



This is a training workshop related to *Federal Requirements Under the Underground Injection Control Program for Carbon Dioxide Geological Sequestration Wells*, also known as the GS Rule.

# Acronyms

AoR	Area of Review
CFR	Code of Federal Regulations
CO <sub>2</sub>	Carbon Dioxide
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
ER	Enhanced Recovery
FR	<i>Federal Register</i>
GS	Geologic Sequestration
MIT	Mechanical Integrity Test
PISC	Post-Injection Site Care
PWSS	Public Water System Supervision
UIC	Underground Injection Control
USDW	Underground Source of Drinking Water

2

Acronyms used in the implementation considerations portion of this training include:

- AoR: Area of Review
- CFR: Code of Federal Regulations
- CO<sub>2</sub>: Carbon Dioxide
- EJ: Environmental Justice
- EO: Executive Order
- EPA: Environmental Protection Agency
- ER: Enhanced Recovery
- FR: *Federal Register*
- GS: Geologic Sequestration
- MIT: Mechanical Integrity Test
- PISC: Post-Injection Site Care
- PWSS: Public Water System Supervision
- UIC: Underground Injection Control
- USDW: Underground Source of Drinking Water

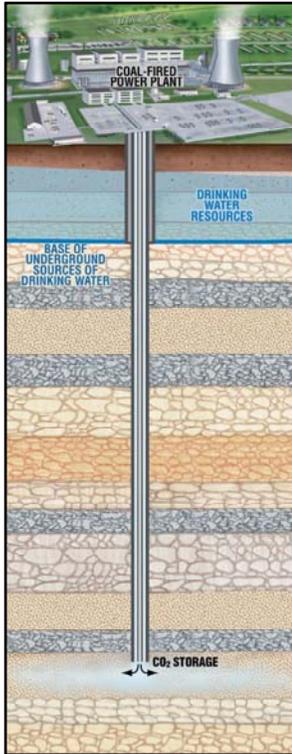
# Topics

---

- Public participation
- Interstate Communication
- Environmental Justice
- Re-permitting existing wells as Class VI



In this section we will discuss public participation, outreach, and public notice, which are critical components of effective implementation of the GS Rule. Also in this section, we will address interstate coordination, environmental justice, and well re-permitting.



# Public Participation

## SDWA Public Participation and Notification Requirements

- SDWA Public Participation Requirements
  - Public information, notification, consultation
  - Hold public hearings and solicit comment
  - Involve variety of stakeholders
  - Preparation of Responsiveness Summary
- Assuring compliance with **GS Rule** requirements

40 CFR 25.4, 25.55, 25.7, 25.8, and 25.12

5

The GS Rule adopts the existing public participation requirements under the Safe Drinking Water Act (SDWA) at 40 CFR Part 25 and permitting procedures at 40 CFR Part 124. These requirements discuss: 1) providing public notice to interested parties of pending actions via newspaper advertisements, radio, mailings, or e-mails; 2) holding public hearings; soliciting and responding to public comment; 3) involving a broad range of stakeholders; and 4) preparation of a responsiveness summary

Directors: READ Parts 25 and 124, plus EJ and public participation appendices to the PAIM, before embarking on Class VI permit notification process.

EPA amended the public notice and comment requirements at 40 CFR 124.10 in the GS Rule to clarify that, in addition to notifying the general public, the UIC Program Director must provide public notice of Class VI permitting activities to state and local oil and gas regulatory agencies, state agencies regulating mineral exploration and recovery, the Director of the Public Water System Supervision (PWSS) program in the state, and all other agencies that may have jurisdiction over injection activities within the state. The UIC Program Director must send copies of public notification (e.g., notice of public hearing, transcripts of hearings) to EPA.

## EPA General Procedures for Decision Making

- General permitting procedures:
  - Administrative Record when EPA is permitting authority
  - Public notice and comment period
  - Mailing a notice of Class VI permit to any state agency/program impacted: minerals, oil and gas, PWSS
    - \*\* **40 CFR 124.10(c)(1)(xi)**
  - Public hearings
  - Response to comments

40 CFR 124.9-124.12 & 124.17

6

EPA's general permitting procedures for decision making include the following steps (these are listed in the order in which they should occur):

- When EPA is the permitting authority, Inclusion in the Administrative Record.
- A public notice and comment period.
- Mailing a notice of a Class VI permit to any state agency or program impacted by the well. This includes, but is not limited to, minerals, oil and gas, and PWSS programs. This is a new requirement under the GS Rule, which can be found at 40 CFR 124.10(c)(1)(xi).
- Holding Public Hearings.
- Compiling response to comments.

## Public Notification Considerations

- Directors may choose to conduct the required public notification activities simultaneously for several Class VI permits
  - Keep public confidence in mind
- Coordinate with owners or operators on public hearings

40 CFR 124

7

The UIC Program Director may choose to achieve economies of scale by conducting the public notification process for several proposed Class VI permits simultaneously. Combined public notification for several permits may improve the efficiency of the evaluation process as well as public understanding of the potential impacts of multiple wells within the same general AoR.

However, local community residents potentially impacted by Class VI well operations should still be confident of government transparency and meaningful participation during the permit review and evaluation process.

For each public hearing or meeting, the UIC Program Director may choose to coordinate with the proposed injection well owners or operators to organize and announce any scheduled hearings.

## Public Notification for Injection Depth Waivers

- Depth of proposed injection zone
- Map of the AoR and location of injection well
- Name and depth of USDWs within AoR
- Names of any public water supplies affected or served by USDWs in AoR
- Results of UIC-PWSS Director consultation

40 CFR 146.95(c)

8

UIC Program Directors must apply the public notice and participation requirements to all supplemental applications for Class VI injection depth waivers. The UIC Program Director must give public notice, concurrent with the notice on the overall Class VI permit application, that a waiver application has also been submitted, and the notice must describe:

- The depth of the proposed injection zone.
- A map of the AoR and the location of the injection well.
- The name and depth of all USDWs within the delineated AoR.
- The names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in AoR.
- And results of UIC-PWSS Director consultation pursuant to 40 CFR 146.95(b)(2).

Following the public notice, the UIC Program Director must provide all information received through the waiver application process to the appropriate EPA Regional Administrator (RA). If the RA deems that additional information is required to support a determination on the proposed Class VI injection well, the UIC Program Director will need to provide the information, and the RA may require that additional public notice be given for the new information.

## Public Participation Responsibilities

---

### UIC Program Director:

- In conjunction with owner or operator, ensure provision of information to, and meaningful input from, potentially affected communities
- Undertake public notification procedures for permit approval, permit modifications and injection depth waivers

EPA strongly encourages UIC Program Directors to work with owners or operators to provide information to and gather input from potentially affected communities on the proposed Class VI injection well permit application as early as possible in the permitting process.

UIC Program Directors are also encouraged to undertake public notification procedures for later activities including permit approval, permit modifications, and injection depth waivers. Details of these required UIC permit application public notification procedures are discussed in later slides.

## Public Involvement Considerations

- UIC Program Directors provide citizens access to decision making processes
- Educate the community about the risks and benefits of the Class VI well
- Program Director becomes aware of public viewpoints and preferences

10

Public participation in Class VI well permitting decisions is critical because GS is a relatively new technology. EPA expects that there will be high levels of public interest in GS. Therefore, UIC Program Directors can increase the likelihood of Class VI injection well permitting success by integrating the social, economic, and cultural concerns of the community into the permit decision process. Public participation can:

- Enable potentially affected communities with the means to provide their input and perspective as part of the decision making processes that impact their area.
- Educate the community about GS and the proposed Class VI injection well – considering both the benefits and risks of this potential climate change mitigation technology.
- And allow the UIC Program Director, and owners or operators, to become aware of public preferences, perceptions, and concerns, in order to work towards addressing these issues in the final permit.

## When the Public Needs Opportunity for Involvement

Prior to approval of Class VI permit	Prior to approval of Class VI injection depth waiver application	At the time of modification to existing Class VI permit
--------------------------------------	--	---

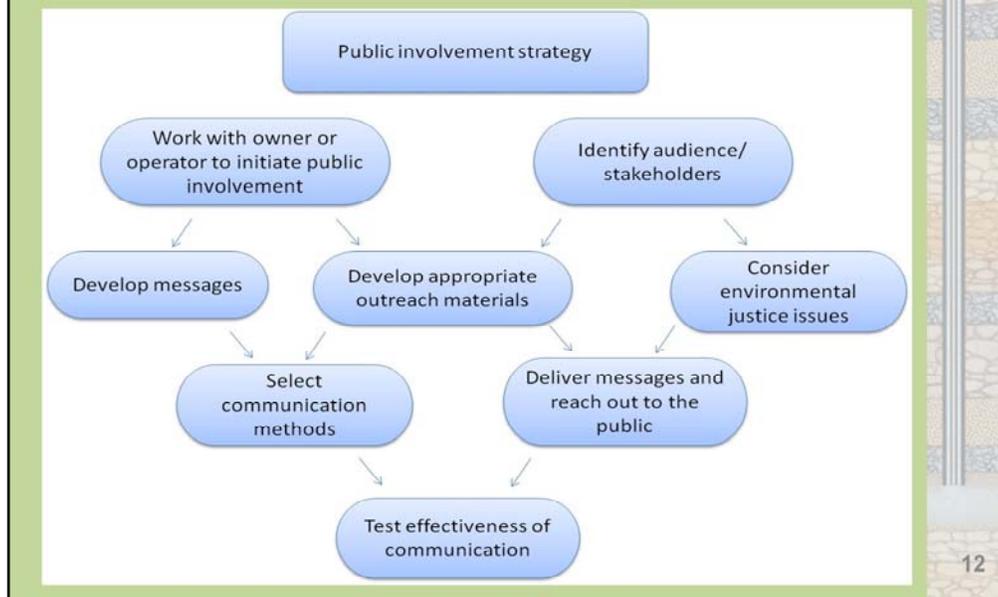
11

Activities in the permitting process that necessitate required public notice and creation of opportunities for public involvement are:

1. Prior to approval of a Class VI permit.
2. Prior to approval of Class VI injection depth waiver application.
3. At the time of modification to an existing Class VI permit.

Waiver applications will come in with the rest of a Class VI permit application – the approval of the waiver and the approval of the permit may happen at the same time, so the public notification requirements/process may be rolled together as appropriate.

# Public Involvement Strategy



This flowchart shows some considerations for the Director in designing and implementing a public involvement process for a GS project.

The flowchart is covered in detail in *Geologic Sequestration of Carbon Dioxide – UIC Quick Reference Guide: Additional Considerations for UIC Program Directors on the Public Participation Requirements for Class VI Injection Wells*, available on the internet at <http://water.epa.gov/type/groundwater/uic/class6/gsinformation.cfm>. Components of this flowchart are covered in the next slide.

# Communications Plan

## Recommended components:

- Think about a public participation and communications strategy
- Think about message and materials development and delivery
- Delivery options
- Think about testing the effectiveness of message

13

Switching now away from the requirements in 40 CFR Parts 25 and 124, an important tool to assist UIC Program Directors with conducting effective public involvement activities is to develop a communications plan. EPA is suggesting some possible components to consider while developing a communications plan for a GS project.

### **Developing a Public Participation/Communications Strategy**

Gauge likely public interest and concerns in permitting of GS site.

Identify key stakeholders: owners or operators, regulators, public water system operators, land and business owners, populations within the AoR, civic and environmental groups, Indian Tribes, educators, etc.

Determine how and when the public should be involved.

Identify communications needs in target audiences (e.g., languages spoken, literacy levels) and how to reach them (e.g., media avenues).

### **Message and Materials Development and Delivery**

Developing the message. A clear message will help inform and involve the public by succinctly presenting what the public should know about the proposed Class VI well. An example of a key message could be "Protecting USDWs and public safety is a priority for permitting officials".

Creating materials that convey the message.

Delivering the message using methods that are useful and accessible to the public in languages they understand and at an appropriate technical level. Consider translations of materials to languages depending on local population.

### **Delivery Options**

Media, including traditional media (TV/radio/newspapers) and Web tools (Internet pages, blogs, web casts).

Hard copy materials (e.g., print advertisements, fact sheets, fliers, press releases).

Face-to-face communication, e.g., public meetings, speakers' forums, roundtable discussions, etc.

### **Testing the Effectiveness of the message**

Assess whether target audiences received the message.

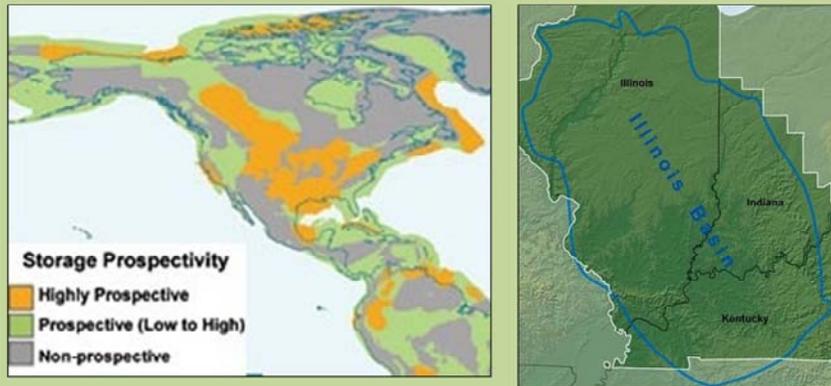
Remember the importance of follow-up testing to inform/improve future outreach.



We will now move on to discussing the topic of Interstate Coordination and Communication.

## Large AoRs

- Large AoRs for GS of CO<sub>2</sub>



40 CFR 145.23(f)(13) and 146.82(b)

15

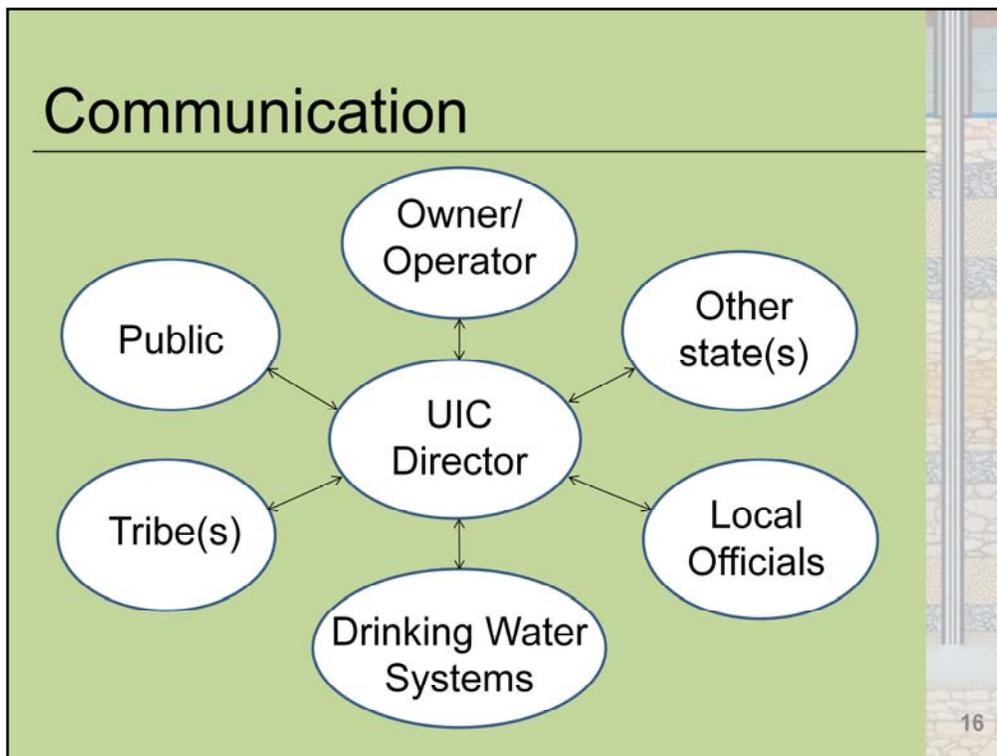
Due to the potentially large AoRs associated with GS projects, interstate issues may need to be addressed. The GS Rule requires the UIC Program Director to initiate notifications with state, tribal, and territorial agencies named by the owner or operator as in the AoR. As part of the rule's Program Description Requirements, the director must submit a description of how such agencies will be notified.

Additionally, the possibility of international plume migration is not addressed in the GS Rule. International plume migration will need to be addressed on a case by case basis.

Image (left): Commonwealth of Australia, Geoscience Australia 2007.

<http://news.stanford.edu/news/2007/june13/carbon-061307.html>

Image (right): DOE Office of Fossil Energy NETL. Carbon Sequestration Atlas of the United States and Canada 2008.



This diagram focuses on interstate coordination and communication, with the UIC Director as the center – facilitating communication among all these interest groups. However, the owner/operator may also be a key player in interstate coordination and communication with some specified stakeholders. The Director and the owner/operator can work together to determine each other's role in this effort.

In addition to meeting the public notification and participation requirements in permitting, UIC Program Directors will need to undertake communication efforts with other states, tribes, local officials, the public, and other stakeholder groups regarding GS projects and Class VI injection. For instance, UIC Program Directors may choose to work more closely with their state PWSS program counterparts when USDWs are determined to be located under the injection site.

UIC Program Directors may also choose to develop communications plans for any permit decisions involving interstate considerations, such as when the delineated AoR of a Class VI injection well involves more than one jurisdiction or where an allowance for an injection depth waiver in one location may impact USDWs in other jurisdictions.

Based on the information provided by the owner or operator in a Class VI injection well permit application, the UIC Program Director must provide written notification to all states, tribes, and territories in the AoR to inform them of pending permit application decisions and to provide these neighboring jurisdictional officials the opportunity to be involved in any necessary processes during permit approval and/or injection well operations (e.g., involvement in review of the Emergency and Remedial Response Plan).

These permit application notification requirements are intended to help begin the dialogue across jurisdictional boundaries, as both the AoR and injection volumes for Class VI wells are anticipated to be larger than in current practices. Transparency in the permitting process is encouraged by EPA. Effective communication among states, tribes, and local governments on GS permitting will facilitate information sharing and encourage safe, protective projects.

## Interstate Coordination

- EPA encourages states to work together when AoRs cross boundaries
  - Make sure everyone knows about permit application and has chance to be involved in process
- Be aware that good communication may require ongoing communication over the course of the GS project

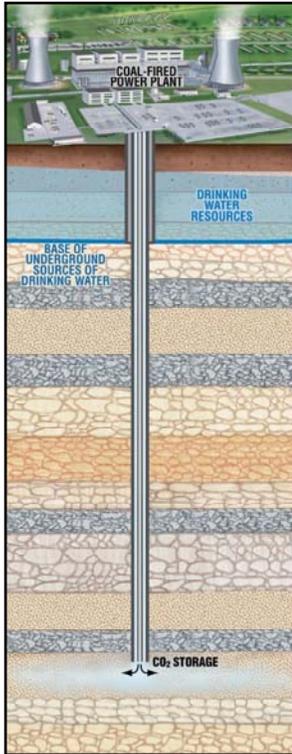
40 CFR 145.23(f)(13) and 146.82(b)

17

The intent of the notification requirement is to inform the parties of any proposed Class VI injection well permit applications and to ensure that neighboring jurisdictions can provide input during the permit application review.

The UIC Program Director should be aware that good communication may necessitate periodic coordination over the course of the GS project.

These interstate communications will facilitate information sharing and encourage safe, protective GS projects.



# Environmental Justice

# Environmental Justice

- EPA Definition: the fair treatment and meaningful involvement of all people, regardless of race, color, origin, or income
- Executive Order 12898 (59 FR 7269 February 16, 1994)
- States' role in EJ



19

EPA strongly recommends that EJ considerations become a routine part of implementing a UIC Class VI program, including the UIC Program Director's evaluation of a Class VI permit application. As noted in Presidential Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 FR 7269, Feb. 16, 1994), "federal agencies shall make achieving environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations in the United States and its territories."

EPA defines EJ as the fair treatment and meaningful involvement of all people during the development, implementation, and enforcement of environmental laws, regulations, and policies, regardless of race, color, national origin, or income. To help achieve EPA's goal for EJ, the Agency considers factors related to the public health and environmental conditions affecting minority, low-income, and indigenous populations when making decisions and developing regulations ([www.epa.gov/compliance/environmentaljustice/index.html](http://www.epa.gov/compliance/environmentaljustice/index.html)).

While state agencies are not obligated to follow this Executive Order, EPA is working on tools, strategies, and guidance to incorporate EJ considerations into all of its programs, policies, and activities, including UIC direct implementation programs in states without UIC Program Primacy.

## EJ and the GS Rule

- GS Rule increases level of environmental protection; does not disproportionately impact EJ communities
  - UIC Program Director should examine potential risks of a proposed Class VI well
- Tribal populations may be considered; specific consultation on EPA actions discussed in EO 13175 (65 FR 67249, November 9, 2000)

20

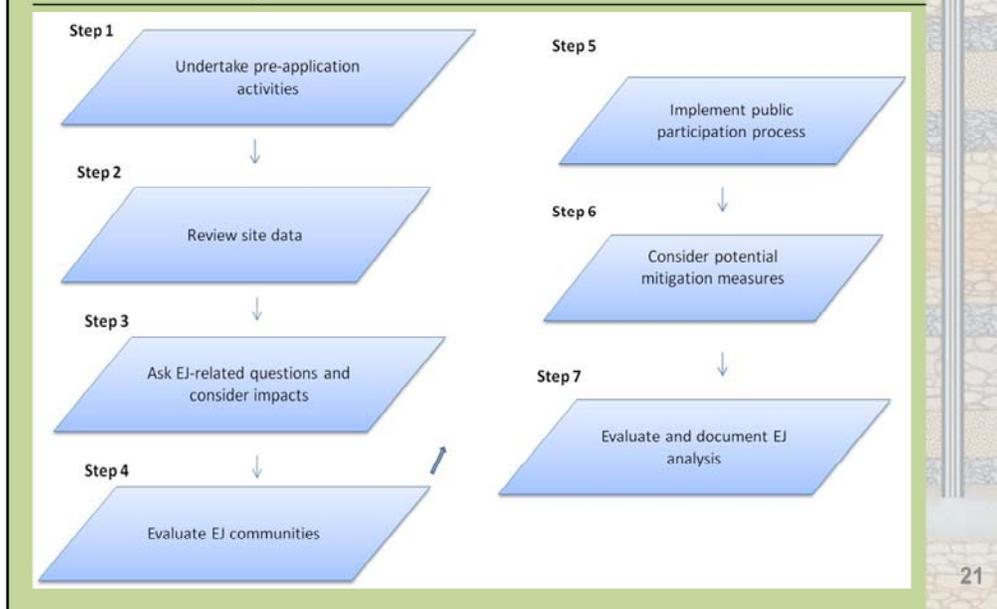
In developing the GS Rule, EPA considered the potential impact that may result from future Class VI wells and corresponding GS operations. EPA determined that the GS Rule will not have disproportionately high and adverse human health or environmental impacts on minority or low-income populations because it increases the level of environmental protection for all affected populations.

While underground injection from carbon dioxide is currently a voluntary activity, the Class VI requirements are in place to minimize potential health risks to populations living in areas within or near the delineated injection well area of review (AoR) or in the anticipated direction of the carbon dioxide plume and pressure front. Therefore, the UIC Program Director plays a public health protection role, and should examine the potential risks of a proposed Class VI injection well within his or her jurisdiction to identify and address any particular potential impacts on minority and low-income populations.

For the purposes of this presentation, EJ communities are defined as minority or low income populations, based on Executive Order 12898. Tribal populations may be considered but the government-to-government relationship between EPA and Tribal Governments, and tribal consultation obligations on EPA actions are discussed in EO 13175 (65 FR 67249, November 9, 2000)

The applicability of EJ to each Class VI injection well site will likely vary significantly.

# EJ Analytic Flowchart



This flowchart outlines the steps of an EJ analysis, with special considerations for GS projects. Because there is not a singular approach to conduct an EJ analysis, these steps provide a general flowchart for UIC Program Directors to follow when incorporating EJ considerations during permit application reviews.

This flowchart is described in further detail in the *Geologic Sequestration of Carbon Dioxide – UIC Quick Reference Guide: Additional Tools for UIC Program Directors Incorporating Environmental Justice Considerations into the Class VI Injection Well Permitting Process*, available at

<http://water.epa.gov/type/groundwater/uic/class6/gsinformation.cfm>. For the purposes of this workshop, we'll summarize the steps in the following slides.

# Conducting EJ Analyses

Possible steps to consider for an EJ analysis of a proposed Class VI injection well permit review:

1. Undertake pre-application activities
2. Examine geologic site characterization data to determine if any EJ communities living within the delineated AoR might be impacted
3. Ask EJ-related questions

22

UIC Program Directors and permit writers may consider following these steps for an EJ analysis.

## **Step 1: Pre-Application Activities on EJ**

If the permitting agency learns of an incoming permit application prior to its official submittal, the UIC Program Director can undertake pre-application activities, such as working with the owner or operator to initiate discussions with the public. These pre-application activities can also help preliminarily assess whether EJ issues may be present for a particular permit application review.

## **Step 2: Review Site Characterization Data**

Upon receipt of a Class VI permit application, UIC Program Directors and permit writers may choose to examine the information provided to determine if any minority or low-income communities might be impacted by the proposed injection well. These data include: site maps; other site characterization data; the proposed AoR delineation; the required AoR and Corrective Action Plan; and the required Emergency and Remedial Response Plan.

## **Step 3: Ask EJ-Related Questions and Consider EJ Impacts on Communities**

UIC Program Directors and permit writers could ask EJ-related questions when evaluating the permit application information submitted. For example:

1. Will siting the proposed well exacerbate any existing disproportionate impacts to EJ communities within the AoR?
2. What is the likely distribution of any identified environmental and public health benefits from this proposed well in communities within the AoR?
3. Will there be any additional environmental or health impacts on minority and low-income communities from the siting of this proposed Class VI injection well with respect to exposure and susceptibility to potential environmental hazards?
4. Are there maps or other tools available that may assist with communicating to the communities about the proposed injection well, and with soliciting input on the proposal from these communities?
5. If minority and low-income communities might be affected by the proposed Class VI injection well, can the owner or operator or UIC Program Director undertake any potential mitigation measures to improve community security and acceptance of the proposal?

## Conducting EJ Analyses (cont'd.)

4. Evaluating EJ communities for environmental hazards, cumulative exposure impacts, potential vulnerable sub-populations
5. Implement an inclusive public participation/public involvement process

23

### **Step 4: Evaluate EJ Communities for Environmental Hazards, Exposure Impacts, and Vulnerable Sub-Populations**

To gauge whether there are communities with EJ considerations at or near a proposed Class VI well site, UIC Program Directors and permit writers might consider an evaluation of the demographic composition of surrounding communities. Any potential benefits or impacts from the proposed GS project on these communities should be included in the evaluation. An evaluation may also consider the presence of existing environmental hazards, potential exposure pathways, and susceptible sub-populations.

We'll discuss some EJ tools for this type of analysis in a later slide.

### **Step 5: Implement an Inclusive Public participation Process**

Once UIC Program Directors review proposed project site data and evaluate the characteristics of the community living near the proposed Class VI well, they must consider creating opportunities for public involvement. This could include providing the public with early notice of proposed Class VI injection activities, enabling face-to-face or written feedback on the permit application, or participating in public hearings and other forms of public involvement.

Directors may consider that challenges to effective and meaningful public participation in identified EJ communities may include obstacles such as language barriers, lack of technical resources, cultural barriers, lack of access to transportation, or an inability to attend public meetings scheduled during working hours. To address these challenges, UIC Program Directors could consider conducting targeted outreach, as soon as possible, to the communities and key stakeholders identified as living within the AoR in the permit evaluation process. For example, Directors and owners or operators can arrange site visits to show the community the proposed site, or provide visual tools (e.g., graphics-heavy products) to inform the community about GS.

## Conducting EJ Analyses (cont'd.)

6. Consider potential mitigation measures to reduce identified concerns, improve community acceptance
7. Evaluate and Document EJ analysis

24

### **Step 6: Consider Potential Mitigation Measures**

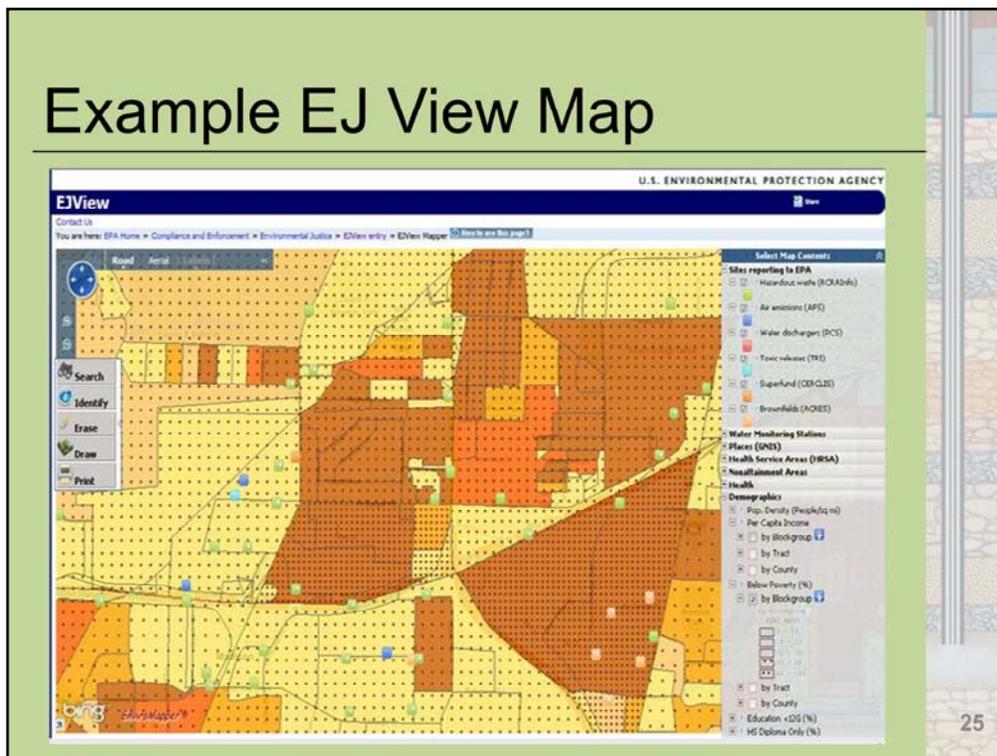
UIC Program Directors can work with owners or operators during the application review process to develop appropriate measures that would reduce or mitigate any potential impacts of a proposed Class VI well. For instance, UIC Program Directors might work with owners or operators during the application review process to help reduce any adverse impacts from well construction and operational activities, or by requiring additional monitoring in areas with identified EJ communities that may be impacted by the activities.

### **Step 7: Evaluate and Document EJ Analysis**

Once the core activities for an EJ analysis and the required public participation activities have been completed, UIC Program Directors and owners or operators can evaluate any lessons learned throughout the process. One way to accomplish this is to conduct surveys and focus groups in the identified EJ communities to assess what information about the proposed Class VI project site was absorbed, and to determine if any community concerns about the environment, health, and economic well-being still exist.

UIC Program Directors might also consider documenting: any EJ analysis processes conducted during the permit review, steps taken to ensure meaningful public involvement, and any mitigation measures implemented within identified EJ communities within the AoR. Documenting the response to public comments received during the public participation process is required at 40 CFR 124.17. Documenting the EJ analysis undertaken and any lessons learned can also improve any future Class VI permit review, and help improve community understanding and acceptance of future projects.

## Example EJ View Map

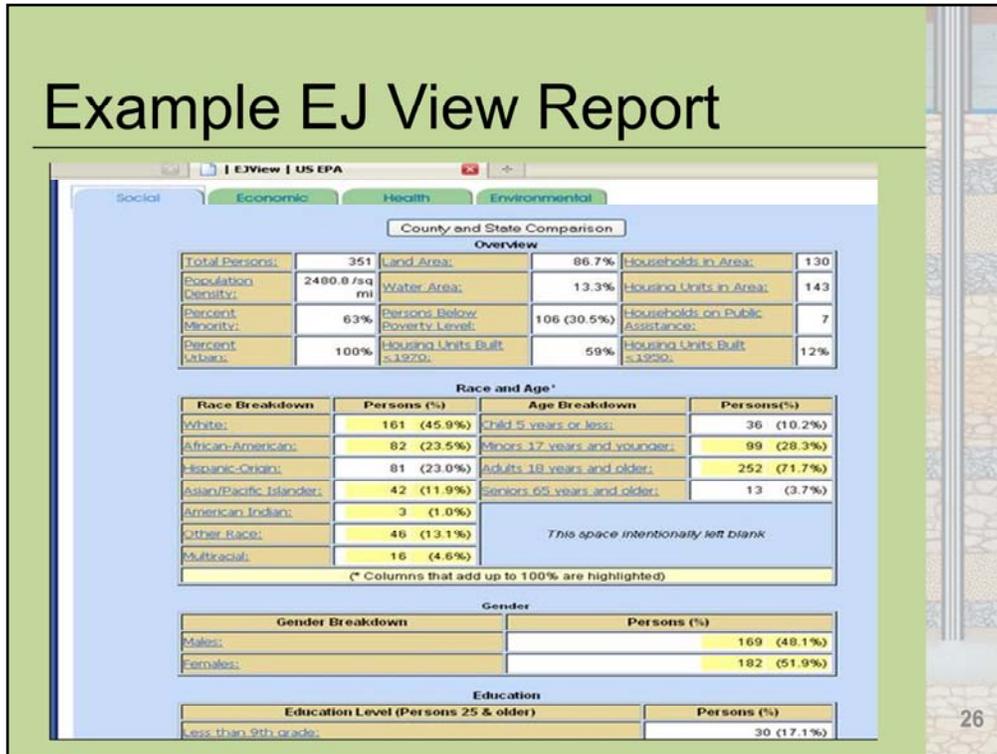


EPA has developed tools to assist permitting agencies with EJ analyses. One tool is EJView, released by EPA's Office of Environmental Justice (OEJ). EJView is an online interactive mapping tool that integrates numerous demographic, socioeconomic, and environmental data sets. The tool allows users to visually assess the spatial relationship between neighborhoods with EJ characteristics and facilities that may adversely affect those communities (e.g., other permitted facilities). In addition, the tool includes a querying function that generates a custom report of these data sets for a user-defined area of interest. Currently, the tool does not include more advanced spatial analysis functions or the products of other risk modeling initiatives.

The map in the figure shows a diverse community with a range of income levels and minority populations. The shaded squares in the image show the location of sites reporting to EPA, including Superfund sites, brownfields, facilities with air emissions, etc. Other areas in the background illustrate minority populations within U.S. Census Blocks; the darker shades represent areas with a higher percentage of minority populations. Finally, the dot density layer illustrates varying poverty levels within U.S. Census Block Groups; areas with increased density.

U.S. EPA. *EJView*. Most recently visited on October 27, 2010.  
<http://epamap14.epa.gov/ejmap/entry.html>

# Example EJ View Report



This figure shows an example report generated with EJView. The report shows information on minority composition, populations below the poverty level, potentially vulnerable subpopulations, and education level, among other data. The information contained in these reports can be used to depict the social, economic, and environmental characteristics of the area, and also compare these attributes to other locations to quantitatively describe the relative differences between EJ and non-EJ communities in the area. A UIC Program Director could use these types of data to determine, for example, whether a community has a greater minority or low-income population percentage than regional or national averages, and whether, on a national or regional scale, the community already has been exposed to a disproportionate number of pathways.

## Example EJ Communications Strategy



This flowchart represents a potential framework for EJ communications for a GS site. In general, a Director should work with the owner or operator to:

- Provide targeted outreach and information to EJ communities.
- Consider potential mitigation measures to improve community acceptance of the proposed site or reduce potential exposures.

This can be accomplished using a similar methodology to that outlined earlier for general public participation procedures – targeted analysis, language translation and appropriate materials may be the only differences.

## Environmental Justice Tools

- EJ View
  - <http://www.epa.gov/environmentaljustice/mapping.html>
  - <http://epamap14.epa.gov/ejmap/entry.html>
- EJ Action Development Process Guide
  - [www.epa.gov/environmentaljustice/resources/policy/ej-rulemaking.html](http://www.epa.gov/environmentaljustice/resources/policy/ej-rulemaking.html)

28

As discussed, the EPA Office of Environmental Justice (OEJ) recently released EJVIEW. EJVIEW mapping tool is a Geographic Information System (GIS) platform designed to supply the public, EPA, and partners with information about communities including demographics, environmental conditions, and health. Currently, the tool enables users to select and overlay social, environmental, economic, health, and other topographical data about a place to examine potential environmental burdens and other socioeconomic characteristics. The mapping tool is available at <http://www.epa.gov/environmentaljustice/mapping.html> and <http://epamap14.epa.gov/ejmap/entry.html>.

EPA published the *Interim Guidance on Considering Environmental Justice during the Development of an Action*, located on our website (posted July 2010). A review of the OEJ Interim Guidance may help Directors and permit writers identify EJ issues and challenges that could occur during implementation of a UIC Class VI program. The Interim Guidance is available at [www.epa.gov/environmentaljustice/resources/policy/ej-rulemaking.html](http://www.epa.gov/environmentaljustice/resources/policy/ej-rulemaking.html).

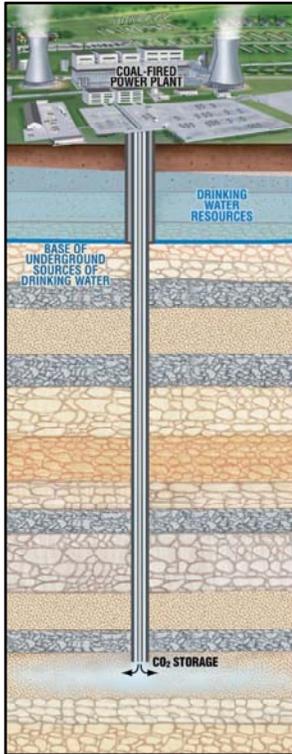
OEJ also plans to develop guidance on conducting technical EJ analyses in the future.

## Class VI Program Resources

- Draft UIC Class VI Primacy Application and Implementation Manual
  - Includes templates of required public notification letters to assist UIC Program Directors
- EPA is developing
  - Public Participation fact sheet
  - UIC Quick Reference Guides on public Participation, EJ, and Interstate Coordination papers for Director's Toolkit CD
  - Communication Strategy Template

29

Included in the appendices of the *Draft Primacy Application and Implementation Manual* are template public notification letters – one is specifically targeted at the requirement to notify state, tribal, and territorial agencies named by the owner or operator as agencies located within the AoR that are potentially impacted by the proposed project, and to discuss how the UIC Program Director plans to perform notifications of Class VI permit applications.



## Re-permitting Existing Injection Wells as Class VI Wells

## Re-Permitting Wells

### Purpose:

- Ensure that wells previously permitted for GS (i.e., as Class I or V; Class II) are re-permitted as Class VI wells to ensure that permits are tailored for the unique characteristics of GS and protect USDWs

31

**Class VI wells** means wells that are not experimental in nature and are used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at 40 CFR 146.95 of this chapter; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption.

## Examples of Unique Class VI Requirements

AoR delineation requires sophisticated modeling (no fixed radius)

More specific construction standards required

More frequent MITs required

Monitoring ground water quality required

Tracking fate of injectate and induced pressure front required

PISC phase required

Area permits prohibited

32

While not an exhaustive list, this table highlights Class VI well requirements that are tailored for GS and which are more stringent than the Class I, II, and V well requirements.

For Class VI wells:

- The AoR delineation requires sophisticated modeling (other wells classes may use a fixed radius AoR);
- Well construction standards are more specific;
- More frequent mechanical integrity testing is required;
- Monitoring of ground water quality and tracking the fate of the injectate and induced pressure front are required;
- PISC is required;
- And the use of area permits are not allowed (though area permits are permitted for other well classes). Remember to refer to the GS Rule and GS technical guidance.

## Re-Permitting Wells

- Class I and V wells injecting CO<sub>2</sub> for GS must apply for a Class VI permit within one year of GS Rule promulgation (by December 10, 2011)
- Class II ER wells may remain Class II as long as there are not increased risks to USDWs as a result of the Class II operation

40 CFR 146.81(c) and 144.19

33

The requirements at 40 CFR 146.81 require owners or operators of all non-experimental technology GS projects to apply for a Class VI permit by December 10, 2011.

Class II ER wells may remain Class II as long as the risk to USDWs from injection of carbon dioxide is not increased as compared to traditional Class II operations. See 40 CFR 144.19 for information about factors to consider when evaluating whether or not to repermit a Class II well to Class VI

Class V Experimental Technology wells may remain Class V if UIC Program Director determines in consultation with the owner or operator that the well will continue to be experimental and will not be sequestering carbon dioxide for long term storage

If a state receives primacy for Class VI wells only, the state and EPA will have to work together to complete the well re-permitting process.

Any Class I or Class V permit approved during the 270-day primacy application period should meet the requirements for Class VI wells to ensure that they can be re-permitted as Class VI wells after the primacy application period ends.

## Grandfathering Construction Requirements



- UIC Program Director has discretion to allow grandfathering
- Wells must be appropriately engineered/constructed
  - Materials compatible with CO<sub>2</sub>

40 CFR 146.81(c)

34

The rule additionally includes provisions for “grandfathering” of some construction requirements (i.e., permanent, cemented well components), if appropriate.

The UIC Program Director has the option to grandfather the construction of existing **Class I, II, or V wells** for GS if the owner or operator demonstrates that the wells were engineered and constructed: 1) to achieve the construction goals for casing and cementing of Class VI wells and pre-injection goals for logging, surveying, and testing prior to injection well operation; and, 2) to ensure protection of USDWs in lieu of Class VI construction requirements. If an owner or operator cannot make this demonstration, then grandfathering will not be allowed by the UIC Program Director.

For carbon dioxide injection wells re-permitted to a Class VI injection well, the same requirements apply for materials compatibility [discussed previously]. The UIC Program Director will need to review cement records to verify that the well is cemented to the surface. Materials incompatible with carbon dioxide will need to be replaced. If replacement is not possible, re-permitting as a Class VI well may not be appropriate. Grandfathering of the well to a Class VI well may be appropriate, at the discretion of the UIC Program Director, if, among other things, if it can be determined that USDWs will not be endangered.

## Re-Permitting from Class II

- UIC Program Directors *and* owners or operators of Class II wells must determine if CO<sub>2</sub> injection results in increased risk to USDWs as compared to traditional Class II operations
  - When the risk profile changes, the well classification and operating permit must also change

40 CFR 144.19

35

The UIC Program Director must determine, based on review of information provided by the owner or operator, when carbon dioxide injection results in an increased risk as compared to traditional Class II operations. The trigger is based on increased risk to USDWs: when the risk profile changes, the well classification and operating permit must also change.

Re-permitting aquifer exemptions: Due to the larger AoRs for Class VI wells, the UIC Program Director will need to evaluate whether an expansion of the areal extent of the existing aquifer exemption should be approved based on the factors at 40 CFR 144.19.

## Re-Permitting from Class II (cont'd.)

- Risk-based factors for the UIC Program Director to consider:
  - Injection zone (reservoir) pressure increase
  - Injection rate increase
  - Decrease in production rates
  - Distance between injection zone and USDWs
  - Suitability of Class II AoR delineation
  - Quality of abandoned well plugs within AoR
  - Source/properties of injected stream
  - Plan for CO<sub>2</sub> recovery at cessation of injection

40 CFR 144.19(b)

36

The final rule includes specific, risk-based factors at 40 CFR 144.19 to be considered by the Director (and owners or operators) in making the determination to apply Class VI requirements to transitioning wells and to require the owner or operator to apply for a Class VI permit. In order to make this determination, the UIC Program Director must consider the following factors:

- Increase in reservoir pressure within the injection zone.
- Increase in carbon dioxide injection rates.
- Decrease in reservoir production rates.
- Distance between the injection zone and USDWs.
- Suitability of the Class II AoR delineation.
- Quality of abandoned well plugs within the AoR.
- The source and properties of the injected carbon dioxide stream.
- The owner's or operator's plan for recovery of carbon dioxide at the cessation of injection.
- Any additional, site-specific criteria required by the UIC Program Director.

## Options for Class V Experimental Technology Wells

Owners/operators of existing Class V Experimental Technology wells will need to:

1. Discuss (with UIC Program Director) renewal of the existing Class V permit, if the well continues to operate solely for experimental research, **or**
2. Apply for a Class VI permit within 1 year of GS Rule promulgation, **or**
3. Cease injection and properly close the well in accordance with the Class V Experimental Technology permit conditions

37

In repermitting wells previously permitted as Class V experimental technology wells, the UIC Program Director will need to determine whether an existing Class V experimental technology well's operating activities continue to qualify as an experimental technology.

Options available for owners or operators of existing Class V experimental technology wells used for GS are:

1. Discussing renewal of the existing Class V experimental technology permit (before it is set to expire) with the UIC Program Director, if the well is intended to be used solely for experimental research.
2. Applying for a Class VI permit.
3. Ceasing injection and properly closing the Class V experimental technology injection well.

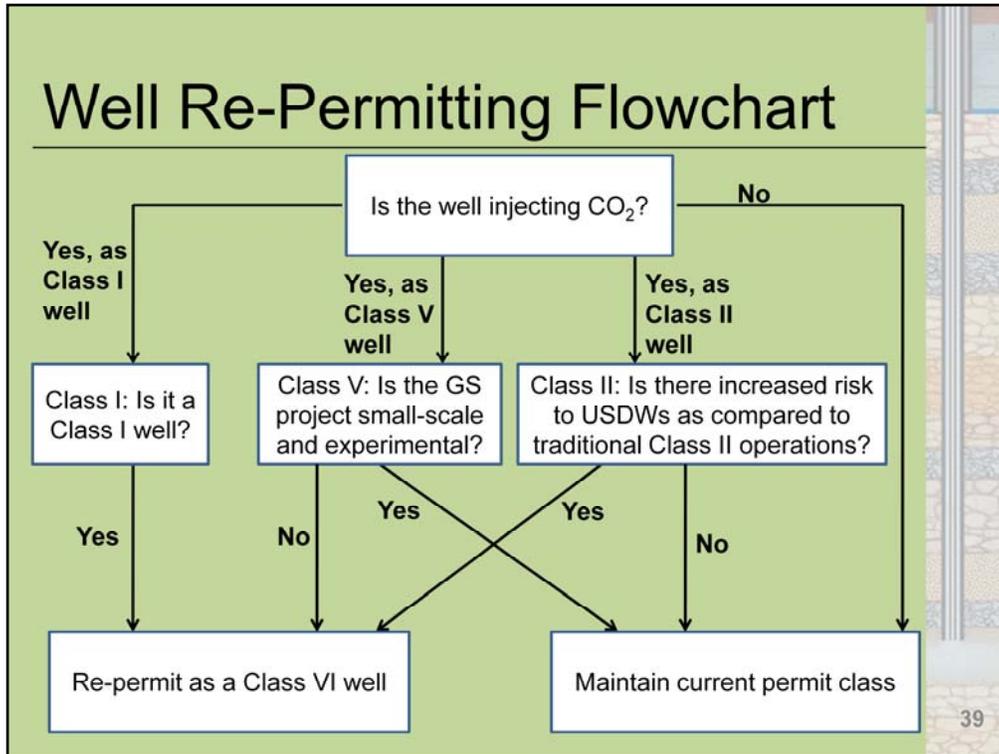
## Re-Permitting from Class V

- UIC Program Director determines whether a Class V Experimental Technology permit is applicable
- Only GS projects of an experimental nature will continue to be permitted as Class V
  - Primary purpose = test new, unproven technologies and collect data
  - Wells testing injectivity/appropriateness of an individual formation should **not** be permitted as Class V Experimental Technology wells

38

The UIC Program Director may only permit GS wells as Class V experimental technology wells if they meet certain qualifications. The UIC Program Director may consider whether conditions that were part of the previous permit are still appropriate or whether additional conditions for the new permit are necessary to address the proposed research to be conducted and/or to address new considerations for GS projects resulting from the GS Rule.

All GS wells used for the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations will need a Class VI permit. Only GS projects of an experimental nature (i.e., those projects whose primary purpose is to test new, unproven technologies and collect data) will continue to be permitted and regulated as Class V experimental technology wells. EPA does not consider it appropriate to permit carbon dioxide injection wells that are testing the injectivity or appropriateness of an individual formation (e.g., as a prelude to a commercial-scale operation) as Class V experimental technology wells. Such wells must be permitted as Class VI wells. The construction, operation, or maintenance of any non-experimental technology Class V GS well is prohibited.



In summary, this slide shows a flowchart that may facilitate decision making related to re-permitting -indicating whether existing Class I, II, or V injection wells will need to be re-permitted as Class VI injection wells.

## Some UIC Injection Well Re-Permitting Resources

- Revised UIC Program Guidance #83: Using the Class V Experimental Technology Well Classification for Pilot Geologic Sequestration Projects - 2010 Version
- Geologic Sequestration of Carbon Dioxide: Draft UIC Program Class VI Primacy Application and Implementation Manual
- Draft UIC Class II to Class VI Well Transition Guidance

40

EPA is developing additional guidance documents on the issue of re-permitting wells, as well as the previously mentioned quick reference guide. These guidance documents are:

- Revised UICPG #83.
- PAIM.
- The forthcoming Draft Class II to Class VI Well Transition Guidance.