for the RCRA hazardous waste regulations that would apply to these specific circumstances.

### *C. Underground Injection of CO<sub>2</sub> Streams at UIC Class VI Wells*

The UIC Class VI regulations specifically preclude CO<sub>2</sub> streams that are defined as RCRA hazardous waste from being injected into a UIC Class VI well. See 40 CFR 146.81(d) (definition of Carbon Dioxide Stream in the UIC Class VI regulation). Instead, under the existing UIC and RCRA regulations, hazardous wastes (including CO<sub>2</sub> streams that meet the definition of hazardous waste)—if injected—must be injected into a Class I hazardous waste well. As already discussed, EPA has little information about whether CO<sub>2</sub> streams would exhibit a RCRA hazardous waste characteristic (in particular, the TC). However, because it is possible that captured CO<sub>2</sub> streams could contain low concentrations of contaminants which could cause a waste to be identified as hazardous by the TC (e.g., arsenic, mercury, selenium),<sup>43</sup> EPA considered whether the injection of captured CO<sub>2</sub> streams into UIC Class VI wells would be properly managed, such that subtitle C regulation was duplicative and unnecessary.

<sup>43</sup> Apps, J.A., *A Review of Hazardous Chemical Species Associate with CO<sub>2</sub> Capture from Coal-Fired Power Plants and Their Potential Fate in CO<sub>2</sub> Geologic Storage*, Lawrence Berkeley National Laboratory, March 2006.

drinking water resources or certain ecologically-sensitive areas. 49 CFR 195.450.

<sup>41</sup> 40 CFR 260.10, 262.20(a)(1), and 263.20(a)(1). See also Memorandum from Marcia Williams, Director, Office of Solid Waste, to Barry [sic] Seraydarian, Director, Toxics and Waste Management Division, EPA Region 9, April 30, 1986.

<sup>42</sup> Memorandum to Docket EPA-HQ-RCRA-2010-0695, Personal Communication with Vince Holohan, PHMSA, U.S. DOT.

The UIC Class VI requirements are designed to ensure that the CO<sub>2</sub> and any incidental associated substances will be isolated within the injection zone, and thus protect USDWs from endangerment. The UIC Class VI requirements are designed for the unique characteristics of CO<sub>2</sub>, including its buoyancy relative to other fluids in the subsurface, which requirements account for the potential presence of impurities (including hazardous contaminants which could cause the waste to be identified as hazardous by the TC) in captured CO<sub>2</sub>. See 75 FR at 77234–5 (December 10, 2010). Thus, EPA expects that compliance with the UIC Class VI requirements, which are designed to ensure isolation of supercritical CO<sub>2</sub> streams, will also address the potential for effects on human health and the environment from the contaminants present in the stream. Below is a description of key elements of the UIC Class VI requirements that EPA believes will ensure protection of human health and the environment, such that RCRA subtitle C regulation would be duplicative and unnecessary.

#### 1. Development of UIC Class VI Wells Under SDWA

Section 1421(d)(2) of the SDWA provides, “Underground injection endangers drinking water sources if such injection may result in the presence in underground water which supplies or can reasonably be expected to supply any public water system of any contaminant, and if the presence of such contaminant may result in such system’s not complying with any national primary drinking water regulation or may otherwise adversely affect the health of persons.” Pursuant to § 1421(d)(2), the UIC program requirements for all well classes, promulgated under the authority of the SDWA, are designed to comprehensively ensure that an injection well is appropriately sited, operated, tested, monitored, and closed in a manner that ensures USDW protection and does not otherwise adversely affect the health of persons.<sup>44</sup>

<sup>44</sup> For example, the following general standard in the SDWA regulations applies to all classes of UIC wells: “No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons. The applicant for a permit shall have the burden of showing that the requirements of this paragraph are met.” 40 CFR 144.12(a).

In developing standards for CO<sub>2</sub> injection for GS, the Agency evaluated the applicability of the existing UIC program requirements for Class I wells (hazardous and non-hazardous) through Class V wells, and determined that new, tailored regulations to address the injection of supercritical CO<sub>2</sub> streams for GS, including any associated constituents that may be present in the CO<sub>2</sub> streams, were warranted in order to protect USDWs from endangerment. In October 2007, EPA announced that it would develop tailored regulations for GS, by adapting the existing UIC program framework and by relying on that program’s experience—over 25 years—in regulating the injection of fluids, including CO<sub>2</sub> injected for enhanced hydrocarbon recovery. The Class VI rule, finalized in December 2010, includes specific requirements designed to address the unique nature of CO<sub>2</sub> injection for GS, including the large CO<sub>2</sub> injection volumes anticipated at GS projects, the relative buoyancy of CO<sub>2</sub>, its mobility within subsurface geologic formations, and its corrosivity in the presence of water. In addition, EPA recognized that the CO<sub>2</sub> stream could contain impurities, including those which could cause the waste to exhibit the TC under the RCRA subtitle C regulations.

Throughout the regulatory development process for the Class VI requirements, the UIC program, in coordination with other EPA program offices, stakeholders, and the public relied upon the existing UIC regulatory framework and applicable requirements of other well classes (*i.e.*, Class II, Class I industrial, Class I hazardous), as appropriate. However, the Agency recognized that these established programmatic requirements required certain modifications and enhancements with respect to CO<sub>2</sub> injection for GS in order to ensure USDW protection.

#### 2. Key Elements of the UIC Class VI Well Requirements

The UIC Class VI final regulations include specific requirements tailored to the particular nature of CO<sub>2</sub> injection for GS. These program elements include site characterization, area of review (AoR) delineation, corrective action,<sup>45</sup>

<sup>45</sup> EPA notes that the term “corrective action” is used in both the SDWA and RCRA programs, but refers to different activities under each. Under the UIC Class VI rule, the phrase refers to actions taken to correct situations where artificial penetrations (*e.g.*, wells) could serve as unwanted conduits for CO<sub>2</sub> or other fluid movement into or between USDW within the AoR. See 40 CFR 144.55, 146.7, and 146.64. Under RCRA subtitle C, corrective action generally refers to actions taken to address releases of hazardous wastes or hazardous constituents from solid waste management units at

well construction and operation, testing and monitoring, post-injection site care, site closure, and financial responsibility. Together, these program elements provide a comprehensive approach for verifiable isolation of the CO<sub>2</sub> stream within the injection zone to ensure protection of USDWs from endangerment. Although not an exhaustive list, some requirements tailored for GS (Class VI) include:

- Class VI well owners or operators must conduct and submit, with the permit application, an extensive, detailed assessment of the geologic, hydrogeologic, geochemical, and geomechanical properties of the proposed GS site to ensure that GS wells are located in suitable geologic formations, and that the geology provides containment. The owner or operator must also select a site with an injection zone of sufficient areal extent, thickness, porosity and permeability to receive the total anticipated volume of the CO<sub>2</sub> stream, and, confining zones free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected CO<sub>2</sub> stream and displaced formation fluids. Class VI requirements also mandate a thorough process for the identification of features that might compromise the integrity of the containment system (*e.g.*, abandoned wells) and remediation of those features through corrective action, within the AoR. Existing UIC regulations, including those for Class I hazardous wells, require that owners or operators define the AoR, within which they must identify artificial penetrations and determine whether they have been properly constructed or plugged; the Class VI regulations are consistent with this approach.

- Class VI well owners or operators must delineate the AoR using a sophisticated computational model that incorporates available site characterization data and planned operational conditions. Throughout the life of the project, the AoR must be periodically reevaluated (at least once every 5 years) through the use of monitoring and operational data to verify that the CO<sub>2</sub> plume and the associated area of elevated pressure are moving as predicted within the subsurface, and that the injected CO<sub>2</sub> stream is isolated within the injection zone. With the exception of the UIC Class VI regulations, the existing UIC regulations (including Class I hazardous) do not include a requirement to reevaluate the AoR and

a treatment, storage, or disposal facility. The RCRA corrective action aspects of this proposed rule are discussed in Section IV.C.4 of this preamble.

corrective action plan. This reevaluation is an additional level of protection that has been added for Class VI wells in order to address the unique characteristics of the CO<sub>2</sub> stream injectate. This reevaluation will provide an ongoing dialogue between the Director and the owners or operators, while ensuring that if a circumstance changes, the AoR will be updated to address those changes, while ensuring protection of USDW. Because there will be inevitable plume movement, a reevaluation was deemed to be necessary to protect USDW for Class VI wells.

○ Class VI well owners or operators must also identify and evaluate all artificial penetrations within the AoR, and based on this review, identify the wells that need corrective action to prevent the movement of CO<sub>2</sub> or other fluids into or between USDWs. Owners or operators must perform corrective action to address deficiencies in any wells (regardless of ownership) that are identified as potential conduits for fluid movement into USDWs. The Director must approve the methods used to identify the wells and the corrective action selected by the owners or operators. This inventory and review process is similar to what is required of all Class I and Class II injection well owners or operators.

○ Class VI wells must meet the same stringent injection well construction standards as Class I hazardous waste wells, in order to ensure that the well itself does not serve as a conduit for fluid movement. In addition, the Class VI rule requires that all well construction materials be compatible with the fluids with which the materials may come in contact (e.g., fluid formations; CO<sub>2</sub> streams) over the life of the GS project. Class VI operating requirements also ensure that injection in a Class VI well will not propagate fractures within the injection and/or confining zones that could compromise containment.

○ Class VI owners or operators must conduct robust monitoring to ensure the integrity of the injection well, detect any changes in groundwater geochemistry that may indicate leakage, and track the evolution of the CO<sub>2</sub> stream and associated pressure front. Class VI monitoring requirements are generally more detailed and rigorous than those for Class I hazardous waste injection wells, and are designed to verify isolation of the injected CO<sub>2</sub> stream, and allow for early-warning of any possible fluid leakage.

○ The Class VI rule contains tailored requirements for extended, comprehensive post-injection

monitoring and site care of GS projects following cessation of injection, until it can be demonstrated that movement of the CO<sub>2</sub> plume and pressure will not pose a risk of endangerment to USDWs. Owners or operators must also plug injection and monitoring wells in a manner that protects USDWs. Proper plugging of injection and monitoring wells is a long-standing requirement in the UIC Program to ensure that existing wells do not serve as conduits for fluid movement following cessation of injection and site closure. Post-injection site care (PISC), which is unique to GS and Class I hazardous wells in the UIC program, is a protective measure that requires site monitoring to continue in order to ensure the injectate and any mobilized fluids do not pose a risk to USDW.

○ Class VI provisions require that owners or operators maintain financial responsibility obligations guaranteeing that funds will be available for all SDWA corrective action, injection well plugging, PISC, site closure, and emergency and remedial response.

These elements of the Class VI requirements are designed to provide verifiable control of the CO<sub>2</sub> stream at the Class VI well, and containment of that stream within the injection zone, in order to ensure protection of USDW from endangerment. EPA believes that the elimination of exposure routes through these requirements will ensure protection of human health and the environment, and views this as determinative in its evaluation of whether the RCRA subtitle C regulatory requirements for hazardous waste disposal provide any substantial, additional protection for CO<sub>2</sub> streams which exhibit a characteristic of hazardous waste and are disposed in UIC Class VI wells. Thus, EPA concludes (subject to consideration of public comment) that a conditional exclusion from RCRA subtitle C requirements is warranted for CO<sub>2</sub> streams that are injected into UIC Class VI wells for purposes of GS.

### 3. RCRA Land Disposal Restrictions

Under today's proposed rule, a CO<sub>2</sub> stream that is conditionally excluded from the definition of hazardous waste would not be subject to the RCRA land disposal restriction (LDR) requirements in 40 CFR part 148 that apply to restricted hazardous wastes that are disposed of in UIC wells. EPA considered how the conditions proposed in today's rule compare to the protections afforded by the RCRA LDR requirements (that would otherwise apply to a CO<sub>2</sub> stream that exhibits a RCRA characteristic and is disposed of

in an injection well). As discussed below, EPA believes that with respect to CO<sub>2</sub> streams that are conditionally excluded for purposes of GS, the LDR requirements would not provide more protection to human health and the environment than the UIC Class VI requirements provide.

The LDR program ensures that hazardous waste cannot be placed on or under the land—i.e., land disposed—until the waste meets specific treatment standards to reduce the mobility or toxicity of the hazardous constituents in the waste. These treatment standards are waste-code specific, and either specify an allowable concentration of hazardous constituents or specify a method of treatment. These treatment standards must be satisfied before land disposal of the waste occurs. The alternative to meeting the treatment standards is to make a successful demonstration to EPA that no hazardous constituents will migrate from the disposal unit (or, in the case of injection wells, the “injection zone” (see RCRA section 3004(d)(1)) for as long as the waste remains hazardous (a “no-migration” petition). See RCRA sections 3004(f) and (m). The LDR requirements are found in 40 CFR part 268, and the LDR requirements regarding injection wells are located in 40 CFR part 148.

LDR requirements attach to wastes that are hazardous at the point of generation. *Chemical Waste Management v. EPA*, 976 F. 2d 2, 13,14 (D.C. Cir. 1992), so that if a waste is conditionally excluded from being a hazardous waste, LDRs do not apply. EPA evaluated the protections afforded under the Class VI regulations and the LDR program to assure that this is an appropriate outcome here.

Class VI wells are required to demonstrate (through the initial permitting process, and periodically during the operational life of the well), on a well-by-well basis, that there are no features near an injection well that would allow injected fluid to move into a USDW or displace native fluids into USDWs resulting in their endangerment. EPA interprets the UIC Class VI isolation requirements as meeting the objectives of the RCRA LDR requirements. This is because the same individualized determination, using the same or similar decision tools, with essentially the same ultimate determination (no migration of hazardous constituents from the injection zone of either a Class VI well or a Class I hazardous waste well) would apply in either instance.

EPA thus believes (subject to consideration of public comment) that the Class VI well review process and

isolation requirements will meet essentially the same requirements and objectives as the RCRA no-migration process, affords similar procedural safeguards (individualized determinations in both instances), and will protect human health and the environment via proper management under the Class VI regulations. Thus, the proposed conditional exclusion appears reasonable with respect to otherwise-applicable LDR requirements.

In addition, we note that RCRA section 1006(b) provides that EPA “shall integrate all provisions of this chapter for purposes of administration and enforcement and shall avoid duplication, to the maximum extent practicable, with the appropriate provisions of the \* \* \* Safe Drinking Water Act.” For the reasons just discussed, it appears that the RCRA LDR provisions duplicate the requirements and procedures of the Class VI rules and that a conditional exclusion from being a hazardous waste avoids this duplication. See *Chemical Waste Management v. EPA*, 976 F. 2d 2, 23–24 (integration of RCRA LDR and Clean Water Act direct discharger requirements).

#### 4. Subtitle C Corrective Action

EPA also reviewed the subtitle C corrective action requirements, which apply to any hazardous waste treatment, storage or disposal facility, including Class I UIC hazardous waste facilities. Under today’s proposed conditional exclusion, CO<sub>2</sub> streams that would otherwise be defined as RCRA hazardous waste (because they exhibit a RCRA characteristic) and meet the proposed conditions, would not be defined as hazardous waste. Therefore, the RCRA corrective action requirements would not be triggered at the UIC Class VI facility as a result of the management of conditionally-excluded CO<sub>2</sub> streams. EPA does not believe, however, that the absence of RCRA corrective action authority at a Class VI UIC facility is of concern with respect to the management of excluded CO<sub>2</sub> streams in the Class VI UIC well under a SDWA permit. In EPA’s view, the comprehensive Class VI UIC regulations provide multiple, enforceable mechanisms to correct permit violations and other situations that may pose a risk to USDW. These include enforceable requirements to develop, maintain, and update an emergency and remedial response plan, and to undertake emergency or remedial response actions for any unauthorized releases from the well or injection zone. See 40 CFR 146.94.

#### 5. Conclusion

In conclusion, consistent with the SDWA and RCRA, the integrated application, implementation, and enforcement of the UIC Class VI requirements will protect human health and the environment by ensuring that the CO<sub>2</sub> streams (which may include low concentrations of hazardous constituents as discussed above) remain isolated in the injection zone and confined by confining zones in an appropriate, well-characterized geologic setting, that is continuously monitored to ensure that the CO<sub>2</sub> streams remain in the injection zone. EPA believes that with respect to CO<sub>2</sub> streams as discussed in today’s proposed conditional exclusion, the existing UIC Class VI requirements sufficiently address any potential risk to human health and the environment, such that subtitle C regulation is unwarranted.

#### *D. Prohibition on Introduction of Other RCRA Hazardous Wastes*

The UIC Class VI well program was specifically developed for the unique purpose of GS of CO<sub>2</sub> streams. Today’s proposed conditional exclusion only applies to CO<sub>2</sub> streams that have been captured for purposes of GS and are to be injected into a UIC Class VI well. EPA is proposing to limit the scope of this exclusion by including a condition that no other hazardous waste can be mixed with, or otherwise co-injected with, the CO<sub>2</sub> streams as defined in today’s proposed rule. Thus, if hazardous waste is mixed with the CO<sub>2</sub> stream, under today’s proposal that stream would not be eligible for the conditional exclusion. That stream would need to be managed as a RCRA hazardous waste, and, if well injection is selected as the means of disposal, injected into a UIC Class I hazardous well.

EPA expects that where facilities have made the significant economic commitment to capture and/or inject CO<sub>2</sub> streams for purposes of GS, such facilities will not wish to jeopardize this arrangement by mixing hazardous waste into the CO<sub>2</sub> stream in violation of the explicit prohibition in the UIC Class VI rule, as well as the condition being proposed today in 40 CFR 261.4(h)(1)(iii). EPA seeks to safeguard the efforts of the CO<sub>2</sub> sources and injection facilities that comply with the regulatory scheme that is enforceable and is structured to ensure compliance, thus obtaining the full benefit of the regulation that the public expects.

In order to better ensure that CO<sub>2</sub> sources and UIC Class VI injection

facilities choosing to use this conditional exclusion fully comply with the conditions of the exclusion, including the prohibition on mixing hazardous waste with the CO<sub>2</sub> stream, EPA is proposing that a certification statement be executed by an authorized representative of the generator and the Class VI injection facility owner/operator. The term “authorized representative” is defined in the RCRA regulations to mean “the person responsible for the overall operation of a facility or an operational unit (*i.e.*, part of a facility), *e.g.*, the plant manager, superintendent or person of equivalent responsibility.” 40 CFR 260.10.

Because the function of the certification statement is to ensure compliance with the conditions of the proposed conditional exclusion, EPA requests comment on whether it should limit the categories of employees who would be required to sign this certification statement, to senior employees in the same manner as that which is required for RCRA permit applications under 40 CFR 270.11(a). Under this alternative approach, certification statements (for corporations) would need to be signed by a “responsible corporate officer” as defined in § 270.11(a)(1)(i), or, plant managers for facilities over a certain size as defined in § 270.11(a)(1)(ii); by a general partner or proprietor (for general partnerships or sole proprietorships, respectively) as specified in § 270.11(a)(2); or, for public agencies, the chief executive officer, or certain other senior officers of that agency, as defined in § 270.11(a)(3). Accountability and enforceability may be improved when signatories to these types of certifications are at the highest levels of an organization.

EPA is not requiring that these certifications be submitted to the Agency; rather, EPA is proposing that the signed certification statement be kept on-site for no less than three years, and that these signed certifications be made available within 72 hours of a written request from the Regional Administrator (or state Director, if located in a state implementing the conditional exclusion as part of their authorized RCRA program).<sup>46</sup> EPA believes the retention time of three years is reasonable and appropriate, and consistent with the existing subtitle C recordkeeping requirements (*e.g.*, 40 CFR 262.40 and 268.7(a)(8) for

<sup>46</sup> “Regional Administrator” as defined under RCRA subtitle C (40 CFR 260.10) includes any designee of the Regional Administrator; therefore, written requests may be made by a designee of the Regional Administrator or state Director. Today’s proposed regulatory text reflects this.

generators; 264.73 for TSDFs). Because EPA is not requiring the submittal of signed certification statements, today's proposed rule does not impose any new reporting requirements; however, EPA will be aware of the universe of generator and UIC Class VI facilities that may potentially claim this proposed conditional exclusion, because under the existing regulatory framework for GS, facilities that capture and sequester CO<sub>2</sub> must identify themselves, and report specific information regarding their CO<sub>2</sub> capture and GS activity, to the Agency.<sup>47</sup> Therefore, EPA believes that it will have adequate opportunity to determine whether any particular facility is claiming the exclusion, as it anticipates a relatively gradual increase in the deployment of CCS activities in the near term. EPA is also proposing that these certifications shall be renewed every year that the generator or UIC Class VI well owner/operator claims the RCRA conditional exclusion, in order to ensure that the certification is kept current (e.g., facility personnel may change, etc.). This yearly renewal of the certification statement means that an authorized representative must annually prepare and sign a new copy of the certification statement, to be retained on-site for no less than three years.

The language for this certification is in proposed 40 CFR 261.4(h)(1)(iv), and reads as follows:

I certify under penalty of law that the carbon dioxide stream that I am claiming to be excluded under 40 CFR 261.4(h)(1) meets all of the conditions set forth in that paragraph."

While EPA is not currently aware of specific examples where hazardous wastes are being mixed into or with CO<sub>2</sub> streams, particularly at this early stage of CCS deployment, well-designed rules are essential to the success of future enforcement efforts. EPA requests comment on the certification statement, and particularly seeks comment on whether this measure will appropriately ensure compliance with the conditional exclusion, including the mixing prohibition. EPA also requests comment on how CO<sub>2</sub> sources, who add excluded CO<sub>2</sub> streams into an existing (or future) CO<sub>2</sub> pipeline network, can ensure that the CO<sub>2</sub> reaches a UIC Class VI facility. Finally, EPA requests comment on whether transporters, as well as pipeline

owners and operators, should also sign such a certification statement.

In addition to the conditions and requirements being proposed today, the Agency recognizes that other conditions or requirements could possibly improve EPA's and the states' ability to monitor compliance with the mixing prohibition. For example, there are certain existing requirements for the physical and chemical characterization of CO<sub>2</sub> streams that apply at the UIC Class VI facility (discussed in Section III.E. of this preamble), and the prohibition that no hazardous waste be injected in the UIC Class VI well. However, there are no CO<sub>2</sub> stream characterization requirements that EPA could identify upstream of the UIC Class VI well, such as at the CO<sub>2</sub> source or in a pipeline, other than the general requirement that generators make a hazardous waste determination for any solid waste they generate (40 CFR 262.11), and the PHMSA requirement that supercritical CO<sub>2</sub> streams be chemically compatible with the pipeline and any commodities in the pipeline (49 CFR 195.4), and will not corrode the pipeline and pipeline system (49 CFR 195.579).<sup>48</sup> EPA requests comment, including supporting information, on whether (and if so, what type of) additional monitoring, recordkeeping, and reporting of the CO<sub>2</sub> composition by generators and transporters (including pipeline operators), might aid EPA and the states in their ability to detect improper mixing of hazardous waste with CO<sub>2</sub> streams. EPA also requests comment on whether there are other conditions, such as a minimum CO<sub>2</sub> content, that could enhance compliance with the proposed "no mixture" condition. For example, EPA is aware that under the PHMSA requirements for the pipeline transportation of supercritical carbon dioxide, the definition of carbon dioxide specifies a CO<sub>2</sub> content of greater than ninety percent. 49 CFR 195.2. EPA also requests comment on what commercial, operational, or regulatory requirements or specifications already exist regarding CO<sub>2</sub> content in the management of supercritical CO<sub>2</sub>.

EPA notes that it is requesting comment on whether persons engaged in the movement of conditionally-excluded CO<sub>2</sub> streams, including

transporters, as well as pipeline owners or operators, should certify that they meet the conditions of today's proposed conditional exclusion. EPA is also requesting comment on whether any new monitoring, recordkeeping or reporting requirements are necessary (including as those might apply to pipeline owners or operators) to ensure that the conditions of the proposed exclusion are met. EPA emphasizes that aside from seeking comment in these two areas, EPA is not proposing any new requirements applicable to pipelines or pipeline owner/operators.

EPA understands that much of the existing U.S. pipeline infrastructure is used to transport materials that are not RCRA solid wastes. EPA also appreciates that because of this, the potential application of subtitle C jurisdiction may raise questions over whether EPA is proposing to extend its existing RCRA jurisdiction in today's proposed rule. EPA wishes to clarify that this is not the case, as EPA generally already has RCRA jurisdiction over solid and hazardous waste. While pipelines are not included in the definition of "transportation" under the RCRA subtitle C regulations (40 CFR 260.10), EPA retains RCRA subtitle C jurisdiction over solid and hazardous wastes generally, including when these materials are in pipelines. At the same time, however, EPA again notes that, provided the conditions proposed today are met (when final), persons engaged in transportation or pipeline delivery of conditionally-excluded CO<sub>2</sub> streams are not managing a RCRA hazardous waste.

#### *E. Loss of the Conditional Exclusion*

The conditional exclusion being proposed today does not preclude regulation or enforcement by EPA or the states against generators, transporters, or treatment, storage, or disposal facilities who are not eligible for the conditional exclusion, or who do not meet the conditions of the exclusion. Because this hazardous waste exclusion is conditional, a claimant must meet the conditions to qualify for and maintain the exclusion from the hazardous waste regulations. Failure to meet the conditions results in the loss of the exclusion. As proposed, a violation of a condition at any point in the management of a CO<sub>2</sub> stream would result in that CO<sub>2</sub> stream being subject to all applicable subtitle C regulatory requirements, from the point of generation. Thus, a violation of a condition at a UIC Class VI facility, for example, would mean that in addition to the UIC Class VI facility, the generator and transporter would also be considered to be managing (or to have

<sup>47</sup> Under subparts PP and RR of the GHG reporting program, facilities that capture CO<sub>2</sub> and facilities that inject CO<sub>2</sub> underground for GS (including UIC Class VI facilities) have certain reporting requirements. For more information, see Section III of this preamble.

<sup>48</sup> The Agency is also aware that supercritical CO<sub>2</sub> pipeline owner/operators follow certain requirements and specifications related to monitoring supercritical CO<sub>2</sub> composition, including water content, and the identification of any impurities or other inert materials, that might negatively affect CO<sub>2</sub> transport, or otherwise take up needed space. Pers. comm., Doug McMurrey, V.P. for Marketing and Business Development, Kinder Morgan, 7-21-2010.

managed) a hazardous waste. Moreover, imminent and substantial endangerment provisions under § 7003 of RCRA will continue to apply to conditionally-excluded CO<sub>2</sub> streams as a safeguard in the unlikely event of a release which could pose a health or environmental threat. This is true even if the CO<sub>2</sub> stream does not otherwise meet the regulatory definition of hazardous waste.<sup>49</sup>

#### F. Adaptive Approach

EPA is using an adaptive approach in the UIC Class VI final rule to allow it to consider making changes to the UIC Class VI program to incorporate new research, data, and information about GS and associated technologies. In the UIC Class VI final rule, EPA stated that the Agency plans, every six years, to review the rulemaking and data on GS projects to determine whether the appropriate amount and types of information and appropriate documentation are being collected, and to determine if modifications to the UIC Class VI requirements are appropriate or necessary. See December 10, 2010 **Federal Register** (75 FR at 77240–41, 77243, and 77257). This new information may increase protectiveness, streamline implementation, or otherwise inform the requirements for GS injection of CO<sub>2</sub>.

Consistent with EPA's stated intent in the UIC Class VI rule, EPA also plans to evaluate any new information related to the conditional exclusion being proposed today at the same time as is planned for the UIC Class VI rule. EPA intends to use the information gathered by the UIC Class VI program described above, as well as additional information, such as data on the chemical and physical characteristics of the CO<sub>2</sub> streams being injected, to inform its consideration of whether changes should be made to the conditional exclusion (such changes could require additional rulemaking). Thus, the Agency commits to reviewing, in coordination with the adaptive approach planned for the UIC Class VI rule, new research, data, and information related to today's proposed

conditional exclusion (if finalized), particularly with respect to compliance with the conditions of the exclusion, and the nature and composition of the CO<sub>2</sub> stream.

#### G. Definition of Carbon Dioxide Stream

Today, EPA is also proposing to add a definition for the term *carbon dioxide (CO<sub>2</sub>) stream* to the hazardous waste regulations in 40 CFR 260.10. Under today's proposed rule, *carbon dioxide (CO<sub>2</sub>) stream* is defined as "carbon dioxide that has been captured from an emission source (e.g., a power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process." The same definition is used in the UIC Class VI regulations in 40 CFR 146.81(d), with one exception. The definition in § 146.81(d) includes additional language that reads, "This subpart does not apply to any carbon dioxide stream that meets the definition of a hazardous waste under 40 CFR part 261," thus, prohibiting the injection of hazardous waste into UIC Class VI wells. Because today's conditional exclusion would apply to CO<sub>2</sub> streams that are otherwise RCRA hazardous wastes, EPA did not include similar language in today's proposed definition of carbon dioxide stream. EPA intends for the two definitions to work in concert, however, such that it is clear that both RCRA hazardous CO<sub>2</sub> streams (that are excluded when managed pursuant to the terms of today's proposed conditional exclusion) and non-hazardous CO<sub>2</sub> streams may be injected into a UIC Class VI well. Finally, EPA notes that in today's proposed definition, "substances added to the stream to enable or improve the injection process" refers to non-waste substances that serve the legitimate purpose as stated (i.e., to enable or improve the injection process), and does not include listed or characteristic hazardous wastes. EPA requests comment on the types and characteristics of substances that are added to CO<sub>2</sub> streams to enable or improve the injection process.

#### V. State Authorization

##### A. Applicability of the Rule in Authorized States

Under Section 3006 of RCRA, EPA may authorize qualified states to administer their own hazardous waste programs in lieu of the Federal program within the state. Following authorization, EPA retains enforcement authority under Sections 3008, 3013,

and 7003 of RCRA, although authorized states have primary enforcement responsibility. The standards and requirements for state authorization are found at 40 CFR part 271.

Prior to enactment of the Hazardous and Solid Waste Amendments of 1984 (HSWA), a state with final RCRA authorization administered its hazardous waste program entirely in lieu of EPA administering the Federal program in that state. The Federal requirements no longer applied in the authorized state, and EPA could not issue permits for any facilities in that state, since only the state was authorized to issue RCRA permits. When new, more stringent Federal requirements were promulgated, the state was obligated to enact equivalent authorities within specified time frames. However, the new Federal requirements did not take effect in an authorized state until the state adopted the Federal requirements as state law.

In contrast, under RCRA Section 3006(g) (42 U.S.C. 6926(g)), which was added by HSWA, new requirements and prohibitions imposed under HSWA authority take effect in authorized states at the same time that they take effect in unauthorized states. EPA is directed by the statute to implement these requirements and prohibitions in authorized states, including the issuance of permits, until the state is granted authorization to do so. While states must still adopt HSWA related provisions as state law to retain final authorization, EPA implements the HSWA provisions in authorized states until the states do so.

Authorized states are required to modify their programs only when EPA enacts Federal requirements that are more stringent or broader in scope than existing Federal requirements. RCRA Section 3009 allows the states to impose standards more stringent than those in the Federal program (see also 40 CFR 271.1). Therefore, authorized states may, but are not required to, adopt Federal regulations that are considered less stringent than previous Federal regulations.

##### B. Effect on State Authorization

The provisions in today's notice are proposed pursuant to non-HSWA authority, and would eliminate the hazardous waste requirements for those CO<sub>2</sub> streams that would otherwise meet the definition of hazardous waste, when these streams are managed in accordance with certain conditions. Therefore, this proposed exclusion is less stringent than the Federal program, and states are not required to adopt this

<sup>49</sup>EPA also notes that existing obligations to address corrective action at RCRA treatment, storage, and disposal facilities would not be affected by this proposed rule. In addition, today's proposed conditional exemption would not preclude RCRA corrective action requirements from applying to a Class VI UIC facility if the facility were to engage in the management of hazardous waste that would require a RCRA permit (e.g., if the conditions of today's proposed exemption were not met and the previously exempt CO<sub>2</sub> streams were no longer exempt; or, if other hazardous wastes were treated, stored, or disposed of at the facility).



provision.<sup>50</sup> Nevertheless, while states do not have to adopt this provision, EPA strongly encourages them to do so, because this amendment will substantially reduce the uncertainty associated with defining and managing these CO<sub>2</sub> streams under RCRA subtitle C, which will remove the uncertainty regarding the type of permit needed for the GS of CO<sub>2</sub> streams.

EPA notes that because the conditional exclusion is less stringent than the current RCRA program, states are not required to adopt this rule, if finalized.<sup>51</sup> In situations involving the interstate transportation of conditionally-excluded waste, the exclusion must be authorized in the state where the waste is generated, any states through which the waste passes, and the state where the UIC Class VI injection well is located, in order for that conditionally-excluded waste to be managed as excluded from subtitle C from point of generation to injection in a UIC Class VI well. A state that has not adopted the conditional exclusion may impose state requirements, including the uniform hazardous waste manifest requirement, if characteristically-hazardous CO<sub>2</sub> streams are being transported through that state.<sup>52</sup>

#### VI. What are the costs and benefits of the proposed rule?

The economic assessment conducted in support of this action evaluated the costs, benefits, small entity impacts, environmental justice, and other impacts (*e.g.*, children's health, unfunded mandates, federalism) of the proposal. As part of the evaluation of potential costs and benefits, EPA first prepared a baseline characterization of the potentially affected universe. We then assessed the "baseline" behavior that the affected entities could be expected to display in the absence of the proposed rule. This baseline provided a reference point from which the incremental costs and benefits of the proposed rule were measured. Finally,

<sup>50</sup> EPA notes that decisions regarding whether a state rule is more stringent or broader in scope than the Federal program are made when the Agency authorizes state programs.

<sup>51</sup> Some states incorporate the Federal regulations by reference, or have specific state statutory requirements that their state program can be no more stringent than the Federal regulations. In those cases, EPA anticipates that the conditional exemption proposed today, if finalized, would be adopted by these states, consistent with state laws and administrative procedures (unless explicit action is taken by such a state to decline the revisions, as specified under that state's laws).

<sup>52</sup> As discussed in Section IV.B.2. of this preamble, the off-site movement of hazardous waste through pipelines does not require the use of a hazardous waste manifest under the Federal subtitle C hazardous waste regulations.

we estimated how the affected entities would likely change their behavior in response to the rule, as proposed. The analysis estimated incremental costs and benefits of the proposed rule over a 50-year period.<sup>53</sup>

The universe of entities that may be directly affected by the proposed rule include CO<sub>2</sub> generators/captors, transporters, and sequestration facilities. CO<sub>2</sub> generator facilities are likely to be entities that capture their CO<sub>2</sub> byproducts and manage them in a manner other than releasing them into the atmosphere. Currently, EPA estimates that, at a maximum, there could be up to 27 CO<sub>2</sub> capture facilities affected by the proposed rule. This estimate includes ten facilities that currently capture CO<sub>2</sub>, along with 17 facilities expected to begin CO<sub>2</sub> capture in the future. These 27 capture facilities include fossil fuel electric power generators, oil and gas extraction facilities, natural gas distribution facilities, ethyl alcohol manufacturers, and nitrogenous fertilizer manufacturers. Our low-end estimate considers only 13 CO<sub>2</sub> capture facilities. This includes ten existing capture facilities, two capture projects associated with named DOE pilot projects, and one capture facility associated with the FutureGen Federal/private partnership.

EPA expects that captured CO<sub>2</sub> will generally be transported by pipeline. As of 2008, there were 30 operating CO<sub>2</sub> pipelines in the U.S., operated by 29 separate entities. CO<sub>2</sub> sequestration facilities inject the CO<sub>2</sub> streams into UIC wells for the purposes of sequestration. This sequestration may be conducted either with or without concurrent EOR. However, EOR itself is outside the scope of this rule, as proposed.<sup>54</sup> EPA estimates that as many as 29 planned sequestration facilities could be affected by the proposed rule. This estimate includes 15 planned commercial CO<sub>2</sub> sequestration projects and 14 planned projects funded by DOE. The 15 planned commercial projects are expected to include 12 EOR projects that transition to sequestration in the

<sup>53</sup> This 50-year time period is consistent with the Office of Water Analysis for the Final Geologic Sequestration Rule: Draft Cost Analysis for the Federal Requirements Under the Underground Injection Control Program for Carbon Dioxide Geologic Sequestration Wells (Final GS Rule), EPA 816-R-10-013, July 2010.

<sup>54</sup> EPA notes that today's proposed conditional exclusion only applies to CO<sub>2</sub> streams that are to be injected into UIC Class VI wells; however, other classes of UIC wells that inject CO<sub>2</sub> streams (*e.g.*, Class II wells conducting EOR and Class V experimental wells) can transition to Class VI wells under certain conditions outlined in the final UIC Class VI rule. December 10, 2010 (75 FR at 77243-77249).

long term and 3 saline reservoir sequestration projects.<sup>55</sup> Our low-end estimate considers only six CO<sub>2</sub> sequestration facilities that will be Class VI UIC wells. This includes five sequestration projects associated with named DOE pilot projects and one sequestration facility associated with the FutureGen Federal/private partnership.

In the baseline (absence of the proposed rule), generators of the captured CO<sub>2</sub> streams would have to determine if their CO<sub>2</sub> stream(s) is (are) a RCRA hazardous waste. Depending upon this determination, a capture facility is most likely to engage in one of four baseline management practices: (1) For CO<sub>2</sub> streams that are determined to be nonhazardous waste, transport the material to a sequestration facility for injection in a Class VI well; for CO<sub>2</sub> streams that are determined to be hazardous waste, either (2) cease capturing the CO<sub>2</sub> stream—that is, continue to allow the CO<sub>2</sub> stream to be emitted into the atmosphere; or (3) transport the CO<sub>2</sub> stream to a sequestration facility for injection in a Class I hazardous well; or (4) treat the CO<sub>2</sub> stream so that it is no longer hazardous and transport it to a sequestration facility for injection in a Class VI well. A generator's determination as to how to manage a RCRA hazardous waste CO<sub>2</sub> stream would depend on several factors. Due to the lack of definitive data on the RCRA hazardous characteristics of CO<sub>2</sub> streams, we applied bounding estimates in our analysis. The high-end assumes that 90% of the CO<sub>2</sub> streams are generated as RCRA hazardous waste, while the low-end assumes that only 10% of the CO<sub>2</sub> streams are RCRA hazardous waste.<sup>56</sup> For all generators that capture CO<sub>2</sub>, we further assume the following: each facility would incur costs to determine if the CO<sub>2</sub> stream is a RCRA hazardous waste; facilities that generate a CO<sub>2</sub> stream that is characterized as a non-hazardous RCRA waste would face no further costs associated with the hazardous waste regulations, as would facilities who cease to capture CO<sub>2</sub>; facilities that generate RCRA hazardous waste CO<sub>2</sub> streams and do not cease capturing the

<sup>55</sup> Department of Energy, National Energy Technology Laboratory, Carbon Capture and Storage Database, [http://www.netl.doe.gov/technologies/carbon\\_seq/database/index.html](http://www.netl.doe.gov/technologies/carbon_seq/database/index.html).

<sup>56</sup> We employ this bounding estimate for analytical purposes only due to the absence of supporting data. This assumption should not be construed as an EPA determination of CO<sub>2</sub> stream status on a nationwide basis. These assumptions were developed solely for this proposed rule, and were not used in, or derived from, the supporting analysis in the UIC Class VI rulemaking.

CO<sub>2</sub> would likely qualify as large quantity generators (LQGs) in the baseline and would be subject to applicable hazardous waste generator requirements; and, CO<sub>2</sub> capture facilities that treat their RCRA hazardous waste CO<sub>2</sub> streams would incur treatment costs, and may also incur RCRA permitting costs.

The baseline universe of CO<sub>2</sub> sequestration facilities is assumed to include a mix of facilities with Class VI wells and facilities with Class I hazardous wells that will meet the Class VI requirements. This analysis assumes that, under the high-end baseline assumption, approximately 57 percent of the sequestration wells would manage non-hazardous CO<sub>2</sub> streams and treated CO<sub>2</sub> streams in Class VI wells.<sup>57</sup> The remaining wells would manage RCRA hazardous CO<sub>2</sub> streams in Class I hazardous wells. For the low-end, our analysis assumes that approximately 97 percent of the sequestration wells would manage non-hazardous CO<sub>2</sub> streams and treated CO<sub>2</sub> streams in Class VI wells. The remaining sequestration wells would manage RCRA hazardous CO<sub>2</sub> streams in Class I hazardous waste wells.

Under the proposed rule, CO<sub>2</sub> streams that are captured, stored, transported, and injected into Class VI UIC wells in accordance with the conditions in the proposed rule would be excluded from the definition of hazardous waste and would therefore not be subject to EPA's RCRA hazardous waste requirements. The exclusion would not apply if the CO<sub>2</sub> stream was mixed or co-injected with any other hazardous wastes.

Our analysis also assumes all affected states will adopt the conditional exclusion and all generators that capture CO<sub>2</sub> will claim the proposed conditional exclusion and send their CO<sub>2</sub> streams to Class VI wells. These facilities would avoid the costs of determining whether their CO<sub>2</sub> stream is RCRA hazardous or non-hazardous, and would also avoid possible RCRA permitting costs and generator requirements. They would only be required to submit an annual certification in accordance with the rule. These generators that capture CO<sub>2</sub> would also be able to send their CO<sub>2</sub> streams to UIC Class VI wells without any additional cost of treating the CO<sub>2</sub> stream. Under the proposed rule, all CO<sub>2</sub> sequestration facilities are assumed

<sup>57</sup> The reasoning behind this assumption is discussed in the supporting economic assessment document: *Assessment of the Potential Costs, Benefits, and Other Impacts of the Conditional Exclusion from the RCRA Definition of Hazardous Waste for CO<sub>2</sub> Streams Managed in UIC Class VI Wells for the Purpose of Geologic Sequestration, as Proposed*.

to be permitted as UIC Class VI wells, resulting in no need for a UIC Class I hazardous permit for those wells.

The CO<sub>2</sub> stream exclusion, as proposed, would result in three areas of savings for generators of CO<sub>2</sub> streams: exclusion from the hazardous waste determination, exclusion from the need for hazardous waste treatment, and exclusion from compliance with any other hazardous waste-related requirements. CO<sub>2</sub> sequestration facilities managing hazardous CO<sub>2</sub> under a Class I hazardous well permit in the baseline would experience savings related to the hazardous waste determination and compliance with applicable hazardous waste regulations. Requirements and associated costs for pipeline transportation would be unchanged.

Due to the high level of uncertainty regarding the percent of CO<sub>2</sub> that may be generated as RCRA hazardous waste, and the uncertainty regarding the actual number of facilities potentially affected over the projected 50 year period, EPA's best estimate for the impacts of the proposed rule ranges from a low-end annualized net savings of \$7.3 million (7% discount rate) to the high-end annualized net savings of \$44.9 million (3% discount rate).<sup>58</sup> These cost savings are expected to occur without any discernible increase in negative impacts to human health and the environment. In addition to industry impacts, we project negligible cost increases to EPA and state governments for rule implementation.

## VII. Statutory and Executive Order (EO) Reviews

### A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

Under Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), this action is a "significant regulatory action." Pursuant to the terms of Executive Order 12866, it has been determined that this rule is a "significant regulatory action" because it raises novel legal or policy issues. Accordingly, EPA submitted this action to the Office of Management and Budget

<sup>58</sup> Under the high-end estimate, the proposed rule is expected to result in undiscounted annualized net savings of approximately \$56.6 million. Applying a 3 percent discount rate, the annualized net savings were found to be approximately \$44.9 million, while a 7 percent discount rate resulted in annualized net savings of approximately \$32.0 million. Under the low-end estimate, the undiscounted annualized net savings are \$9.3 million. Applying a 3 percent and 7 percent discount rate, the annualized net savings were found to be approximately \$8.5 million and \$7.3 million, respectively.

(OMB) for review under Executive Orders 12866 and 13563 (76 FR 3821, January 21, 2011) and any changes made in response to OMB recommendations have been documented in the docket for this action. In addition, EPA prepared an analysis of the potential costs and benefits associated with this action. This analysis is presented in the following support document: *Assessment of the Potential Costs, Benefits, and Other Impacts of the Conditional Exclusion From the RCRA Definition of Hazardous Waste for CO<sub>2</sub> Streams Managed in UIC Class VI Wells for the Purposes of Geologic Sequestration, as Proposed*. A copy of this document is available in the docket established for this action. The methodology and findings from this analysis are briefly summarized in Section VI above. The reader is encouraged to review and comment on the full assessment document. The final rule will respond to any substantive comments received on the assessment document.

### B. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget under the *Paperwork Reduction Act*, 44 U.S.C. 3501 *et seq.* The Information Collection Request (ICR) document prepared by EPA has been assigned EPA ICR number 2421.01.

The Agency believes that this proposal is an important part of its efforts to establish a regulatory framework for GS.<sup>59</sup>

The certification included in the proposed rule would be required for entities wishing to take advantage of the flexibility provided by the conditional exclusion. The certification statements would be used by regulators to hold generators and UIC Class VI well owner/operators accountable for knowing the conditions applicable to them (*e.g.*, during an on-site inspection). The certification statements also would be used by generators and owner/operators to demonstrate that they are aware of, and complying with, the conditions.

We believe that the certifications are a practical way to assure compliance because they hold a single person at each facility accountable for compliance (*i.e.*, the authorized representative). Because of this, the representative has a personal incentive to make sure that the facility complies with the conditions. The proposed rule requires that the certification be renewed every year that

<sup>59</sup> See Section III of this preamble for a discussion of other recent EPA rules related to this strategy.

the generator or UIC Class VI well owner/operator claims the RCRA conditional exclusion, in order to ensure that the certification is kept current.

EPA estimates the total annual burden to respondents under the new paperwork requirements to be 79 hours and \$6,753. However, EPA also estimates an annual burden savings under the existing RCRA subtitle C paperwork requirements of 303 hours and \$25,428. Thus, this would result in a net annual savings of 224 hours and \$18,675. The bottom-line burden savings over three years is estimated to be 672 hours and \$56,025. There are no capital costs associated with this burden requirement. Burden is defined at 5 CFR 1320.3(b).

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9.

To comment on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, EPA has established a public docket for this proposed rule, which includes this ICR, under Docket ID number EPA-HQ-RCRA-2010-0695. Submit any comments related to the ICR to EPA and OMB. See **ADDRESSES** section at the beginning of this notice for where to submit comments to EPA. Send comments to OMB at the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW., Washington, DC 20503, Attention: Desk Officer for EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after August 8, 2011, a comment to OMB is best assured of having its full effect if OMB receives it by September 7, 2011. The final rule will respond to any comments on the information collection requirements contained in this proposal.

### C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) A small business (based on *Small Business Administration (SBA) size standards*), that is primarily engaged in the generation, capture, storage, transportation, and GS of excluded hazardous CO<sub>2</sub> streams, as defined by NAICS codes 211111, 221112, 322121, 324110, 324199, 325120, 325193, 325311, and 327310, with total corporate employment ranging from 500 to 1,500 persons<sup>60</sup> (based on SBA size standards); (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of today's proposed rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. In determining whether a proposed rule has a significant economic impact on a substantial number of small entities, the impact of concern is any significant adverse economic impact on small entities, since the primary purpose of the regulatory flexibility analyses is to identify and address regulatory alternatives "which minimize any significant economic impact of the proposed rule on small entities" 5 U.S.C. 603 and 604. Thus, an agency may certify that a proposed rule will not have a significant economic impact on a substantial number of small entities if it relieves regulatory burden, or otherwise has a positive economic effect on all of the small entities subject to the proposed rule. This rule, as proposed, is projected to reduce the burden on regulated entities by conditionally exempting them from the RCRA subtitle C hazardous waste management requirements associated with CO<sub>2</sub> streams captured, transported, and injected into UIC Class VI wells. We have, therefore, concluded that today's proposed rule will relieve regulatory burden for all affected small entities. We continue to be interested in the potential impacts of the proposed rule on small entities and welcome comments on issues related to such impacts.

<sup>60</sup> 211111 (500 persons), 221112 (500 persons), 322121 (750 persons), 324110 (1,500 persons), 324199 (500 persons), 325120 (1,000 persons), 325193 (1,000 persons), 325311 (1,000 persons), and 327310 (750 persons).

### D. Unfunded Mandates Reform Act

This action contains no Federal mandates under the provisions of Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), 2 U.S.C. 1531–1538 for State, local, or tribal governments or the private sector. As explained above, this proposed exclusion is less stringent than the current RCRA Federal program, and states are therefore not required to adopt it. Moreover, the rule does not contain a Federal mandate that may result in expenditures of \$100 million or more for state, local, and tribal governments, in the aggregate, or the private sector in any one year. Our analysis indicates that the proposed rule is expected to result in undiscounted annualized net savings to the regulated community ranging from \$7.3 million to \$44.9 million (3% discount rate). Incorporated into these net saving estimates is a negligible total estimated annualized cost to states of \$70 to nearly \$565, depending on the discount rate. Thus, this proposed rule is not subject to the requirements of sections 202 or 205 of UMRA.

This proposed rule is also not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments. Occasional requests for and review of certification statements is the only potential impact on small governments. Furthermore, no small governments are known to be owners or operators of compressed CO<sub>2</sub> facilities, storage facilities, transporters, or sequestration facilities. We encourage comments on potential unfunded mandates associated with this proposed action.

### E. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132 (64 FR 43255, August 10, 1999), because the rule will not impose any requirements on States or any other level of government. As explained above, today's proposed rule conditionally excludes CO<sub>2</sub> streams that are hazardous from the definition of hazardous waste, where such streams, in accordance with the rule, are captured from emission sources and injected into UIC Class VI wells for purposes of GS, but States would not be required to adopt the rule. Thus, Executive Order 13132 does not apply to this action.

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicits comment on this proposed action from State and local officials.

*F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments*

This action does not have tribal implications, as specified in Executive Order 13175 (65 FR 67249, November 9, 2000). No tribal governments are known to generate CO<sub>2</sub> streams or own or operate UIC Class VI wells subject to the proposed rule. Furthermore, we have identified no existing CO<sub>2</sub> pipelines that cross tribal lands. Thus, Executive Order 13175 does not apply to this action. EPA specifically solicits additional comment on this proposed action from tribal officials.

*G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks*

This action is not subject to EO 13045 (62 FR 19885, April 23, 1997) because it is not economically significant as defined in EO 12866, and because the Agency does not believe the environmental health or safety risks addressed by this action presents a disproportionate risk to children. The public is invited to submit comments or identify peer-reviewed studies and data that are relevant to assessing the effects of early life exposure to CO<sub>2</sub> streams captured from emission sources and transported to and injected into UIC Class VI wells for purposes of GS.

*H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use*

This action is not a “significant energy action” as defined in Executive Order 13211 (66 FR 28355, May 22, 2001), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. The only effect of this action will be to conditionally exclude CO<sub>2</sub> streams that are hazardous from the definition of hazardous waste, where such streams are captured from emission sources and injected into UIC Class VI wells for purposes of GS. This conditional exclusion would allow for the GS of CO<sub>2</sub>, while maintaining protection of human health and the environment, and would not significantly disrupt the supply, distribution, or use of energy.

*I. National Technology Transfer and Advancement Act*

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (“NTTAA”), Public Law 104–113, 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This proposed rulemaking does not involve technical standards. Therefore, EPA is not considering the use of any voluntary consensus standards.

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

Executive Order (EO) 12898 (59 FR 7629, February 16, 1994) establishes Federal executive policy on environmental justice. Its main provision directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this proposed rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it does not affect the level of protection provided to human health or the environment. The only effect of this action will be to conditionally exclude CO<sub>2</sub> streams that are hazardous from the definition of hazardous waste, where such streams are captured from emission sources and injected into UIC Class VI wells for purposes of GS, and meet other conditions. Existing regulations governing the generation, transportation, and injection of CO<sub>2</sub> streams in UIC Class VI wells are expected to provide safety to human health and the environment, making additional regulation under RCRA subtitle C unnecessary (see discussion under Section IV).

**List of Subjects in 40 CFR Parts 260 and 261**

Environmental protection, Hazardous waste, Recycling, Reporting and recordkeeping requirements

Dated: August 1, 2011.

**Lisa P. Jackson,**  
*Administrator.*

For the reasons set out in the preamble, Parts 260 and 261 of title 40, Chapter I of the Code of Federal Regulations are proposed to be amended as follows:

**PART 260—HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL**

1. The authority citation for Part 260 continues to read as follows:

**Authority:** 42 U.S.C. 6905, 6912(a), 6921–6927, 6930, 6935, 6937–6939, and 6974.

**Subpart B—Definitions**

2. Section 260.10 is amended by adding in alphabetical order the definition of “Carbon dioxide stream” to read as follows:

**§ 260.10 Definitions.**

\* \* \* \* \*

*Carbon dioxide stream* means carbon dioxide that has been captured from an emission source (e.g., power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process.

\* \* \* \* \*

**PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE**

3. The authority citation for Part 261 continues to read as follows:

**Authority:** 42 U.S.C. 6905, 6912(a), 6921, 6922, 6924(y), and 6938.

4. Section 261.4 is amended by adding a new paragraph (h) to read as follows:

**§ 261.4 Exclusions.**

\* \* \* \* \*

(h) *Carbon Dioxide Stream Injected for Geologic Sequestration.* Carbon dioxide streams that are captured and transported for purposes of injection into an underground injection well subject to the requirements for Class VI Underground Injection Control wells, including the requirements in 40 CFR parts 144 and 146 of the Underground Injection Control Program of the Safe Drinking Water Act, are not a hazardous waste, provided the following conditions are met.

(1) Carbon dioxide streams that meet all of the following conditions are excluded from the definition of hazardous waste:

(i) Transportation of the carbon dioxide stream must be in compliance with applicable Department of Transportation requirements;

(ii) Injection of the carbon dioxide stream must be in compliance with the applicable requirements for Class VI Underground Injection Control wells, including the applicable requirements in 40 CFR parts 144 and 146;

(iii) No other hazardous wastes may be mixed with, or otherwise co-injected with, the carbon dioxide stream; and

(iv) Any generator of a carbon dioxide stream, and any Class VI Underground Injection Control well owner or operator, who claims that a carbon dioxide stream is excluded under paragraph (h)(1) of this section, must have an authorized representative (as defined in 40 CFR 260.10) sign a certification statement worded as follows:

I certify under penalty of law that the carbon dioxide stream that I am claiming to be excluded under 40 CFR 261.4(h)(1) meets all of the conditions set forth in that paragraph.

The signed certification statement must be kept on-site for no less than three years. The signed certification statement must be made available within 72 hours of a written request from the Regional Administrator or state Director (if located in an authorized state), or their designee, and shall be renewed every year by persons claiming the exclusion in 40 CFR 261.4(h). The yearly renewal of a certification statement under this paragraph means that an authorized representative must annually prepare and sign a new copy of the certification statement.

[FR Doc. 2011-19915 Filed 8-5-11; 8:45 am]

BILLING CODE 6560-50-P

## ENVIRONMENTAL PROTECTION AGENCY

### 40 CFR Part 370

[EPA-HQ-SFUND-2010-0763; FRL-9448-8]

RIN 2050-AG64

### Hazardous Chemical Reporting: Revisions to the Emergency and Hazardous Chemical Inventory Forms (Tier I and Tier II)

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Proposed rule.

**SUMMARY:** The U.S Environmental Protection Agency (EPA or the Agency)

is proposing to revise the Emergency and Hazardous Chemical Inventory Forms (Tier I and Tier II) under Section 312 of the Emergency Planning and Community Right-to-Know Act (EPCRA) to add new data elements and revise some existing data elements.

**DATES:** Comments must be received on or before October 7, 2011.

**ADDRESSES:** Submit your comments, identified by Docket ID No. EPA-HQ-SFUND-2010-0763 by one of the following methods:

- <http://www.regulations.gov>: Follow the on-line instructions for submitting comments.
- *E-mail:* [superfund.docket@epa.gov](mailto:superfund.docket@epa.gov).
- *Fax:* (202) 566-0224.
- *Mail:* EPA Docket Center, Superfund Docket, Environmental Protection Agency, Mailcode: 2822T, 1200 Pennsylvania Ave., NW., Washington, DC 20460. In addition, please mail a copy of your comments on the information collection provisions to the Office of Information and Regulatory Affairs, Office of Management and Budget (OMB), Attn: Desk Officer for EPA, 725 17th St., NW., Washington, DC 20503.

• *Hand Delivery:* Environmental Protection Agency West Building, Room 3334, 1301 Constitution Avenue, NW., Washington, DC 20004. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

**Instructions:** Direct your comments to Docket ID No. EPA-HQ-SFUND-2010-0763. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at <http://www.regulations.gov>, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through <http://www.regulations.gov> or e-mail. The <http://www.regulations.gov> Web site is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through <http://www.regulations.gov>, your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your

name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket, visit the EPA Docket Center homepage at <http://www.epa.gov/epahome/dockets.htm>.

**Docket:** All documents in the docket are listed in the <http://www.regulations.gov> index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material will be publicly available only in hard copy. Publicly available docket materials are available either electronically in <http://www.regulations.gov> or in hard copy at the Superfund Docket, EPA/DC, EPA West Building, Room 3334, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Superfund Docket is (202) 566-0276.

**FOR FURTHER INFORMATION CONTACT:** Sicy Jacob, Office of Emergency Management, Mailcode 5104A, Environmental Protection Agency, 1200 Pennsylvania Avenue, NW., Washington DC 20004; telephone number: (202) 564-8019; fax number: (202) 564-2620; e-mail address: [jacob.sicy@epa.gov](mailto:jacob.sicy@epa.gov). You may also contact the Superfund, TRI, EPCRA, RMP and Oil Information Center at (800) 424-9346 or (703) 412-9810 (in the Washington, DC, metropolitan area). You may wish to visit the Office of Emergency Management (OEM) Internet site at <http://www.epa.gov/emergencies>.

**SUPPLEMENTARY INFORMATION:** Here are the contents of today's preamble.

- I. General Information
  - A. Who is affected by this proposed rule?
  - B. What should I consider as I prepare my comments for EPA?
  - C. What is the statutory authority for this proposed rule?
  - D. What is the background of this proposed rule?
- II. What are the revisions that EPA is proposing on the Tier I and Tier II forms?
  - A. Facility Identification
  - B. Name of the Facility's Parent Company and Owner or Operator of the Facility
  - C. Facility Emergency Coordinator