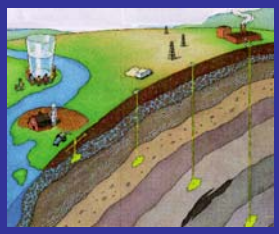
The Underground Injection Control (UIC) Program



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Purpose of Presentation

- UIC Program overview and SDWA/UIC Basics
- UIC Injection Well Permits
- Aquifer Exemptions

2

Part I: Overview and Basics

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Underground Injection Control Program

- US Environmental Protection Agency
  - Office of Water
    - Office of Ground Water and Drinking Water
      - »Drinking Water Protection Division
- Authorizing legislation
  - Safe Drinking Water Act
- Mission: to **protect underground sources of drinking water** (USDW) from contamination by regulating the construction and operation of injection wells.

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SDWA Provisions: UIC

- SDWA (1974) requires that EPA determine the need for, and promulgate, **minimum** requirements for State and Tribal regulations sufficient to protect underground sources of drinking water.
- Requires that injection activities must not endanger an underground source of drinking water.
- Establishes a process for delegating primary enforcement authority to States and Tribes.
- Authorizes EPA to directly implement the UIC program in States that do not receive primacy.
- Authorizes EPA to provide grants to the States (and Tribes) in support of essential program functions.

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Definition: USDW

- Underground source of drinking water:
  - An aquifer or portion of an aquifer that supplies any public water system *or* contains a quantity of ground water sufficient to supply a public water system, ***and***
  - Currently supplies drinking water for human consumption, ***or***
  - Contains fewer than 10,000 mg/L total dissolved solids *and* is not an exempted aquifer

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Non-Endangerment Standard

Endangerment occurs if the introduction of any contaminant results in a violation of any drinking water standard, or otherwise endanger human health.

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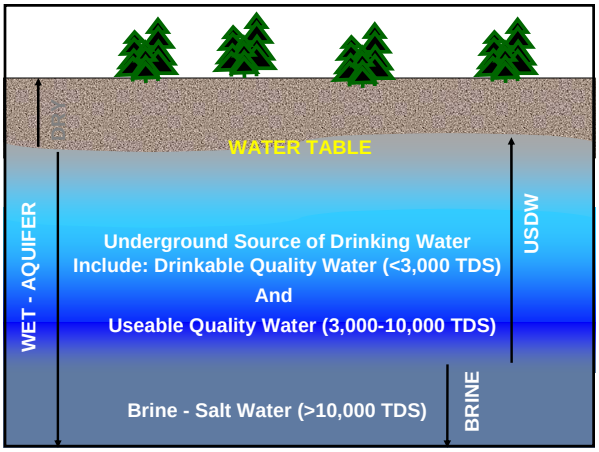

Federal UIC Regulations

- Part 144: UIC Program
- Part 145: State UIC Program Requirements
- Part 146: UIC Program: Criteria and Standards
- Part 147: State UIC Programs
- Part 148: Hazardous Waste Injection Restrictions

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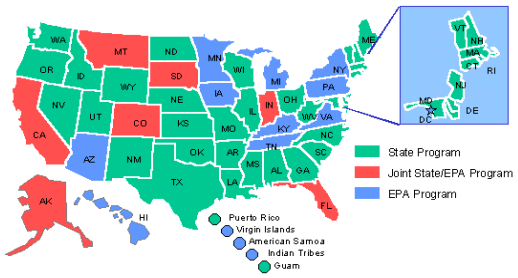
Classes of Injection Wells

UIC Program Delegation Status



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Why is the UIC Program Relevant at ISL Facilities?

- Underground injection wells have the potential to contaminate USDWs.
- UIC Program regulates injection at ISL facilities
- UIC Program requires an injection well permit at ISL facilities
- UIC Program has authority to require cleanup or closure to prevent ”endangerment” of USDWs

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Part 2: Permit Application

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EPA

United States Environmental Protection Agency
Underground Injection Control
Permit Application

(Collected under the authority of the Safe Drinking Water Act, Sections 1421, 1422, 40 CFR 144)

Read Attached Instructions Before Starting

For Official Use Only

Application approved | Date received | Permit Number | Well ID | FINDS Number

II. Owner Name and Address

III. Operator Name and Address

IV. Commercial Facility | V. Ownership | VI. Legal Contact | VII. SIC Codes

VIII. Well Status (Mark "x")

A. Operating | B. Modification/Conversion | C. Proposed

IX. Type of Permit Requested (Mark "x" and specify if required)

A. Individual | B. Area | Number of Existing Wells / Number of Proposed Wells | Name(s) of Field(s) or project(s)

X. Class and Type of Well (see reverse)

A. Class(es) | B. Type(s) | C. If class is "other" or type is code "x," explain | D. Number of wells per type (if area permit)

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude | Longitude | Township and Range | Section | Feet From | Line | Feet From | Line | XII. Indian Lands (Mark "x")

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)
For Classes I, II, III, and other classes) complete and submit on a separate sheet(s) Attachments A–U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

A. Name and Title (Type or Print) | B. Phone No. (Area Code and No.)

C. Signature | D. Date Signed

EPA Form 7520-6 (Rev. 8-91)

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Application Attachments

- Provide the details needed to determine if the site and well meet Federal criteria
  - Class III Wells -- Details are provided in attachments:
    - III new well A, B, C, D, F, H, I, J, K, M – S, U
    - Existing A, B, C, D, F, H, J, K, M – U
  - Class I Wells -- Details are provided in attachments as above plus
    - For new wells, Attachment L
    - For existing wells, Attachments I, L and T

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Permit Attachments

- APPLICANT SUBMITS:
  - **A. AREA OF REVIEW METHODS**
  - **B. MAPS OF WELL/AREA AND AREA OF REVIEW**
  - **C. CORRECTIVE ACTION PLAN AND WELL DATA**
  - **D. MAPS AND CROSS SECTION OF USDWs**
  - **F. MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA**
  - **H. OPERATING DATA**
  - **I. FORMATION TESTING PROGRAM**
  - **J. STIMULATION PROGRAM**

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Permit Attachments (cont'd)

- **K. INJECTION PROCEDURES**
- **L. CONSTRUCTION PROCEDURES**
- **M. CONSTRUCTION DETAILS**
- **N. CHANGES IN INJECTED FLUID**
- **O. PLANS FOR WELL FAILURES**
- **P. MONITORING PROGRAM**
- **Q. PLUGGING AND ABANDONMENT PLAN**
- **R. NECESSARY RESOURCES**
- **S. AQUIFER EXEMPTIONS**
- **T. EXISTING EPA PERMITS**
- **U. DESCRIPTION OF BUSINESS**

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Area of Review

- The Area of Review (AoR) of a well may be considered the "Area of Most Detailed Study," or the "Area of Greatest Concern" regarding a UIC permit.
- Area around the well where injection pressures in the injection zone may cause fluids to migrate upwards to a USDW.
- A primary concern of the UIC program is the potential for waste excursion from the ***injection zone*** due to the presence of conduits or other pathways.

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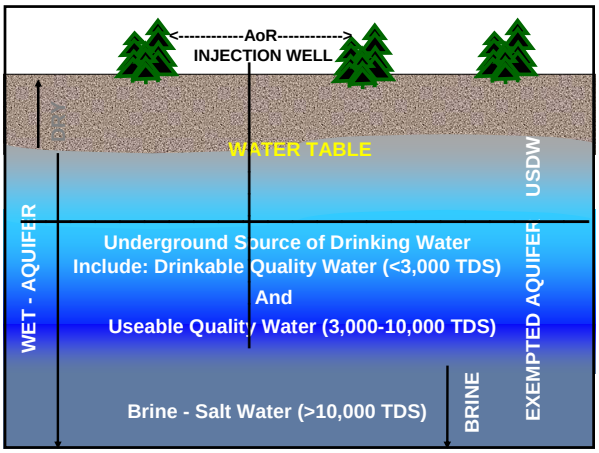

Area of Review Methods (Attachment A)

- Radius of the AoR
  - Determined by either:
    - Fixed radius not less than ¼ mile
      - unless a calculation is approved by Director
    - Zone of Endangering Influence

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Maps of Well, Area and Area of Review (Attachment B)

- Map of well, area and AoR depicting:
  - facility and potential conduits for upward migration of injection fluid
  - nearby land uses and operations that could be impacted by, or could impact, the injection well
  - public water systems and other pertinent information
  - wells (including drinking-water wells), springs, surface water bodies

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Attachments D and F

- ATTACHMENT D
  - Maps and cross sections indicating the vertical limits of all underground sources of drinking water within the area of review
  - USDW position relative to the injection formation and, if possible, the direction of water movement, in all USDWs which may be affected by the injection
- ATTACHMENT F
  - Maps and cross sections detailing the geologic structure of the local area
  - Generalized maps and cross sections illustrating the regional geologic setting

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Monitoring Requirement Attachment P

- Include maps showing the number and location of monitoring wells
- Monitoring includes but may not be limited to:
  - The nature of injected fluids Monitoring injection pressure and either flow rate or volume semimonthly, or metering and daily recording of injected and produced fluid volumes as appropriate;
  - Demonstration of mechanical integrity (Class I);
  - Fluid level in the injection zone
  - Monitoring of the water quality in the monitoring wells

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Plugging and Abandonment (Attachments Q and R)

- Attachment Q: Information on cement, plugs and method to place plugs
- Attachment R: Permit application required to include documentation of financial assurance

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Part 3: Aquifer Exemptions

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Aquifer Exemptions (Attachment S)

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What is an aquifer exemption?

- The aquifer-exemption process occurs where an aquifer that is considered an underground source of drinking water is “exempted” from SDWA protections forever, according to specific criteria in §§ 144.7 and 146.4.
- The exemption is a separate process from the permit process, but can be done simultaneously with, or after, the permit process.
- **If the USDW is used as a source of drinking water, it can not be exempted.**

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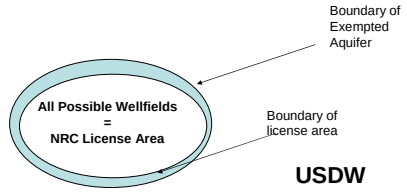
Birds Eye View of Hypothetical Wellfields, License Area and Exempted Aquifer

USDW



USDW

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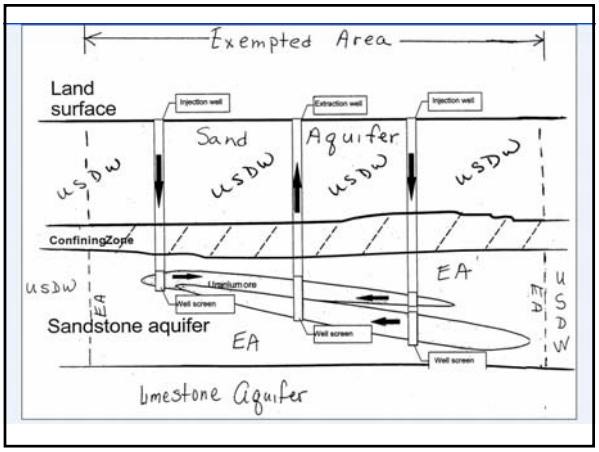

Why an Exemption?

- All USDWs are to be protected, except exempted aquifers
- Most mining could not take place without an exemption
- If injection is to occur into a formation that technically meets definition, but practically is not a potential drinking water source, then the exemption process is available

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Basis for Exemption

- Criteria for exemptions in 40 CFR 146.4
  - (a) Not currently serving as source of drinking water **and**
  - (b) Cannot now and will not in future serve as source of drinking water **or**
  - (c) TDS >3,000 mg/l and <10,000 mg/l, and not reasonably expected to supply public water system

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Determining If the Aquifer Cannot Now and Will Not in the Future Serve as a Drinking Water Source

- Consider:
  - Mineral or hydrocarbon resource?
  - Depth and location compared to technology and economics?
  - Contamination?
  - Subsidence or collapse likely from Class III UIC mining? [Note: Not relevant to ISL]

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Procedure for Exemptions

- Administrator and Regional Administrators have authority to approve exemptions
  - Exemptions are either “Substantial” -- need EPA Administrator’s approval or
  - “Non-substantial” – need Regional Administrator’s approval
- Exemptions subject to public input

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Public Participation in the Permitting Process

- EPA's policy is to inform, and maintain open communication channels with the public
- The permit application is advertised in a manner, such as a newspaper, that makes it widely known
- Anyone can comment during the permitting process
- Anyone can request a public hearing
- However, the ultimate decision is based on the applicable regulations

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Chronology: ESTIMATED Timeframe

- Aquifer Exemption for aquifer with >3000 ppm
  - Region approves/disapproved: 6 months - 1 year
- Aquifer Exemption for aquifer with <3000 ppm (or other criteria of concern)
  - EPA HQ approves/disapproves: 1 - 2 years
- Class I or Class III well permit : 1 -2 years

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Chronology: Process

- Similar for Aquifer Exemptions and Permits:
  - Application is submitted
  - EPA perform a completeness review
  - EPA notes deficiencies in application
  - Applicant addresses deficiencies
  - Notice of public hearing
  - Public hearing; comments received
  - EPA addresses comments, with input from applicant as needed
  - Permit approved with conditions (or disapproved)

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Part 4: Further Information

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Informational resources

- UIC web site (http://www.epa.gov/safewater/uic) has information on:
  - Regulations
  - Guidance (esp. aquifer exemptions in Guidance #34)
  - General program details
  - 7520-6 application form: http://www.epa.gov/r5water/uic/pubpdf/7520-6.pdf
- The UIC Permit course materials are available at http://www.epa.gov/safewater/dwa/electronic/ematerials.html#UIC

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EPA Regional Contacts

- Region 1: David Delaney (617-918-1614, delaney.david@epamail.epa.gov)
- Region 2: Luis Rodriguez (212-637-4274, Rodriguez.Luis@epamail.epa.gov)
- Region 3: Stephen Platt (215-814-5464, Platt.Steve@epamail.epa.gov)
- Region 4: Nancy Marsh (404-562-9450, March.Nancy@epamail.epa.gov)
- Region 5: Rebecca Harvey (312-886-6594, Harvey.Rebecca@epamail.epa.gov)

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- Region 8: Wendy Cheung (303-312-6242, Cheung.Wendy@epamail.epa.gov)
- Region 9: David Albright (415-972-3971, Albright.David@epamail.epa.gov)
- Region 10: Kirk Robinson (206-553-2104, Robinson.Kirk@epamail.epa.gov)

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